Missouri
DEPARTMENT OF ELEMENTARY & SECONDARY
EDUCATION™

End-of-Course Assessments
Technical Report
2014–2015

English II
Algebra I
Biology
English I
Algebra II
Geometry
Physical Science
American History
Government

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List of Abbreviations

Below is a list of abbreviations that appear in this technical report.

ALD .....Achievement Level Descriptor
ARC .....Assessment Resource Center
AYP .....Adequate Yearly Progress
CLE.....Course-Level Expectation
CR .....Constructed-Response
CSEM.....Conditional Standard Error of Measurement
CTT.....Classical Test Theory
DESE .....Department of Elementary and Secondary Education
DIF .....Differential Item Functioning
DOK.....Depth of Knowledge
EFT .....Embedded Field Test
ELL .....English Language Learner
EOC .....End-of-Course
ESEA .....Elementary and Secondary Education Act
FRL .....Free and Reduced Lunch
GLE.....Grade-Level Expectation
GRF.....General Research File
IAP .....Individualized Accommodation Program
IDEA.....Individuals with Disabilities Education Act
IEP .....Individualized Education Program
IRR.....Inter-Rater Reliability
IRT .....Item Response Theory
ISR .....Individual Student Report
ITS .....Internet Testing Systems
LEP .....Limited English Proficient
LOSS.....Lowest Obtainable Scale Score
MAP.....Missouri Assessment Program
MCDS .....Missouri Comprehensive Data System
MH .....Mantel-Haenszel procedure
MOSIS .....Missouri Student Information System
NCLB.....No Child Left Behind
PE.....Performance Event
RS.....Raw Score
SD .....Standard Deviation
SE.....Standard Error
SEM .....Standard Error of Measurement
SR.....Selected-Response
TAC .....Technical Advisory Committee
WP .....Writing Prompt

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Executive Summary

This document provides a technical summary of the 2014–2015 administrations of the Missouri End-of-Course (MO EOC) Assessments in English II, Algebra I, Biology, English I, Algebra II, Geometry, Government, American History, and Physical Science. The criterion-referenced MO EOC Assessments are designed to assess students' knowledge of the Missouri Learning Standards. The 2014–2015 school year marked the seventh operational administration of the English II, Algebra I, and Biology Assessments; the sixth operational administration of the English I, Algebra II, Geometry, Government, and American History Assessments; and the first operational administration of the Physical Science Assessment.

Prior to 2014–2015, all MO EOC Assessments were required. However, beginning in Fall 2014, five MO EOC Assessments are required (English II, Algebra I, Algebra II[1], Biology, and Government) and four MO EOC Assessments are optional (English I, Geometry, Physical Science, and American History).

Test forms for all MO EOC Assessments in Summer 2014 were intact forms previously administered in other testing administrations. Test forms in Fall 2014 and Spring 2015 for Biology, Government, and American History were also intact forms previously administered in other testing administrations. However, starting in Fall 2014, the following changes occurred for English I, English II, Algebra I, Algebra II, and Geometry:

- Revised test blueprints
- New test forms
- Alignment of existing items in English Language Arts and Mathematics to the Missouri Learning Standards
- New scoring rubrics for performance events (PEs) and change of PE scores
- Change of test length and total score points
- Addition of PEs to English I
- Updated achievement level descriptors (ALDs)

Because the Summer 2014 test forms were intact forms, the existing raw to scale score (RSS) conversion tables were used. Because new test forms were used for English II, Algebra I, English I, Algebra II, and Geometry beginning in Fall 2014, new RSS tables were created by post-equating.

Historical information from previous technical reports is included in this version to provide context in which technical procedures were developed and to assist with the understanding and interpretation of the 2014–2015 results. Previous technical reports can be found on the Missouri Department of Elementary and Secondary Education (DESE) website at http://dese.mo.gov/college-career-readiness/assessment/assessment-technical-support-materials.

[1] For students who complete the Algebra I EOC Assessment prior to high school, Algebra II is the required high school Mathematics assessment for accountability purposes. (http://dese.mo.gov/college-career-readiness/assessment/end-course)

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E.1. Background

In 1993, the Missouri legislature passed the Outstanding Schools Act (Senate Bill 380), requiring the Missouri State Board of Education to adopt challenging academic performance standards that define the skills and competencies necessary for students to successfully advance through the public school system, prepare for post-secondary education and the workplace, and participate as citizens in a democratic society. The Missouri State Board of Education formally adopted the academic standards known as the Show-Me Standards in January 1996.

In addition to mandating the development of rigorous academic standards, the Outstanding Schools Act of 1993 required the development and implementation of a comprehensive assessment program to measure student proficiency in the knowledge, skills, and competencies identified in the standards. Therefore, upon adoption of the standards in 1996, Missouri developed the Missouri Assessment Program (MAP) that included grade-level assessments for elementary, middle, and high school students in core academic content areas.

In January 2007, the Missouri State Board of Education approved a plan to replace the MAP for high school students with the MO EOC Assessments beginning with English II, Algebra I, and Biology in 2008–2009. English I, Algebra II, Geometry, Government, and American History were added the following year, and Physical Science was added in 2014–2015. The MO EOC Assessments have been administered each summer, fall, and spring since:

- the 2008–2009 school year for English II, Algebra I, and Biology (beginning with the Fall 2008 administration)
- the 2009–2010 school year for English I, Algebra II, Geometry, Government, and American History (beginning with the Fall 2009 administration)
- the 2014–2015 school year for Physical Science (beginning with the Fall 2014 administration)

E.2. Administration

Missouri's goal is for every student to be Proficient, as defined by the Missouri State Board of Education. Therefore, EOC testing is conducted as close as possible to the end of each course to allow school staff and students the greatest opportunity to achieve the goal of proficiency.

The scope of this technical report includes the Summer 2014, Fall 2014, and Spring 2015 administrations. Data analyses for the total assessed population, which includes students who have not yet reached the secondary level, are based on a combination of assessment results as well as demographic criteria required by Missouri's approved Elementary and Secondary Education Act (ESEA) Flexibility Waiver.

Individual student reports are distributed to school districts following each assessment administration window. Building-, district- and state-level reports are available following each spring administration. Scores are used during the accountability year in which the tests are administered. The accountability year begins with the summer administration preceding the academic year. Therefore, the score reports for the 2014–2015 assessment year contained information from the Summer 2014, Fall 2014, and Spring 2015 assessments.

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E.3. Student Performance

The MO EOC Assessment score matches a student's performance to a defined achievement level. ALDs associated with each level provide details about the content expectations that students at that level meet or exceed. Missouri uses four achievement levels for the MO EOC Assessments: Below Basic, Basic, Proficient, and Advanced.

Table E.1 displays the percentage of students at each achievement level for the Summer 2014, Fall 2014, and Spring 2015 MO EOC Assessments, respectively. Data for Physical Science is only included for Spring 2015 because the n-count for the Fall 2014 Physical Science administration was too small to report.

Table E.1. Percentage of Students at Each Performance Level for 2014–2015

		Summer 2014		Fall 2014		Spring 2015	
Content Area	**Achievement Level**	**Freq.**	**%**	**Freq.**	**%**	**Freq.**	**%**
English II	Below Basic	46	12.71	343	14.10	3,126	5.02
	Basic	161	44.48	733	30.14	12,769	20.49
	Proficient	131	36.19	1,082	44.49	34,970	56.13
	Advanced	24	6.63	274	11.27	11,439	18.36
	Total	362	100.00	2,434	100.00	62,304	100.00
Algebra I	Below Basic	134	15.24	1,209	23.57	11,373	18.13
	Basic	361	41.07	1,258	24.52	11,947	19.04
	Proficient	267	30.38	2,002	39.03	27,426	43.72
	Advanced	117	13.31	661	12.88	11,992	19.11
	Total	879	100.00	5,130	100.00	62,738	100.00
Biology	Below Basic	69	21.30	728	22.97	1,878	3.00
	Basic	154	47.53	1,052	33.20	13,217	21.12
	Proficient	92	28.40	938	29.60	31,465	50.28
	Advanced	9	2.78	451	14.23	16,015	25.59
	Total	324	100.00	3,169	100.00	62,575	100.00
English I	Below Basic	28	17.07	53	8.49	1,113	6.21
	Basic	57	34.76	145	23.24	4,774	26.65
	Proficient	57	34.76	320	51.28	10,075	56.24
	Advanced	22	13.41	106	16.99	1,952	10.90
	Total	164	100.00	624	100.00	17,914	100.00
Algebra II	Below Basic	33	42.86	136	17.73	3,022	14.47
	Basic	33	42.86	133	17.34	4,031	19.30
	Proficient	9	11.69	254	33.12	7,896	37.81
	Advanced	2	2.60	244	31.81	5,936	28.42
	Total	77	100.00	767	100.00	20,885	100.00
Geometry	Below Basic	31	28.97	104	13.65	2,147	19.07
	Basic	35	32.71	112	14.70	2,059	18.29
	Proficient	32	29.91	347	45.54	5,189	46.10
	Advanced	9	8.41	199	26.12	1,861	16.53
	Total	107	100.00	762	100.00	11,256	100.00

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Content Area	Achievement Level	Summer 2014		Fall 2014		Spring 2015	
		Freq.	%	Freq.	%	Freq.	%
Government	Below Basic	117	13.65	1,071	7.75	3,183	6.96
	Basic	232	27.07	4,695	33.98	12,884	28.19
	Proficient	315	36.76	5,591	40.47	20,965	45.87
	Advanced	193	22.52	2,459	17.80	8,669	18.97
	Total	857	100.00	13,816	100.00	45,701	100.00
American History	Below Basic	56	32.18	199	30.15	2,832	25.04
	Basic	59	33.91	141	21.36	2,847	25.17
	Proficient	43	24.71	191	28.94	3,406	30.12
	Advanced	16	9.20	129	19.55	2,224	19.67
	Total	174	100.00	660	100.00	11,309	100.00
Physical Science	Below Basic	--	--	--	--	344	5.54
	Basic	--	--	--	--	4,175	67.21
	Proficient	--	--	--	--	1,443	23.23
	Advanced	--	--	--	--	250	4.02
	Total	--	--	--	--	6,212	100.00

Beginning with the 2012–2013 administration, Missouri began operating under the requirements of its approved ESEA Flexibility Waiver, which includes new high school EOC requirements beginning with the graduating class of 2017. This waiver, approved by the U.S. Department of Education in June 2012, gives Missouri flexibility from No Child Left Behind (NCLB) requirements and allows the state to use its own accountability system. In order to establish three years of trend data prior to the 2012–2013 test administrations, building- and district-level student performance data for English II, Algebra I, and Biology was recalculated for the 2010–2011 and 2011–2012 administration years to include the banked scores of all students who took those assessments prior to entering high school. Scores are no longer banked and are instead considered for accountability purposes at the time the student is assessed and in the building that provided the instruction.[2]

It should be noted that the data for *all* tested students are used each year for purposes of item analysis and scaling and equating. For this reason, the numbers and/or percentages of tested students reported in the MO EOC technical reports for the 2008–2009 through the 2011–2012 administrations do not match the numbers of students reported by DESE for accountability purposes in those years.

E.4. Evidence Supporting the Validity of Inferences from the MO EOC Assessment Scores

The MO EOC Assessments are part of an integrated program of testing, accountability, and curricular and instructional support. This technical report provides extensive details about the development and operation of the MO EOC Assessments. While Chapter 11 of this report is devoted specifically to the documentation of validity evidence for the MO EOC Assessment scores, all information contained herein ultimately contributes to the argument for the validity of the scores for their intended purposes.

[2] Find more information regarding Missouri's ESEA Waiver at http://dese.mo.gov/quality-schools/esea-flexibility-waiver.

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E.5. Chapter Summaries

This section summarizes the information contained in each chapter of this report.

Chapter 1: Introduction

Chapter 1 provides background information about the MO EOC Assessments, as well as the MAP in general. It also provides information about the organizational support provided by each contractor and subcontractor for the MO EOC Assessment program. The chapter ends with a statement of purpose for this technical report.

Chapter 2: Test Development

Chapter 2 mostly consists of historical data from Riverside Publishing, the previous contractor, and contains descriptions of each step in the development process for the MO EOC Assessments, including test design, test blueprints, test specifications and target point distributions, item writing, content and bias review procedures, test form assembly, and statistical item review. The evidence provided in this chapter is important to the content-related validity of the MO EOC Assessment scores. Additionally, this chapter covers principles of universal design and outlines the quality control processes employed throughout the test development process.

In addition to previous test development activities, test development information for the Fall 2014 and Spring 2015 administrations is also included.

Chapter 3: Achievement-Level Setting

Chapter 3 summarizes the 2008 achievement-level setting (or standard setting) for English II, Algebra I, and Biology; the 2009 standard setting for English I, Algebra II, Geometry, Government, and American History; the 2015 standard setting for Physical Science; and the 2015 cutpoint validation for English I, English II, Algebra I, Algebra II, and Geometry.

This chapter details the standard setting process for the 2008 and 2009 standard setting events that resulted in the cut scores of the MO EOC achievement levels. While more comprehensive details of these standard setting workshops are included in the *2009–2010 MO EOC Phase I and Phase II Technical Reports*, the events are summarized here since the results are relevant to the current test administrations. This chapter also includes information from the 2015 standard setting and the 2015 cutpoint validation workshops, although full reports for these meetings are provided in Appendix C and Appendix D, respectively.

Chapter 4: Item Analysis

Chapter 4 contains summary information, including item difficulty and discrimination indices, at the item level for each content area. The chapter also contains information on omit rates for the Summer 2014, Fall 2014, and Spring 2015 operational items.

Chapter 5: Test Administration

Chapter 5 contains information about the administration of the MO EOC Assessments, beginning with a description of students for whom the assessments are appropriate. Details of the administration are then summarized. This summary includes a description of how the materials are distributed and how Test Examiners are trained, as well as information about the organization of the assessments, preparation of students to take the assessments, and directions for

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administration. The chapter also includes information about the accommodations allowed on the MO EOC Assessments and describes how materials are submitted for processing and scoring.

Chapter 6: Scoring

Chapter 6 covers the scoring processes for both the selected-response (SR) and performance events/writing prompts (PE/WPs) on the MO EOC Assessments. It contains information on how Questar scored the MO EOC SR items and the PE/WPs, including the scoring training and qualification processes, scoring procedures, and monitoring for quality assurance.

Chapter 7: Scaling and Equating

Chapter 7 begins with an introduction to the item response theory (IRT) model used for scaling and equating the MO EOC Assessments. Next, steps are given for the scaling and equating procedures established for the MO EOC Assessments, which include the 2008 and 2009 standalone field-test items, the Spring 2009 operational forms (for establishing the base scale), and the Spring 2009 field-test items. Finally, the raw score to scale score conversion tables are presented for the Summer 2014, Fall 2014, and Spring 2015 operational forms.

Chapter 8: Reporting

Chapter 8 contains information about the reports Questar produced for the MO EOC Assessments, including the Individual Student Report (ISR) and Student Score Label. A brief description of the state's data portal and reporting system is also included.

Chapter 9: Summary Statistics

Chapter 9 provides descriptive statistics for raw scores and scale scores for the MO EOC Assessments. Raw score statistics are summarized by test administration, content area, and cluster. Scale score statistics are summarized for each content area and are also broken down by gender and ethnicity, as well as migrant, free and reduced lunch (FRL), limited English proficient (LEP), Title I, Individualized Education Program (IEP), and accommodation statuses.

Chapter 10: Reliability

Chapter 10 begins by defining reliability and providing an overview of reliability estimation techniques. Raw-score internal consistency reliability coefficients are presented for all students and for each demographic group. Conditional standard errors of measurement (CSEMs) are presented at each scale score cut point. Finally, this chapter provides inter-rater reliability information for the Summer 2014, Fall 2014, and Spring 2015 administrations.

Chapter 11: Validity

Chapter 11 begins with an introduction to the validity evidence for the MO EOC Assessments, followed by more specific evidence related to test content, the internal structure of the assessments, and other types of validity evidence proposed by the *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 1999).[3] The chapter summarizes and reiterates validity evidence presented in earlier chapters in addition to providing new information. It

[3] Even though the 2014 *Standards for Educational and Psychological Testing* were released in 2014, the 1999 edition of the Standards is referenced in this technical report since the MO EOC Assessments were developed based on these standards.

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provides an argument supporting the validity of the MO EOC Assessments for measuring Missouri students' mastery of the Missouri Learning Standards, for identifying students' strengths and weaknesses, for serving as a basis for evaluating accountability plans, and for program evaluation.

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Chapter 1: Introduction

This technical report provides detailed information and statistical results for the Summer 2014, Fall 2014, and Spring 2015 administrations of the Missouri End-of-Course (MO EOC) Assessments in English II, Algebra I, Biology, English I, Algebra II, Geometry, Government, American History, and Physical Science. These criterion-referenced assessments are designed to assess students' knowledge of the Missouri Learning Standards.

The 2014–2015 administration of the MO EOC Assessments marked the seventh operational year for English II, Algebra I, and Biology; the sixth operational year for English I, Algebra II, Geometry, Government, and American History; and the first operational year for Physical Science. Previously used operational test forms were re-administered for Biology, Government, and American for the 2014–2015 year, and no new item or test development was conducted for those content areas. New test forms were developed for English II, Algebra I, English I, Algebra II, and Geometry beginning in Fall 2014 with existing items that were aligned to the new Missouri Learning Standards. Physical Science was administered for the first time in Fall 2014. However, data for Physical Science is only included for Spring 2015 in this technical report because the n-count for the Fall 2014 Physical Science administration was too small to report.

Prior to 2014–2015, all MO EOC Assessments were required. However, beginning in Fall 2014, five MO EOC Assessments are required (English II, Algebra I, Algebra II[4], Biology, and Government) and four MO EOC Assessments are optional (English I, Geometry, Physical Science, and American History).

For the Summer 2014 administration, the English II, Algebra I, and Biology Assessments contained both selected-response (SR) items and performance events/writing prompts (PE/WPs). The English I, Algebra II, Geometry, Government, and American History Assessments contained only SR items. The Fall 2014 and Spring 2015 administrations were similar except that beginning in Fall 2014, the English I Assessment contained both SR items and a PE. The Physical Science Assessment, administered for the first time in Fall 2014, contained only SR items.

Past administrations have had two separate technical reports:

- One for the assessments first administered during the 2008–2009 school year, which were designated as Phase I Assessments
- One for the assessments first administered during the 2009–2010 school year, which were designated as Phase II Assessments

However, starting in 2012–2013 and continuing for subsequent administrations, there is only one technical report that contains information for all eight MO EOC Assessments. This chapter starts with the history of the MO EOC Assessments, followed by a description of the current assessments and the purpose of the technical report.

[4] For students who complete the Algebra I EOC Assessment prior to high school, Algebra II is the required high school Mathematics assessment for accountability purposes. (http://dese.mo.gov/college-career-readiness/assessment/end-course)

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1.1. History of the MO EOC Assessments

In 1993, the Missouri legislature passed the Outstanding Schools Act (Senate Bill 380) requiring the Missouri State Board of Education to adopt challenging academic performance standards defining the skills and competencies necessary for students to successfully advance through the public school system, prepare for post-secondary education and the workplace, and participate as citizens in a democratic society. The Missouri State Board of Education formally adopted the academic standards known as the Show-Me Standards in January 1996.

These 73 standards are organized around four broad goals that address application, communication, problem-solving, and responsible decision-making. Thirty-three process standards emphasize the importance of engaging students of all ages in hands-on, active learning and integrating practical, challenging learning across all content areas. An additional 40 content standards define the academic skills and knowledge that provide the foundation for student learning in six content areas: Communication Arts, Mathematics, Science, Social Studies, Fine Arts, and Health/Physical Education. Content standards serve as the vehicle through which students demonstrate proficiency in the broader process standards. The Show-Me Standards are available for review on the Missouri Department of Elementary and Secondary Education (DESE) website at http://dese.mo.gov/show-me-standards.

In 2001, DESE developed Grade-Level Expectations (GLEs) to assist districts in articulating the Show-Me Standards across grade levels and content areas. GLEs were developed for Mathematics, Communication Arts, Science, Social Studies, Physical Education, Health, Music, Visual Arts, and Theater. In 2008, the high school GLEs were clustered into Course-Level Expectations (CLEs) to define content within typical high school courses of study in English, Mathematics, Social Studies, and Science. The Missouri Learning Standards define the knowledge and skills students need in each grade level and course for success in college, other post-secondary training and careers. These grade-level and course-level expectations are aligned to the Show-Me Standards. Archived GLEs and CLEs are available on the DESE website at http://dese.mo.gov/college-career-readiness/curriculum/missouri-learning-standards.[5]

In addition to mandating the development of rigorous academic standards, the Outstanding Schools Act of 1993 also required the development and implementation of a comprehensive assessment program to measure student proficiency in the knowledge, skills, and competencies identified within the standards. Upon adoption of the standards in 1996, Missouri began developing the Missouri Assessment Program (MAP) in collaboration with contractor CTB/McGraw-Hill.

The Missouri State Board of Education adopted the purposes listed below to serve as guiding principles for developing the MAP:

- Improving students' acquisition of important knowledge, skills, and competencies
- Monitoring the performance of Missouri's educational system
- Empowering students and their families to improve their educational prospects
- Supporting the teaching and learning process

[5] This link is to the Missouri Learning Standards. For Biology, Government, and American History, these standards are the same as the CLEs. For English I, English II, Algebra I, Algebra II, and Geometry, the CLEs can be found under "Archived GLEs/CLEs."

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The first MAP assessments administered to students statewide were grade-span Mathematics assessments in grades 4, 8, and 10 in Spring 1998. A voluntary grade-span Communication Arts assessment for students in grades 3, 7, and 11 was also administered in Spring 1998 and became mandatory in Spring 1999. Required Science and Social Studies grade-span assessments (grades 3, 7, and 10, and grades 4, 8, and 11, respectively) were added to the program in subsequent years. A voluntary Health/Physical Education assessment was available in 2000 and was required until Spring 2002, and a Fine Arts assessment was field tested in 2001. Due to budget constraints, development of the Fine Arts assessment was suspended and the Health/Physical Education assessment was discontinued. Science and Social Studies grade-span assessments returned to voluntary status in Spring 2003. Social Studies assessments were discontinued in Spring 2008 and required assessments in Science were implemented in grades 5, 8, and 11 to comply with No Child Left Behind (NCLB) requirements.

Through the Spring 2005 administration, the MAP statewide assessment program included grade-span assessments in the following grade levels and content areas:

- Mathematics at grades 4, 8, and 10
- Communication Arts at grades 3, 7, and 11
- Science at grades 3, 7, and 10 (required Spring 1998 through Spring 2002; returned to voluntary status in Spring 2003)
- Social Studies at grades 4, 8, and 11 (required Spring 1999 through Spring 2002; returned to voluntary status in Spring 2003)

All MAP assessments included three types of items: selected-response (SR), constructed-response (CR), and performance events (PEs). For all content areas, MAP assessments included SR items from the TerraNova® Survey Edition. CR items and PEs were custom-developed with significant input from Missouri educators.

During the initial MAP development and implementation period, DESE developed two to four equivalent forms for each content area and grade-level assessment, using the first form for a voluntary testing cycle and administering the next form(s) in subsequent years. Early in the development phase, DESE tried out new items using separate field tests that usually occurred in the fall of the school year. As the program continued, each test form contained embedded field-test items. Small-scale pilots continued as well.

As each content area and grade-level assessment was administered, DESE used the Bookmark method to set achievement levels, defining student performance through Spring 2005 as Advanced, Proficient, Nearing Proficiency, Progressing, or Step 1.

After nearly a decade of MAP administration, new federal and state legislation prompted change in the program. To comply with NCLB requirements, Missouri's assessment program needed to incorporate Mathematics and Communication Arts assessments at all elementary and middle school grade levels (grades 3–8) and at one high school grade level. As a result, new grade-level assessments were developed for both content areas. These assessments were administered for the first time in Spring 2006.

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Additional NCLB requirements necessitated the addition of a mandatory Science assessment once in the elementary grade range, once in the middle school grade range, and once in the high school grade range beginning in Spring 2008. The voluntary Science assessment in grades 3, 7, and 10 became a requirement and was moved to grades 5, 8, and 11. The voluntary Social Studies MAP assessment was eliminated following the Spring 2007 administration.

Missouri's assessment system changed further in 2008–2009 when high school content area MAP assessments were replaced by the MO EOC Assessments. In 2008–2009, the MO EOC Assessments included English II, Algebra I, and Biology. In 2009–2010, the EOC Assessments in English I, Algebra II, Geometry, Government, American History, Integrated Mathematics II, and Integrated Mathematics III were added to the program. However, following the 2009–2010 administration year, the Integrated Mathematics II and Integrated Mathematics III Assessments were discontinued due to extremely low enrollment. The Physical Science Assessment was administered for the first time in Fall 2014.

1.2. Description of Missouri's Current Assessment System

The current MAP system includes the following assessment components for elementary and middle school:

- Grades 3–8 Communication Arts
- Grades 3–8 Mathematics
- Grades 5 and 8 Science

The MO EOC Assessments administered in 2014–2015 included the following:

- English II
- Algebra I
- Biology
- English I
- Algebra II
- Geometry
- Government
- American History
- Physical Science

The statewide assessment program also currently includes the Missouri Assessment Program–Alternate (MAP-A) for students with severe cognitive disabilities, WIDA ACCESS for English language learners (ELLs), and a Personal Finance assessment for high school students who do not enroll in a personal finance course or who are receiving personal finance credit for embedded coursework.

1.3. Summary of the MO EOC Assessments

The MO EOC Assessments were developed and first administered during the 2008–2009 school year for English II, Algebra I, and Biology. Other MO EOC Assessments were developed and first administered in the 2009–2010 school year for English I, Algebra II, Geometry,

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Government, and American History. The Physical Science Assessment was first administered in the 2014–2015 school year.

The MO EOC Assessments assess the Missouri Learning Standards and were created to meet the needs of Missouri districts, schools, teachers, and students while also meeting state and federal requirements. The Missouri State Board of Education identified the following purposes for the MO EOC Assessments:

- Measuring and reflecting students' mastery toward post-secondary readiness
- Identifying students' strengths and weaknesses
- Communicating expectations for all students
- Serving as the basis for state and national accountability plans
- Evaluating programs

The Missouri Learning Standards define the knowledge and skills students need in each grade level and course for success in college, other post-secondary training and careers. They include grade-level and course-level expectations for the MO EOC Assessments. Each MO EOC Assessment is tailored to each EOC content area and is designed to be administered when a student has completed the content defined for that course. Districts can offer EOC course content in any grade and in a variety of configurations. Although many districts offer EOC course content within a course bearing the same name, EOC course content can also be embedded within a course or across several courses. MO EOC Assessments are administered according to a "right test, right time" philosophy when students have completed the appropriate content.

An SR item (also known as a multiple-choice item) presents students with a question followed by four response options. PEs are open-ended items that require students to perform more complicated tasks. A PE measures depth of understanding and interpretative and analytical abilities in a format that allows for more than one approach to arrive at a correct response. The advantage of this item type is that it provides insight into a student's ability to apply knowledge and understanding in real-life situations. The WP, a special type of PE that appears in the English II Assessment, is an open-ended item that requires students to demonstrate their writing proficiency. Beginning in Summer 2010, PE/WPs were suspended from the English II, Algebra I, and Biology Assessments due to budget constraints but were added back in beginning with the Fall 2012 administration.

For the Summer 2014 administration, the English II, Algebra I, and Biology Assessments contained both SR items and PE/WPs. The English I, Algebra II, Geometry, Government, and American History Assessments contained only SR items. The Fall 2014 and Spring 2015 administrations were similar except that beginning in Fall 2014, the English I Assessment contained both SR items and a PE. The Physical Science Assessment, administered for the first time in Fall 2014, contained only SR items. These tests are designed to be administered in approximately one testing period and are not strictly timed.

The 2014–2015 MO EOC Assessments were offered primarily in an online administration mode with Paper/Pencil, Braille, or Large Print forms available for students requiring accommodations.

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1.4. Testing, Reporting, and Accountability

Evidence of students' progress in meeting the Missouri Learning Standards is obtained from the MO EOC Assessments. These assessments provide the data that DESE uses to inform students, parents, the public, and the state legislature about student performance to help make informed decisions about educational issues and to drive student services throughout the state.

The MO EOC Assessment reports provide useful information for determining the performance of students in a particular school and classroom. These reports help identify students who are below Proficient in a particular test area so that the school may determine a course of action that will meet the students' specific needs. Districts may also use locally designed assessments aligned to the Missouri Learning Standards to provide more detailed information for each student in specific test areas.

Testing for the MO EOC Assessments is conducted during three state-designated windows each year for summer, fall, and spring. Table 1.1 displays the 2014–2015 MO EOC testing windows.

Table 1.1. 2014–2015 MO EOC Testing Windows

Summer 2014	June 9, 2014 – August 29, 2014
Fall 2014	October 6, 2014 – January 23, 2015
Spring 2015	February 23, 2015 – May 22, 2015

Individual Student Reports (ISRs) and student raw scores are available to the district five business days after the close of their district content window. Timely availability of score reports allows teachers the option to consider MO EOC Assessment results in assigning course grades. ISRs are only available in an online format unless an order is placed by the district for paper reports. Multiple testing windows allow school districts the flexibility to schedule MO EOC testing as close as possible to the end of each course to provide students the greatest opportunity to demonstrate proficiency in the course content.

In the 2008–2009 and 2009–2010 administration years, districts were required to administer the English II, Algebra I, and Biology Assessments to all students prior to graduation, unless students completed coursework prior to the operational administration of the assessments. In 2010–2011, Government was added to the list of required EOC Assessments. In 2012–2013 and 2013–2014, districts were required to administer the English II, Algebra I, Biology, English I, Government, and American History Assessments to all students prior to graduation. Beginning in Fall 2014, five MO EOC Assessments are required (English II, Algebra I, Algebra II[6], Biology, and Government) and four MO EOC Assessments are optional (English I, Geometry, Physical Science, and American History).

Data for this technical report came from the Summer 2014, Fall 2014, and Spring 2015 operational administrations. Data analyses for the total assessed population, which includes

[6] For students who complete the Algebra I EOC Assessment prior to high school, Algebra II is the required high school Mathematics assessment for accountability purposes. (http://dese.mo.gov/college-career-readiness/assessment/end-course)

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students who have not yet reached the secondary level, are based on a combination of assessment results and DESE-provided demographic criteria required under Missouri's approved ESEA Flexibility Waiver.

Through the 2011–2012 administration year, Missouri reported English II, Algebra I, and Biology EOC scores in accordance with NCLB, which requires states to assess all students at least once in high school in Mathematics, English/Communication Arts, and Science. All students who took the MO EOC Assessments in English II, Algebra I, and/or Biology prior to entering high school were excluded from Missouri's high school accountability data until they enrolled in high school. Their scores were "banked" until they actually reached high school, at which time they were rolled into the high school accountability data for that year. However, beginning with the 2012–2013 administration with the approved ESEA Flexibility Waiver, scores are no longer banked and are instead considered for accountability purposes at the time the student is assessed and in the building that provided the instruction.

1.5. MO EOC Organizational Support

DESE coordinates the development and implementation of the MO EOC Assessments. In addition to planning, scheduling, and directing all EOC activities, the staff is extensively involved in numerous test reviews, security, and quality assurance procedures. At the outset of the 2008 contract award, Riverside Publishing was the primary contractor working in partnership with Questar Assessment, Inc. (Questar), the Assessment Resource Center (ARC), Internet Testing Systems (ITS), Bookette, and others. Beginning with the Summer 2011 administration, DESE contracted operational activities with Questar. Table 1.2 outlines the main activities for each group involved with the 2014–2015 MO EOC administrations.

Table 1.2. Main Activities for Groups Involved in MO EOC Organizational Support

Group	Responsibilities
Questar Assessment, Inc. (Questar)	• Provide program management, including primary contact with DESE; coordinate all meetings; handle all administrative costs/activities; generate all program management reports and status reports • Create and update the Test Administration Manual, Software Installation Guides, and other ancillary materials • Conduct psychometric analyses, reporting, linking/equating studies, and associated tasks • Provide all needed prepress work for program materials through camera-ready art • Produce all materials, including online, Paper/Pencil, Braille, and Large Print versions of the test, as well as online testing tools and content area-specific tutorials • Account for secure test books received after testing • Provide a direct customer service line, including technical support and general support to the program and customer interactions • Store materials after testing • Participate in and present at Technical Advisory Committee (TAC) meetings • Score all SR items and the PE/WPs • Produce and distribute all score reports and the Guide for Interpreting Results • Complete the technical report for DESE • Provide online enrollment and pre-ID system for use by Missouri districts

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Group	Responsibilities
	• Provide online testing interface and online test administration site • Package and distribute materials • Barcode test books with security IDs
Districts	• Distribute materials to the school buildings, track all secure materials, and promptly return all materials, including transcribed test forms, for scoring • Assist in the timely resolution of scoring alerts • Act as a liaison between Questar and buildings
School Buildings	• Administer tests, track all secure materials, and promptly return materials to districts for scoring
American Printing House for the Blind (APH)	• Print both Braille and Large Print versions

1.6. Purpose of the Technical Report

The purpose of this technical report is to provide information about the technical characteristics of the 2014–2015 operational administration of the MO EOC Assessments. Because this report is technical in nature and the intended audience is psychometric and educational research experts, it is best understood with a working knowledge of measurement concepts such as reliability and validity and statistical concepts such as correlation. For some chapters, the reader is presumed to have basic familiarity with advanced topics in measurement and statistics such as item response theory (IRT).

This technical report provides extensive detail about the operation of the MO EOC Assessments, as well as the history of their development. The empirical reliability of the assessments and validity of intended uses of the scores are reported explicitly in this document. Chapter 10 contains a discussion of reliability, and Chapter 11 summarizes the validity argument. The validity of score use and interpretation for any assessment stems from:

- the statement of the test's purpose and the intended use of the scores
- the steps taken in designing the test
- the processes of developing the content of the test, consulting with stakeholders, communicating about the test to users, scoring and reporting, and conducting data analysis

The careful documentation of each of these steps is a necessary piece of a comprehensive, defensible validity argument for the intended uses of the assessment scores. While a specific chapter is devoted to validity, other parts of this document provide evidence necessary to assess the validity of the MO EOC Assessment scores for their intended purposes.

In reading this technical report, it is critical to remember that the testing program does not exist in a vacuum; it is not just a test. It is one part of a complex network intended to help schools to improve student learning. The MO EOC Assessments are an integrated program of testing and accountability, as well as curricular and instructional support. The assessments can be evaluated properly only within their full context.

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Chapter 2: Test Development

2.1. Introduction

The English II, Algebra I, and Biology Assessments were first administered operationally during the 2008–2009 school year. The English I, Algebra II, Geometry, Government, American History, Integrated Mathematics II, and Integrated Mathematics III Assessments were first administered operationally during the 2009–2010 school year. (Integrated Mathematics II and Integrated Mathematics III were discontinued after the first administration year due to extremely low enrollment.) The Physical Science Assessment was first administered operationally during the 2014–2015 school year.

Documentation of test development from previous technical reports has been carried over and constitutes the majority of this chapter's content. However, beginning in Fall 2014, new test forms were developed for English I, English II, Algebra I, Algebra II, and Geometry for the following reasons:

- Revised test blueprints
- New test forms
- Alignment of existing items in English Language Arts and Mathematics to the Missouri Learning Standards
- New scoring rubrics for PEs and change of PE scores
- Change of test length and total score points
- Addition of PEs to English I
- Updated ALDs

This chapter provides an overview of the development of the MO EOC Assessments, including the test specifications, item development, item review, and test form development. According to the *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 1999)[7] (hereafter referred to as the Standards), "Important validity evidence can be obtained from an analysis of the relationship between a test's content and the construct it is intended to measure" (p. 11). Accordingly, the descriptions of the test development procedures included in this chapter provide validity evidence of the MO EOC Assessments.

2.2. Design of the MO EOC Assessments

For English II, Figure 2.1 details the design of:

- the Spring 2008 standalone field test
- the Fall 2008 operational administration
- the Spring 2009 operational administration with the embedded field test
- the Spring 2009 standalone WP field test

[7] Even though the 2014 *Standards for Educational and Psychological Testing* were released in 2014, the 1999 edition of the Standards is referenced in this technical report since the MO EOC Assessments were developed based on these standards.

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For Algebra I and Biology, Figure 2.2 details the design of:

- the Spring 2008 standalone field test
- the Fall 2008 operational administration
- the Spring 2009 operational administration with the embedded field test

Figure 2.1. 2008–2009 Field-Test and Operational Assessment Design, English II

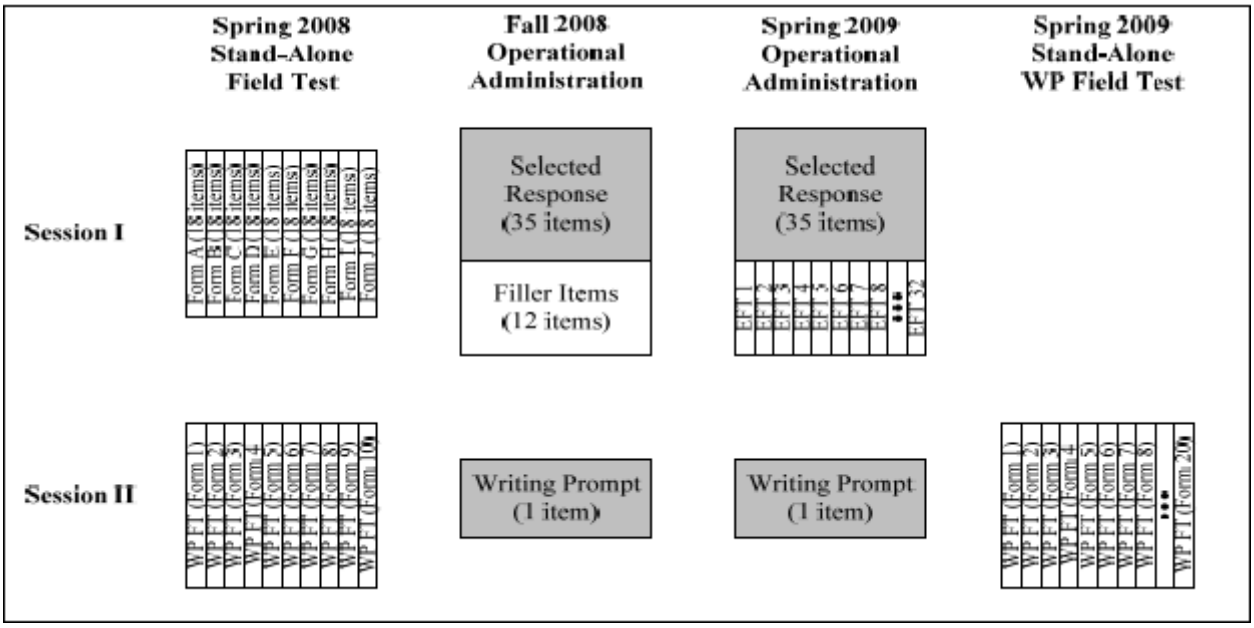

Figure 2.2. 2008–2009 Field-Test and Operational Assessment Design, Algebra I and Biology

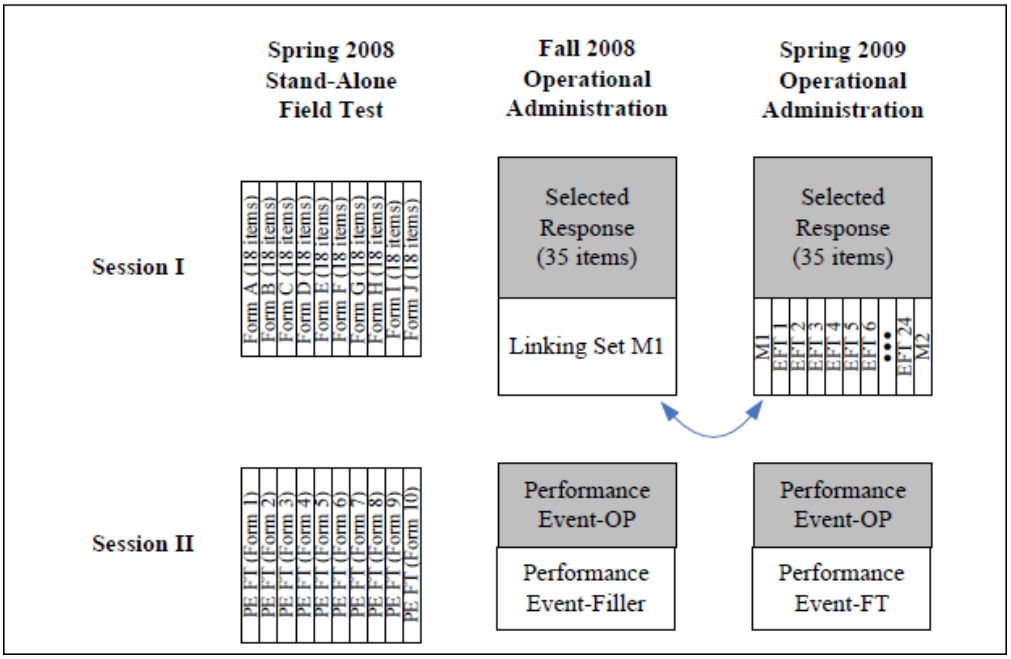

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Figure 2.3 details the design of the linking forms for the 2009–2010 administration year. The Fall 2009 operational administration was linked to both the Spring 2009 and Spring 2010 operational administrations. Additionally, the Spring 2010 administration was linked to the Summer 2010 administration. Besides being linked to the Spring 2010 administration, the Summer 2010 administration was also linked to the Spring 2009 administration.

Figure 2.3. Linking Design for Post Equating the MO EOC Assessments

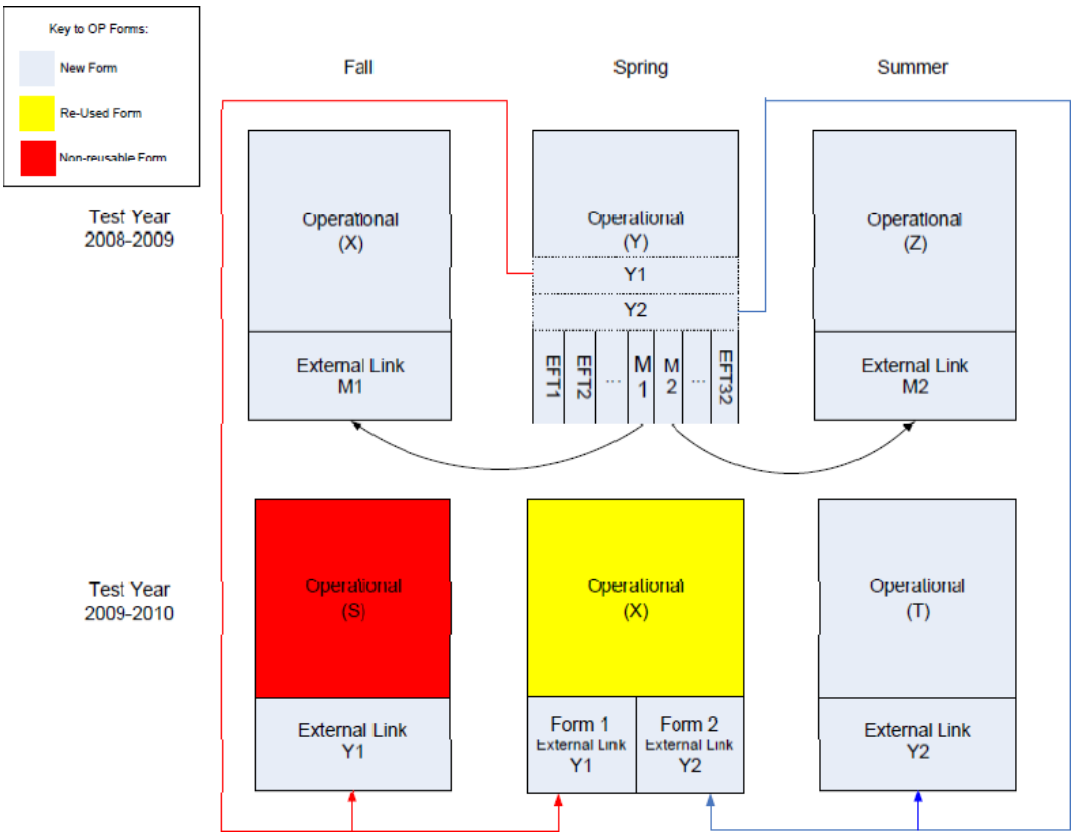

Table 2.1 lists the linking design for multiple operational administration years of the English II, Algebra I, and Biology Assessments.

Table 2.1. Linking Design for the English II, Algebra I, and Biology Assessments

Test Period	Assessment Form*	Linking Set(s)
Fall 2008	A	M1
Spring 2009	B	M1, M2, Y1, Y2
Summer 2009	C	M2
Fall 2009	D	Y1
Spring 2010	A	Y1, Y2
Summer 2010	E	Y2
Fall 2010	B	M1, M2
Spring 2011	F	M1, M2

*The correspondence between the forms presented in Figure 2.3 and Table 2.1 is X=A, Y=B, Z=C, S=D, and T=E.

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For English I, Figure 2.4 details the design of:

- the Spring 2009 standalone field test
- the Fall 2009 operational administration
- the Spring 2010 operational administration with the embedded field test

For Algebra II, Geometry, Government, and American History, Figure 2.5 details the design of:

- the Spring 2009 standalone field test
- the Fall 2009 operational administration
- the Spring 2010 operational administration with the embedded field tests

Figure 2.4. Field Test and Operational Assessment Design, English I

Figure 2.5. Field Test and Operational Assessment Design, Algebra II, Geometry, Government, and American History

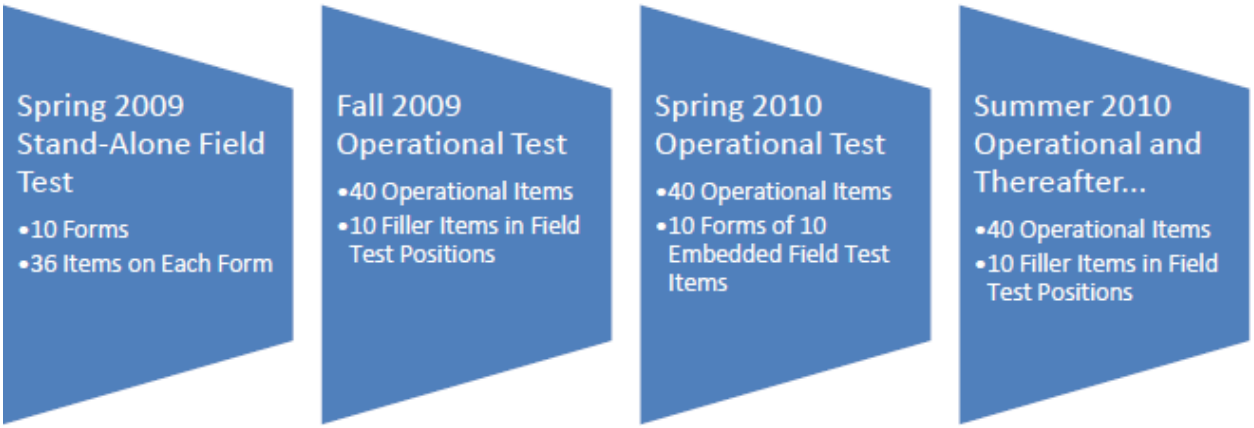

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Figure 2.6 details the design of the Spring 2009, Fall 2009, and Spring 2010 Integrated Mathematics II and III Assessments. It should be noted that DESE made the determination to discontinue these two assessments because of extremely low enrollments for the Fall 2009 assessments and low projections of the number of students who would enroll to take these assessments in Spring 2010. Therefore, information about the Integrated Mathematics II and Integrated Mathematics III Assessments is limited in this technical report.

Figure 2.6: Field Test and Operational Assessment Design, Integrated Mathematics II and III

2.2.1. Spring 2008 Standalone Field Test

The Spring 2008 standalone field test of the English II, Algebra I, and Biology Assessments provided item data to inform the 2008–2009 operational forms selection process. The Spring 2008 field test consisted of two sessions. For each assessment, Session I included 10 unique forms of SR items, with each form containing 19 items. Session II included 10 unique forms of PE/WPs. For English II, the PE forms in Session II each consisted of one 4-point WP. For Algebra I, each Session II form consisted of one 4-point PE. For Biology, each Session II form consisted of 10–12 CR items for a total of 20 points on each form. Forms within each session were spiraled at the student level across the state.

2.2.2. Fall 2008 Operational Administration

The Fall 2008 administration consisted of three operational assessments (English II, Algebra I, and Biology). English II consisted of one 35-item SR form and one WP. Algebra I and Biology each consisted of one 35-item SR form and one PE form. The Algebra I PE consisted of one 4-point item. The Biology PE consisted of 10 CR items, ranging from 1 to 4 points each for a total of 20 points.

In addition to the 35 scored items, each Fall 2008 Algebra I and Biology Session I test book contained a set of 12 linking items (designated as M1 in Figures 2.2 and 2.3). These linking items were used for the post-equating check of the pre-equating results following the Spring 2009 operational administration (indicated by an arrow in Figure 2.2). For the English II Assessment, the 12 additional SR items in Session I were filler (non-scored) items.

2.2.3. Spring 2009 Operational Administration

The Spring 2009 administration consisted of three operational assessments (English II, Algebra I, and Biology). For all three content areas, Session I consisted of 35 operational SR items. English

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II had 32 unique sets of 12 EFT items (labeled as EFT 1 through EFT 32 in Figure 2.1). Algebra I and Biology had 24 unique sets of 12 EFT items (labeled as EFT 1 through EFT 24 in Figure 2.2). Additionally, the sets of items used to link the Spring 2009 form to the Fall 2008 (M1) and Summer 2009 (M2) assessments for the post-equating check occupied two of the EFT slots on the Algebra I and Biology Assessments.

Session II of the Spring 2009 English II Assessment contained one 4-point WP. Session II of the Algebra I Assessment contained one 4-point PE. Finally, Session II of the Biology Assessment contained 11 CR items, ranging from 1 to 4 points each, for a total of 20 points. Session II of the Algebra I and Biology Assessments also contained an EFT PE.

2.2.4. Spring 2009 Standalone English II WP Field Test

In Spring 2009, 20 English II WPs were administered statewide in a separate standalone field test. Each WP was administered on its own form.

2.2.5. Spring 2009 Standalone Field Test

The Spring 2009 standalone field test of the English I, Algebra II, Geometry, Government, and American History Assessments provided item data to inform the 2009–2010 operational forms selection process. The field test included 10 unique forms of 36 items each for Algebra II, Geometry, Government, and American History. The English I field test included 14 unique forms with 36 items on each form. Forms for each course were spiraled at the student level across the state.

2.2.6. Fall 2009 Operational Administration

The Fall 2009 administration consisted of 10 operational assessments (English II, Algebra I, Biology, English I, Algebra II, Geometry, Government, American History, Integrated Mathematics II, and Integrated Mathematics III). Session I for English II, Algebra I, and Biology consisted of 35 operational SR items. Each form also contained 12 linking items used to equate the Fall 2009 forms to the Spring 2009 forms as shown in Figure 2.3. Session II of the Fall 2009 English II Assessment contained one 4-point WP. Session II of the Algebra I Assessment contained one 4-point PE. Session II of the Biology Assessment contained 12 CR items, ranging from 1 to 4 points each, for a total of 20 points.

English I consisted of one 52-item SR form. Algebra II, Geometry, Government, American History, Integrated Mathematics II, and Integrated Mathematics III each consisted of one 50-item SR form. In addition to the 40 scored items, each Algebra II, Geometry, Government, American History, Integrated Mathematics II, and Integrated Mathematics III Assessment in the Fall 2009 administration contained a set of 10 EFT items. The English I Assessment contained 12 EFT items in addition to the 40 scored items.

2.2.7. Spring 2010 Operational Administration

The Spring 2010 administration consisted of 10 operational assessments (English II, Algebra I, Biology, English I, Algebra II, Geometry, Government, American History, Integrated Mathematics II, and Integrated Mathematics III). For English II, Algebra I, and Biology, the Fall 2008 operational form was re-used for the Spring 2010 operational SR assessment. The English II, Algebra I, and Biology Assessments each had two forms, which contained the same set of

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operational items but two unique sets of linking items. As shown in Figure 2.3, each course had two unique sets of linking items. Set Y1 linked the Spring 2010 Form A to the Fall 2009 and the Spring 2008 forms. Set Y2 linked the Spring 2010 Form B to the Spring 2008 and the Summer 2009 forms. Session II of the Spring 2010 English II Assessment contained one 4-point WP. Session II of the Algebra I Assessment contained one 4-point PE. Session II of the Biology Assessment contained 12 CR items, ranging from 1 to 4 points each, for a total of 20 points. Session II of the Algebra I and Biology Assessments also contained an EFT PE.

The forms for English I, Algebra II, Geometry, Government, American History, Integrated Mathematics II, and Integrated Mathematics II consisted of 40 operational SR items. English I had four unique sets of 12 EFT items. Algebra II, Geometry, Government, and American History had 10 unique sets of 10 field-test items. There was one form each of Integrated Mathematics II and Integrated Mathematics III with online administration only. As previously noted, because these assessments were discontinued by DESE, districts never accessed the online Integrated Mathematics II and Integrated Mathematics III Assessments in Spring 2010.

2.2.8. Summer 2010 Operational Administration

The Summer 2010 administration consisted of eight operational assessments (English II, Algebra I, Biology, English I, Algebra II, Geometry, Government, and American History). The English II, Algebra I, and Biology Assessments were newly developed test forms. For all three assessments, Session I consisted of 35 operational SR items. Each form also contained 12 linking items that were also administered on the Summer 2009 test form and the Spring 2010 test form as shown in Figure 2.3. Session II of the Fall 2009 English II Assessment contained one 4-point WP. Session II of the Algebra I assessment contained one 4-point PE. Finally, Session II of the Biology Assessment contained 12 CR items, ranging from 1 to 4 points each, for a total of 20 points. Session II of the Algebra I and Biology Assessments also contained an EFT PE. After the forms were created and printed, a decision was made to discontinue the use of PE/WPs on the MO EOC Assessments. Therefore, the student responses from this administration were not scored.

The English I, Algebra II, Geometry, Government, and American History Assessments had filler items in the EFT slots.

2.2.9. Fall 2010 Operational Administration

The Fall 2010 administration consisted of eight operational assessments (English II, Algebra I, Biology, English I, Algebra II, Geometry, Government, and American History). For English II, Algebra I, and Biology, the operational form was reused for the Spring 2009 operational SR assessment. The English II, Algebra I, and Biology Assessments each had two forms, which contained 12 linking items. As shown in Figure 2.3, each course had two unique sets of linking items. Set M1 linked the Fall 2010 form to the Fall 2008 and the Spring 2009 forms. Set M2 linked the Fall 2010 form to the Summer 2008 and the Spring 2009 forms.

English I consisted of one 52-item SR form. Algebra II, Geometry, Government, and American History each consisted of one 50-item SR form. Each Algebra II, Geometry, Government, and American History Assessment consisted of 40 operational items and 10 filler items in the EFT slots. The English I Assessment contained 12 filler items in the EFT slots in addition to 40 scored items.

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2.2.10. Spring 2011 Operational Administration

The Spring 2011 administration consisted of eight operational assessments (English II, Algebra I, Biology, English I, Algebra II, Geometry, Government, and American History). The English II, Algebra I, and Biology Assessments were newly created. For all three assessments, Session I consisted of 35 operational SR items. Each form also contained 12 linking items (sets M1 and M2) as shown in Figure 2.3. In addition to the linking items, additional items were field tested in the EFT positions. Each of the three content areas field tested an additional 12 forms' worth of new items.

English I consisted of one 52-item SR form. Algebra II, Geometry, Government, and American History each consisted of one 50-item SR form. Each Algebra II, Geometry, Government, and American History Assessment consisted of 40 operational items and 10 filler items in the EFT slots. The English I Assessment contained 12 filler items in the EFT slots in addition to 40 scored items.

2.2.11. Released Forms

In addition to the operational forms, DESE and contractor Riverside Publishing constructed "released" forms for each operational assessment. The English II, Algebra I, and Biology forms were posted on the DESE website in August 2008, and the English I, Algebra II, Geometry, Government, and American History forms were posted on the DESE website in August 2009. They were constructed to mirror the test content of the actual operational forms (minus the EFT items) to allow Missouri teachers, parents, and students the opportunity to review the new format and representative content of the MO EOC Assessments. Although these forms were constructed to parallel the operational forms, the items in these released forms were never used on an operational MO EOC Assessment.

2.2.12. Summer 2011 through Summer 2014 Operational Administrations

Beginning with Summer 2011, Questar was awarded the contract for administering the MO EOC Assessments. The assessments were administered according to an established form rotation schedule, and two forms of each of the operational assessments were used to create Braille and Large Print versions of the assessments. Depending on the form rotation schedule, the Braille and Large Print versions of the test may not have been the same form administered to the general student population.

2.2.13. Fall 2014 and Spring 2015 Operational Administrations

Beginning in the Fall 2014 administration, five MO EOC Assessments (English I, English II, Algebra I, Algebra II, and Geometry) have new test forms developed due to following changes:

- Revised test blueprints
- New test forms
- Alignment of existing items in English Language Arts and Mathematics to the Missouri Learning Standards
- New scoring rubrics for PEs and change of PE scores
- Change of test length and total score points
- Addition of PEs to English I
- Updated ALDs

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2.3. Test Blueprints

Test blueprints specify the relative percentage of items in each high-level content strand. This document helps ensure that each strand is represented by the minimum number of points (8) for student score reports.

Riverside Publishing content experts worked with DESE to develop blueprints for each course before item writing began in Fall 2007. Blueprint development was guided by the Missouri Show-Me Standards.

Tables 2.2 – 2.15 outline the test construction blueprints for English II, Algebra I, Biology, English I, Algebra II, Geometry, Government, American History, and Physical Science.

Table 2.2. Test Construction Blueprint for English II—Summer 2014

Big Idea	Target # of Points	Point Range*	Target % Total	Minimum Emphasis	Maximum Emphasis
Develop and apply skills and strategies to the reading process	12	10–14	31%	26%	36%
Develop and apply skills and strategies to comprehend, analyze, and evaluate fiction, poetry, and drama	9	8–11	23%	23%	28%
Develop and apply skills and strategies to comprehend, analyze, and evaluate nonfiction	9	8–11	23%	23%	28%
Writing • Apply a writing process in composing text • Compose well-developed text • Write effectively in various forms and types of writing	9	8–9	23%	23%	23%
Total	39		100%		

Note: Total score points for each content strand may vary depending on which passages are selected for a particular administration. The percentage of total score points from each content strand (emphasis) will fall within the blueprint range described above.

*The minimum number of points in each strand will be 8.

This blueprint was built under the following assumptions:

1. The operational test will be composed of two sessions. Session I will have 35 1-point SR items, and Session II will have one 4-point WP.
2. The reading passages will generally be balanced between nonfiction and fiction. A slight imbalance may occur if an odd number of passages appears on the operational test.
3. Content strand 1 has a larger percentage of total points because it can be assessed using both fiction and nonfiction passages.
4. The writing form/type will vary depending on the WP selected for a particular administration. WPs will be aligned to a primary CLE; however, multiple writing CLEs may be assessed to reflect the holistic rubric.

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Table 2.3. Test Construction Blueprint for English II—Fall 2014 and Spring 2015

Claim	Category	Big Idea	Target # of Points	Point Range	Range of Emphasis
Reading	Claim 1a	Apply reading skills to demonstrate the ability to integrate key ideas and details, interpret and analyze the craft and structure of texts, and evaluate the knowledge and ideas found in literary texts	15	15	33%
Reading	Claim 1b	Apply reading skills to demonstrate the ability to integrate key ideas and details, interpret and analyze the craft and structure of texts, and evaluate the knowledge and ideas found in informational text	15	15	33%
Writing	Claim 2a	Demonstrate the ability to produce a variety of text types and purposes	10	10	22%
Writing	Claim 2b	Demonstrate a command of the convention of standard English, appropriate grade-level acquisition of vocabulary	5	5	11%
		Total	45	45	100%

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Table 2.4. Test Construction Blueprint for Algebra I—Summer 2014

Content Strand	Target # of Points	Point Range	Target % Total	Minimum Emphasis	Maximum Emphasis
Number and Operations	8	7–9	21%	19%	23%
Algebraic Relationships	23	21–25	58%	53%	63%
Data and Probability	8	7–9	21%	19%	23%
Total	39		100%		

Note: Total score points for the operational tests may vary depending on which PE is selected for a particular administration. Regardless of the total score points on a particular operational test, the percentage of total score points from each content strand (emphasis) will fall within the blueprint range described above. Point ranges are determined using a 10 percent tolerance.

This blueprint was built under the following assumptions:

1. The operational test will be composed of two sessions. Session I will have 35 1-point SR items, and Session II will have one 4-point PE.
2. Each PE will be aligned to one CLE from the Algebraic Relationships strand.

Table 2.5. Test Construction Blueprint for Algebra I—Fall 2014 and Spring 2015

Content Strand	Target # of Points	Point Range	Range of Emphasis
Number and Quantity	3	2–4	5–10%
Algebra	17	14–21	35–53%
Functions	15	11–20	28–50%
Stats and Probability	5	3–6	8–15%
Total	40	40	100%

Table 2.6. Test Construction Blueprint for Biology

Content Strand	Target # of Points	Point Range	Target % Total	Minimum Emphasis	Maximum Emphasis
Characteristic and Interactions of Living Organisms	22	20–24	40%	36%	44%
Changes in Ecosystems and Interactions of Organisms with Their Environments	13	12–14	24%	22%	27%
Scientific Inquiry	20	20	36%	36%	36%
Total	55		100%		

Note: Total score points for the operational tests may vary depending on which PE prompts are selected for a particular administration. Regardless of the total score points on a particular operational test, the percentage of total score points from each content strand (emphasis) will fall within the blueprint range described above. Point ranges are determined using a 10 percent tolerance.

This blueprint was built under the following assumptions:

1. The operational test will be composed of two sessions. Session I will have 35 1-point SR items, and Session II will have one 20-point PE that is comprised of a main context and several prompts.
2. Prompts within PEs will be aligned to CLEs from the Scientific Inquiry strand only.

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Table 2.7. Test Construction Blueprint for English I—Summer 2014

Big Idea	Target # of Points	Point Range*	Target % Total	Minimum Emphasis	Maximum Emphasis
Develop and apply skills and strategies to the reading process	15	13–17	38%	33%	43%
Develop and apply skills and strategies to comprehend, analyze, and evaluate fiction, poetry, and drama from a variety of cultures and times	12	10–14	30%	25%	35%
Develop and apply skills and strategies to comprehend, analyze, and evaluate nonfiction (such as biographies, newspapers, technical manuals) from a variety of cultures and times	13	11–15	32%	28%	38%
Total	40	40	100%		

Note: Total score points for each content strand may vary depending on which passages are selected for a particular administration. The percentage of total score points from each content strand (emphasis) will fall within the blueprint range described above.

*The minimum number of points in each strand will be 8.

This blueprint was built under the following assumptions:

1. The reading passages will generally be balanced between nonfiction and fiction. A slight imbalance may occur if an odd number of passages appears on the operational test.
2. Content strand 1 has a larger percentage of total points because it can be assessed using both fiction and nonfiction passages.

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Table 2.8. Test Construction Blueprint for English I—Fall 2014 and Spring 2015

Claim	Category	Big Idea	Target # of Points	Point Range	Range of Emphasis
Reading	Claim 1a	Apply reading skills to demonstrate the ability to integrate key ideas and details, interpret and analyze the craft and structure of texts, and evaluate the knowledge and ideas found in literary texts	15	15	33%
Reading	Claim 1b	Apply reading skills to demonstrate the ability to integrate key ideas and details, interpret and analyze the craft and structure of texts, and evaluate the knowledge and ideas found in informational text	15	15	33%
Writing	Claim 2a	Demonstrate the ability to produce a variety of text types and purposes	10	10	22%
Writing	Claim 2b	Demonstrate a command of the convention of standard English, appropriate grade-level acquisition of vocabulary	5	5	11%
		Total	45	45	100%

Table 2.9. Test Construction Blueprint for Algebra II—Summer 2014

Content Strand	Target # of Points	Point Range	Target % Total	Minimum Emphasis	Maximum Emphasis
Number and Operations	8	7–9	20%	17.5%	22.5%
Algebraic Relationships	22	20–24	55%	50%	60%
Data and Probability	10	9–11	25%	22.5%	27.5%
Total	40	40	100%		

Table 2.10. Test Construction Blueprint for Algebra II—Fall 2014 and Spring 2015

Content Strand	Target # of Points	Point Range	Range of Emphasis
Number and Quantity	0	0–4	0–10%
Algebra	17	16–22	40–55%
Functions	23	18–24	45–60%
Stats and Probability	0	0–6	0–15%
Total	40	40	100%

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Table 2.11. Test Construction Blueprint for Geometry—Summer 2014

Content Strand	Target # of Points	Point Range	Target % Total	Minimum Emphasis	Maximum Emphasis
Algebraic Relationships	8	7–10	20%	18%	25%
Geometric Spatial	24	22–24	60%	55%	60%
Measurement	8	7–9	20%	18%	23%
Total	40	40	100%		

Table 2.12. Test Construction Blueprint for Geometry—Fall 2014 and Spring 2015

Content Strand	Point Range	Range of Emphasis
Geometry	34–40	85–100%
Stats and Probability	0–6	0–15%
Total	40	100%

Table 2.13. Test Construction Blueprint for Government

Content Strand	Target # of Points	Point Range	Target % Total	Minimum Emphasis	Maximum Emphasis
Principles of Constitutional Democracy	20	18–22	50%	45%	55%
Principles and Processes of Governance Systems	20	18–22	50%	45%	55%
Total	40	40	100%		

Note: Point ranges are determined using a 10 percent tolerance.

Table 2.14. Test Construction Blueprint for American History

Content Strand	Target # of Points	Point Range	Target % Total	Minimum Emphasis	Maximum Emphasis
Government	8	7–9	20%	18%	23%
History	16	14–18	40%	35%	45%
Economics	8	7–9	20%	18%	23%
Geography	8	7–9	20%	18%	23%
Total	40	40	100%		

Note: Point ranges are determined using a 10 percent tolerance.

Table 2.15. Test Construction Blueprint for Physical Science

Content Strand	Point Range	Range of Emphasis
Properties and principles of matter and energy	25–30	55–66%
Properties and principle of force and motion	15–20	33–44%
Total	40	100%

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2.4. Test Specifications

Standard 1.6[8] specifically addresses the appropriateness of test content and its relationship to a solid validity argument. Additionally, Standard 3.3[9] defines "test specifications" and provides examples of the type of information that should be included in a specification document. The test specifications describe the content and format of the test and delineate the ideal number of items and points assessed for each CLE. This section details the development and use of the test specification documents for the MO EOC Assessments.

Riverside Publishing content experts developed draft test specifications for English II, Algebra I, and Biology in 2007 and for English I, Algebra II, Geometry, Government, and American History in 2008. These draft test specifications were subsequently reviewed and approved by DESE. The specifications were finalized in Fall 2007 and Fall 2008, respectively, before the development of items for the field-test forms.

The test specification document served as the foundation for all item development. The material in the test specifications was designed for use by Riverside Publishing content experts and DESE to construct tests with the following characteristics:

- Aligned to Missouri CLEs
- Aligned to Norman Webb's Depth of Knowledge (DOK) cognitive levels
- Include both SR items and PE/WPs
- Include both standalone and passage-based items

Detailed descriptions of the test content measured in each MO EOC Assessment are presented in the following sections.

2.4.1. English II

Summer 2014:

The English II Assessment measures student achievement in reading and writing. Session I of the test contains commissioned passages that comprise both fiction and nonfiction and cover a wide range of genres, including poems, short stories, newspaper articles, historical fiction, functional texts, and webpages. The questions associated with each passage are in SR format. The English II Assessment has 35 SR items, as well as standalone SR items that assess grammar and language usage. Session II of the English II Assessment comprises a WP, which could cover one or more of the following genres: narrative, expository, persuasive, or informative. The WP is scored based on a holistic 4-point rubric.

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[8] **Standard 1.6:** When the validation rests in part on the appropriateness of test content, the procedures followed in specifying and generating test content should be described and justified in reference to the construct the test is intended to measure or the domain it is intended to represent. If the definition of the content sampled incorporates criteria such as importance, frequency, or criticality, these criteria should also be clearly explained and justified (p. 18).

[9] **Standard 3.3:** The test specifications should be documented, along with their rationale and the process by which they were developed. The test specifications should define the content of the test, the proposed number of items, the item formats, the desired psychometric properties of the items, and the item and section arrangement. They should also specify the amount of time for testing, directions to the test takers, procedures to be used for test administration and scoring, and other relevant information (p. 43).

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Table 2.16 contains targets for the CLE point distribution on the English II operational forms for Session I only for Summer 2014. Some of the CLE point targets may not be met because the use of a passage or scenario is not conducive to items written to the CLE. Some Big Ideas are not represented in this chart because they are not assessed at this course level.

Table 2.18 contains the actual point distributions for the Summer 2014 operational forms.

Fall 2014 and Spring 2015:
Beginning in Fall 2014, English II has 35 SR items and 3 WPs with a score range from 2–4.

Table 2.17 contains targets for the CLE point distribution on the English II for the Fall 2014 and Spring 2015 operational forms for Session I only. Tables 2.19 and 2.20 contain actual point distributions for Fall 2014 and Spring 2015 operational forms, respectively.

Table 2.16. Target Point Distributions for the English II Operational Forms—Summer 2014

Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
Reading Strand				
Develop and apply skills and strategies to the reading process	Vocabulary	Develop vocabulary through text, using a. roots and affixes b. context clues c. glossary, dictionary, and thesaurus	2	3–4
	Post Reading	Apply post-reading skills to comprehend, interpret, analyze, and evaluate text: a. draw conclusions b. paraphrase c. summarize	3	5–6
	Making Connections	Compare, contrast, analyze and evaluate connections: a. text to text (information and relationships in various fiction and nonfiction works)	3	1–2
Develop and apply skills and strategies to comprehend, analyze, and evaluate fiction, poetry and drama from a variety of cultures and times	Text Features	Analyze and evaluate the text features in grade-level text	3	2–3
	Literary Techniques	Identify and explain literary techniques, emphasizing a. understatement b. parallelism c. allusion d. analogy e. analyze and evaluate literary techniques previously introduced	3	2–3

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Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
	Literary Elements	Use details from text(s) to a. demonstrate comprehension skills previously introduced b. analyze character, plot, setting, point of view c. analyze the development of a theme across genres d. identify and analyze tone	3	4–5
Develop and apply skills and strategies to comprehend, analyze, and evaluate nonfiction (such as biographies, newspapers, technical manuals) from a variety of cultures and times	Text Features	Explain, analyze, and evaluate the author's use of text features to clarify meaning	3	1–2
	Literary Techniques	Identify, explain, and analyze literary techniques in nonfiction, emphasizing a. understatement b. parallelism c. allusion d. analogy e. figurative language and sound devices previously introduced	3	2–3
	Text Structures	Use details from informational and persuasive text(s) to a. analyze and evaluate the organizational patterns b. identify and analyze faulty reasoning and unfounded inferences c. evaluate proposed solutions d. evaluate for accuracy and adequacy of evidence e. evaluate effect of tone on the overall meaning of work f. analyze and evaluate point of view g. analyze and evaluate author's viewpoint/perspective h. demonstrate comprehension skills previously introduced	3	3–4
Writing Strand				
Compose well-developed text	Conventions	In written text, apply a. conventions of capitalization b. conventions of punctuation c. standard usage	1	5

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Table 2.17. Target Point Distributions for the English II Operational Forms—Fall 2014 and Spring 2015

Claim	Anchors	Missouri Learning Standards (MLS)	DOK Limit	Range of Points per MLS
Reading				
1a Literacy	Apply reading skills to demonstrate the ability the integrate key ideas and details	• Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. • Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text. • Analyze how complex characters (e.g., those with multiple or conflicting motivations) develop over the course of a text, interact with other characters, and advance the plot or develop the theme.	3	15
	Interpret and analyze the craft and structure of texts	• Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the cumulative impact of specific word choices on meaning and tone. • Analyze how an author's choices concerning how to structure a text, order events within it (e.g., parallel plots), and manipulate time (e.g., pacing, flashbacks) create such effects as mystery, tension, or surprise. • Analyze a particular point of view or cultural experience reflected in a work of literature from outside the United States, drawing on a wide reading of world literature.	3	
	Evaluate the knowledge and ideas found in literary texts	• Analyze the representation of a subject or a key scene in two different artistic mediums, including what is emphasized or absent in each treatment. • Analyze how an author draws on and transforms source material in a specific work.	3	

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Claim	Anchors	Missouri Learning Standards (MLS)	DOK Limit	Range of Points per MLS
1b Informational	Apply reading skills to demonstrate the ability the integrate key ideas and details	• Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. • Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text. • Analyze how the author unfolds an analysis or series of ideas or events, including the order in which the points are made, how they are introduced and developed, and the connections that are drawn between them.	3	15
	Interpret and analyze the craft and structure of texts	• Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone. • Analyze in detail how an author's ideas or claims are developed and refined by particular sentences, paragraphs, or larger portions of a text. • Determine an author's point of view or purpose in a text and analyze how an author uses rhetoric to advance that point of view or purpose.	3	
	Evaluate the knowledge and ideas found in informational texts	• Analyze various accounts of a subject told in different mediums (e.g., a person's life story in both print and multimedia), determining which details are emphasized in each account. • Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning. • Analyze seminal U.S. documents of historical and literary significance, including how they address related themes and concepts.	3	

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Claim	Anchors	Missouri Learning Standards (MLS)	DOK Limit	Range of Points per MLS
Writing				
2a	Demonstrate the ability to produce a variety of text types and purposes	• Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. • Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content. • Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.	3	10
2b	Demonstrate a command of the conventions of standard English	• Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. • Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.	2	
	Appropriate grade-level acquisition of vocabulary	• Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 9–10 reading and content, choosing flexibly from a range of strategies. • Demonstrate understanding of figurative language, word relationships, and nuances in word meanings. • Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.	2	5

Table 2.18. Actual Point Distributions for the Summer 2014 English II Operational Forms

Reporting Category	Blueprint Target				Actual			
	# Items		# Points		# Items		# Points	
	SR	WP	SR	WP	SR	WP	SR	WP
Reading Process	12		12		10		10	
Reading (fiction)	9		9		9		9	
Reading (nonfiction)	9		9		11		11	
Writing	5	1	5	4	5	1	5	4
Total #Items/Points	**35**	**1**	**35**	**4**	**35**	**1**	**35**	**4**

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Table 2.19. Actual Point Distributions for the Fall 2014 English II Operational Forms

	Blueprint Target				Actual			
	# Items		# Points		# Items		# Points	
Reporting Category	**SR**	**WP**	**SR**	**WP**	**SR**	**WP**	**SR**	**WP**
Reading – Claim 1a	15		15		15		15	
Reading – Claim 1b	15		15		15		15	
Writing – Claim 2a		2		8		2		8
Writing – Claim 2b	5	1	5	2	5	1	5	2
Total #Items/Points	**35**	**3**	**45**	**10**	**35**	**3**	**35**	**10**

Table 2.20. Actual Point Distributions for the Spring 2015 English II Operational Forms

	Blueprint Target				Actual			
	# Items		# Points		# Items		# Points	
Reporting Category	**SR**	**WP**	**SR**	**WP**	**SR**	**WP**	**SR**	**WP**
Reading – Claim 1a	15		15		15		15	
Reading – Claim 1b	15		15		15		15	
Writing – Claim 2a		2		8		2		8
Writing – Claim 2b	5	1	5	2	5	1	5	2
Total #Items/Points	**35**	**3**	**45**	**10**	**35**	**3**	**35**	**10**

2.4.2. Algebra I

Summer 2014:

The Algebra I Assessment measures a student's ability to solve problems by applying mathematical concepts. Three strands are assessed on the Algebra I Assessment:

- Numbers and Operations
- Algebraic Relationships
- Data and Probability

The 35 SR items in Session I are aligned to the strands listed above. Session II contains a PE aligned to the Algebraic Relationships strand. The PE is a mathematical scenario in which the student is required to respond to several CR items. The student may be asked to construct a graph and/or provide equations. On some items, the student is required to show his or her work for full credit. The PE is worth a total of 4 points and is scored on an item-specific rubric.

Table 2.21 contains targets for the CLE point distribution on the Algebra I operational forms for Summer 2014. Some Big Ideas are not represented in this table because they are not assessed at this course level. Table 2.23 contains actual point distributions for the Summer 2014 operational form.

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Fall 2014 and Spring 2015:
Beginning of Fall 2014, the strands being assessed has changed from three strands to four stands:

- Number and Quantity
- Algebra
- Functions
- Statistics and Probability

The 40 SR items are aligned to the strands listed above. Four PEs are aligned to Algebra. The score for the PEs ranges from 1–4 and is scored on an item specific rubric.

Table 2.22 contains targets for the CLE point distribution on the Algebra I operational forms for Fall 2014 and Spring 2015. Tables 2.24 and 2.25 contain actual point distributions for the Fall 2014 and Spring 2015 operational forms.

Table 2.21. Target Point Distributions for the Algebra I Operational Forms—Summer 2014

Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
Numbers and Operations Strand				
Understand numbers, ways of representing numbers, relationships among numbers, and number systems	Read, write, and compare numbers	Compare and order rational and irrational numbers, including finding their approximate locations on a number line	1	3–5
	Represent and use real numbers	Use real numbers and various models, drawing, etc. to solve problems	3	3–5
Algebraic Relationships Strand				
Understand patterns, relations, and functions	Create and analyze patterns	Generalize patterns using explicitly or recursively defined functions	2	1–2
	Classify objects and representations	Compare and contrast various forms of representations of patterns	3	1–2
	Identify and compare functions	Understand and compare the properties of linear and nonlinear functions	2	2–3
	Describe the effects of parameter changes	Describe the effects of parameter changes on linear, exponential growth/decay, and quadratic functions including intercepts	2	2–3
Represent and analyze mathematical situations and structures using algebraic symbols	Represent mathematical situations	Use symbolic algebra to represent and solve problems that involve linear and quadratic relationships, including equations and inequalities	3	2–3

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Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
	Describe and use mathematical manipulation	Describe and use algebraic manipulations, including factoring and rules of integer exponents, and apply properties of exponents, including order of operations, to simplify expressions	2	2–3
	Use equivalent forms	Use and solve equivalent forms of equations (linear, absolute value, and quadratic)	2	1–2
	Use systems	Use and solve systems of linear equations or inequalities with 2 variables	2	1–2
Use mathematical models to represent and understand quantitative relationships	Use mathematical models	Identify quantitative relationships and determine the type(s) of functions that might model the situation to solve the problem	2	3–4
Analyze change in various contexts	Analyze change	Analyze linear and quadratic functions by investigating rates of change, intercepts, and zeros	3	3–4
Data and Probability Strand				
Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them	Formulate questions	Formulate questions and collect data about a characteristic, which include sample spaces and distributions	3	1–2
	Represent and interpret data	Select and use appropriate graphical representation of data and, given one-variable quantitative data, display the distribution and describe its shape	3	2–3
Select and use appropriate statistical methods to analyze data	Describe and analyze data	Apply statistical measures of center to solve problems	2	2–3
	Represent data algebraically	Given a scatterplot, determine an equation for a line of best fit	2	1–2
Develop and evaluate inferences and predictions that are based on data	Develop and evaluate inferences	Make conjectures about possible relationships between 2 characteristics of a sample on the basis of scatterplots of the data	3	2–3

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Table 2.22. Target Point Distribution for the Algebra I Operational Forms—Fall 2014 and Spring 2015

Claim	Anchors	Missouri Learning Standards (MLS)	DOK Limit	Range of Points per MLS
Number & Quantity				
Number & Quantity	Real Number System	• Rewrite expressions involving radicals and rational exponents using the properties of exponents. • Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define 51/3 to be the cube root of 5	2	2–4
	Quantities	• Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays. • Define appropriate quantities for the purpose of descriptive modeling. • Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	2	
Algebra				
Algebra	Seeing Structure in Expressions	• Use the structure of an expression to identify ways to rewrite it. For example, see x4 – y4 as (x2)2 – (y2)2, thus recognizing it as a difference of squares that can be factored as (x2 – y2)(x2 + y2). • Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.	2	14–21
	Arithmetic with polynomials and Rational Expressions	• Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.	3	
	Creating Equations	• Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance R • Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. • Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. • Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.	3	

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Claim	Anchors	Missouri Learning Standards (MLS)	DOK Limit	Range of Points per MLS
	Reasoning with Equations and Inequalities	• Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. • Solve quadratic equations in one variable. • Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. • Graph the solutions to a linear inequality in two variables as a half plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	3	
Functions				
Functions	Interpreting Functions	• Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. • For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. • Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). • Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).	3	11–20
	Building Functions	• Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. • Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs.	3	
	Linear, Quadratic and Exponential Models	• Distinguish between situations that can be modeled with linear functions and with exponential functions. • Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. • Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs	2	
Stats & Probability				
Stats & Probability	Interpreting Categorical and Quantitative Data	• Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.	2	3–6

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Table 2.23. Actual Point Distributions for the Summer 2014 Algebra I Operational Forms

	Blueprint Target				Actual			
	# Items		# Points		# Items		# Points	
Reporting Category	**SR**	**PE**	**SR**	**PE**	**SR**	**PE**	**SR**	**PE**
Number and Operation	8		8		8		8	
Algebraic Relationships	19	1	19	4	19	1	19	4
Data and Probability	8		8		8		8	
Total #Items/Points	**35**	**1**	**35**	**4**	**35**	**1**	**35**	**4**

Table 2.24. Actual Point Distributions for the Fall 2014 Algebra I Operational Forms

	Blueprint Target				Actual			
	# Items		# Points		# Items		# Points	
Reporting Category	**SR**	**PE**	**SR**	**PE**	**SR**	**PE**	**SR**	**PE**
Number and Quantity	4		4		4		4	
Algebra	17	4	17	10	17	4	17	10
Function	14		14		14		14	
Stats and Probability	5		5		5		5	
Total #Items/Points	**40**	**4**	**40**	**10**	**40**	**4**	**40**	**10**

Table 2.25. Actual Point Distributions for the Spring 2015 Algebra I Operational Forms

	Blueprint Target				Actual			
	# Items		# Points		# Items		# Points	
Reporting Category	**SR**	**PE**	**SR**	**PE**	**SR**	**PE**	**SR**	**PE**
Number and Quantity	4		4		3		3	
Algebra	17	4	17	10	17	2	17	6
Function	14		14		15	1	15	4
Stats and Probability	5		5		5		5	
Total #Items/Points	**40**	**4**	**40**	**10**	**40**	**3**	**40**	**10**

2.4.3. Biology

The Biology Assessment measures student achievement in the following content and process strands:

- Characteristics and Interactions of Living Organisms
- Changes in Ecosystems and Interactions of Organisms with Their Environments
- Scientific Inquiry

The 35 SR items in Session I are aligned to the two strands listed above. Session II contains a PE aligned to the Scientific Inquiry strand, in which the student is required to respond to several CR items. The student may be asked to construct a data table, measure, and/or graph scientific results. Individual items within the PE may be worth 1, 2, 3, or 4 points and are scored on item-specific rubrics. The total point value of each operational PE is 20 points.

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Table 2.26 is used as a target for the CLE point distribution for the Biology operational forms. Some Big Ideas are not represented in this table because they are not assessed at this course level. Tables 2.27, 2.28, and 2.29 contain actual point distributions for the Summer 2014, Fall 2014, and Spring 2015 operational forms, respectively.

Table 2.26. Target Point Distributions for the Biology I Operational Forms

Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
Characteristics and Interactions of Living Organisms Strand				
There is a fundamental unity underlying the diversity of all living organisms	Organisms progress through life cycles unique to different types of organisms	Recognize cells both increase in number and differentiate, becoming specialized in structure and function, during and after embryonic development	1	1–2
	Cells are the fundamental units of structure and function of all living things	Describe the structure of cell parts (e.g., cell wall, cell membrane, cytoplasm, nucleus, chloroplast, mitochondrion, ribosome, vacuole) found in different types of cells (e.g., bacterial, plant, skin, nerve, blood, muscle) and the functions they perform (e.g., structural support, transport of materials, storage of genetic information, photosynthesis and respiration, synthesis of new molecules, waste disposal) that are necessary to the survival of the cell and organism	2	1–2
Living organisms carry out life processes in order to survive	The cell contains a set of structures called organelles that interact to carry out life processes through physical and chemical means	Explain physical and chemical interactions that occur between organelles (e.g., nucleus, cell membrane, chloroplast, mitochondrion, ribosome) as they carry out life processes	2	1–2
	Photosynthesis and cellular respiration are complementary processes necessary to the survival of most organisms on Earth	Explain the interrelationship between the processes of photosynthesis and cellular respiration (e.g., recycling of oxygen and carbon dioxide), comparing and contrasting photosynthesis and cellular respiration reactions (Do NOT assess intermediate reactions.)	2	1–2
		Determine what factors affect the processes of photosynthesis and cellular respiration (i.e., light intensity, availability of reactants, temperature)	2	1–2

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Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
Living organisms carry out life processes in order to survive	Cellular activities and responses can maintain stability internally while external conditions are changing (homeostasis)	Explain the significance of the selectively permeable membrane to the transport of molecules	2	1–2
		Predict the movement of molecules across a selectively permeable membrane (i.e., diffusion, osmosis, active transport) needed for a cell to maintain homeostasis given concentration gradients and different sizes of molecules	2	1–2
		Explain how water is important to cells (e.g., is a buffer for body temperature, provides a soluble environment for chemical reactions, serves as a reactant in chemical reactions, provides hydration that maintains cell turgidity, maintains protein shape)	2	1–2
There is a genetic basis for the transfer of biological characteristics from one generation to the next through reproductive processes	All living organisms have genetic material (DNA) that carries hereditary information	Describe the chemical and structural properties of DNA (e.g., DNA is a large polymer formed from linked subunits of four kinds of nitrogen bases; genetic information is encoded in genes based on the sequence of subunits; each DNA molecule in a cell forms a single chromosome) (Assess the concepts; do NOT memorize the nitrogen base pairs.)	1	1–2
		Recognize the DNA codes for proteins, which are expressed as the heritable characteristics of an organism.	1	1–2
		Identify possible external causes (e.g., heat, radiation, certain chemicals) and effects of DNA mutations (e.g., altered proteins which may affect chemical reactions and structural development)	2	1–2
There is a genetic basis for the transfer of biological characteristics from one generation to the	Chromosomes are components of cells that occur in pairs and carry hereditary information from one cell to	Recognize the chromosomes of daughter cells, formed through the processes of asexual reproduction and mitosis, the formation of somatic (body) cells in multicellular organisms, are identical to the chromosomes of the parent cell	1	1–2

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Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
next through reproductive processes	daughter cells and from parent to offspring during reproduction	Recognize that during meiosis, the formation of sex cells, chromosomes are reduced to half the number present in the parent cell	1	1–2
		Explain how fertilization restores the diploid number of chromosomes	2	1–2
	There is heritable variation within every species of organism	Describe the advantages and disadvantages of asexual and sexual reproduction with regard to variation within a population	2	1–2
	The pattern of inheritance for many traits can be predicted by using the principles of Mendelian genetics	Predict the probability of the occurrence of specific traits, including sex-linked traits, in an offspring by using a monohybrid cross	2	1–2
Changes in Ecosystems and Interactions of Organisms with their Environments Strand				
Organisms are interdependent with one another and with their environment	All populations living together within a community interact with one another and with their environment in order to survive and maintain a balanced ecosystem	Explain the nature of interactions between organisms in predator/prey relationships and different symbiotic relationships (i.e., mutualism, commensalism, parasitism)	1	1–3
		Explain how cooperative (e.g., symbiotic) and competitive (e.g., predator/prey) relationships help maintain balance within an ecosystem	2	1–2
Organisms are interdependent with one another and with their environment	Living organisms have the capacity to produce populations of infinite size, but environments and resources are finite	Identify and explain the limiting factors (biotic and abiotic) that may affect the carrying capacity of a population within an ecosystem	2	1–3
	The diversity of species within an ecosystem is affected by changes in the environment, which can be caused by other organisms or outside processes	Predict the impact (beneficial or harmful) a natural environmental event (e.g., forest fire, flood, volcanic eruption, avalanche) or human caused change (e.g., acid rain, global warming, pollution, deforestation, introduction of an exotic species) may have on the diversity of different species in an ecosystem	2	1–2

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Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
Matter and energy flow through the ecosystem	As energy flows through the ecosystem, all organisms capture a portion of that energy and transform it to a form they can use	Predict how the use and flow of energy will be altered due to changes in a food web	2	1–2
Genetic variation sorted by the natural selection process explains evidence of biological evolution	Reproduction is essential to the continuation of every species	Explain the importance of reproduction to the survival of a species (i.e., the failure of a species to reproduce will lead to extinction of that species)	1	1–2
	Natural selection is the process of sorting individuals based on their ability to survive and reproduce within their ecosystem	Identify examples of adaptations that may have resulted from variations favored by natural selection (e.g., long-necked giraffes, long-eared jack rabbits) and describe how that variation may have provided populations an advantage for survival	2	1–2
		Explain how environmental factors (e.g., habitat loss, climate change, pollution, introduction of non-native species) can be agents of natural selection	2	1–2

Table 2.27. Actual Point Distributions for the Summer 2014 Biology Operational Forms

Reporting Category	Blueprint Target				Actual			
	# Items		# Points		# Items		# Points	
	SR	PE	SR	PE	SR	PE	SR	PE
Characteristics and Interactions of Living Organisms Total	22		22		22		22	
Changes in Ecosystems and Interactions of Organisms with Their Environments Total	13		13		13		13	
Scientific Inquiry		10		20		10		20
Total #Items/Points	**35**	**10**	**35**	**20**	**35**	**10**	**35**	**20**

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Table 2.28. Actual Point Distributions for the Fall 2014 Biology Operational Forms

Reporting Category	Blueprint Target				Actual			
	# Items		# Points		# Items		# Points	
	SR	PE	SR	PE	SR	PE	SR	PE
Characteristics and Interactions of Living Organisms Total	22		22		22		22	
Changes in Ecosystems and Interactions of Organisms with Their Environments Total	13		13		13		13	
Scientific Inquiry		10		20		10		20
Total #Items/Points	**35**	**10**	**35**	**20**	**35**	**10**	**35**	**20**

Table 2.29. Actual Point Distributions for the Spring 2015 Biology Operational Forms

Reporting Category	Blueprint Target				Actual			
	# Items		# Points		# Items		# Points	
	SR	PE	SR	PE	SR	PE	SR	PE
Characteristics and Interactions of Living Organisms Total	22		22		22		22	
Changes in Ecosystems and Interactions of Organisms with Their Environments Total	13		13		13		13	
Scientific Inquiry		10		20		10		20
Total #Items/Points	**35**	**10**	**35**	**20**	**35**	**10**	**35**	**20**

2.4.4. English I

Summer 2014:

The English I Assessment measures student achievement in reading. All administrations of the test contain commissioned passages that comprise both fiction and nonfiction and cover a wide range of genres, including poems, short stories, newspaper articles, historical fiction, functional texts, and webpages. The items associated with each passage are in SR format. The English I Assessment contains 40 SR items.

Table 2.30 contains targets for the CLE point distribution on the English I operational forms for Summer 2014. Some of the CLE point targets may not be met because the use of a passage or scenario is not conducive to items written to the CLE. Some Big Ideas are not represented in this chart because they are not assessed at this course level.

Table 2.32 contains actual point distributions for the Summer 2014 operational form.

Fall 2014 and Spring 2015:

Beginning in Fall 2014, English I has 35 SR items and 3 WPs with a score range from 2–4.

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Table 2.31 contains targets for the CLE point distribution on the English II Fall 2014 and Spring 2015 operational forms for Session I only. Tables 2.33 and 2.34 contain actual point distributions for the Fall 2014 and Spring 2015 operational forms, respectively.

Table 2.30. Target Point Distributions for the English I Operational Forms—Summer 2014

Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
Develop and apply skills and strategies to the reading process	Vocabulary	Develop vocabulary through text, using a. roots and affixes b. context clues c. glossary, dictionary, and thesaurus	2	4–6
	Post Reading	Apply post-reading skills to comprehend, interpret, analyze, and evaluate text: a. identify and explain the relationship between the main idea and supporting details d. draw conclusions e. paraphrase f. summarize	3	6–9
	Making Connections	Compare, contrast, analyze, and evaluate connections a. text to text (information and relationships in various fiction and nonfiction works)	3	2–3
Develop and apply skills and strategies to comprehend, analyze, and evaluate fiction, poetry, and drama from a variety of cultures and times	Text Features	Analyze and evaluate the text features in grade-level text	3	2–3
	Literary Techniques	Identify and, explain literary techniques, emphasizing a. irony b. imagery c. repeated sound, line, or phrase d. analyze literary techniques previously introduced	3	3–4
	Literary Elements	Use details from text(s) to a. demonstrate comprehension skills previously introduced b. analyze character, plot, setting, point of view c. analyze the development of a theme across genres d. evaluate the effect of author's style	3	4–7
Develop and apply skills and strategies to comprehend, analyze, and evaluate nonfiction (such as biographies, newspapers, technical manuals) from a variety of cultures and times	Text Features	Explain, analyze and evaluate the author’s use of text features to clarify meaning	3	2–3
	Literary Elements	Identify, explain, and analyze literary techniques in nonfiction, emphasizing a. irony b. imagery c. repeated sound, line, or phrase d. figurative language and sound devices previously introduced	3	3–4

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Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
	Text Structures	Use details from informational and persuasive text(s) to a. identify and explain the organizational patterns b. analyze and evaluate effectiveness of word choice c. analyze and evaluate for accuracy and adequacy of evidence d. analyze and evaluate point of view e. analyze and evaluate author's viewpoint/perspective f. evaluate proposed solutions g. demonstrate comprehension skills previously introduced	3	5–7

Table 2.31. Target Point Distributions for the English I Operational Forms—Fall 2014 and Spring 2015

Claim	Anchors	Missouri Learning Standards (MLS)	DOK Limit	Range of Points per MLS
Reading				
1a Literacy	Apply reading skills to demonstrate the ability the integrate key ideas and details	• Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. • Determine a theme or central idea of a text and analyze in detail its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text. • Analyze how complex characters (e.g., those with multiple or conflicting motivations) develop over the course of a text, interact with other characters, and advance the plot or develop the theme.	3	15

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Claim	Anchors	Missouri Learning Standards (MLS)	DOK Limit	Range of Points per MLS
	Interpret and analyze the craft and structure of texts	• Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the cumulative impact of specific word choices on meaning and tone. • Analyze how an author's choices concerning how to structure a text, order events within it (e.g., parallel plots), and manipulate time (e.g., pacing, flashbacks) create such effects as mystery, tension, or surprise. • Analyze a particular point of view or cultural experience reflected in a work of literature from outside the United States, drawing on a wide reading of world literature.	3	
	Evaluate the knowledge and ideas found in literary texts	• Analyze the representation of a subject or a key scene in two different artistic mediums, including what is emphasized or absent in each treatment. • Analyze how an author draws on and transforms source material in a specific work.	3	
1b Informational	Apply reading skills to demonstrate the ability the integrate key ideas and details	• Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text. • Determine a central idea of a text and analyze its development over the course of the text, including how it emerges and is shaped and refined by specific details; provide an objective summary of the text. • Analyze how the author unfolds an analysis or series of ideas or events, including the order in which the points are made, how they are introduced and developed, and the connections that are drawn between them.	3	15

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Claim	Anchors	Missouri Learning Standards (MLS)	DOK Limit	Range of Points per MLS
	Interpret and analyze the craft and structure of texts	• Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the cumulative impact of specific word choices on meaning and tone. • Analyze in detail how an author's ideas or claims are developed and refined by particular sentences, paragraphs, or larger portions of a text. • Determine an author's point of view or purpose in a text and analyze how an author uses rhetoric to advance that point of view or purpose.	3	
	Evaluate the knowledge and ideas found in informational texts	• Analyze various accounts of a subject told in different mediums (e.g., a person's life story in both print and multimedia), determining which details are emphasized in each account. • Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and fallacious reasoning. • Analyze seminal U.S. documents of historical and literary significance, including how they address related themes and concepts.	3	
Writing				
2a	Demonstrate the ability to produce a variety of text types and purposes	• Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence. • Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content. • Write narratives to develop real or imagined experiences or events using effective technique, well-chosen details, and well-structured event sequences.	3	6–8
2b	Demonstrate a command of the conventions of standard English	• Demonstrate command of the conventions of standard English grammar and usage when writing or speaking. • Demonstrate command of the conventions of standard English capitalization, punctuation, and spelling when writing.	2	1–2

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Claim	Anchors	Missouri Learning Standards (MLS)	DOK Limit	Range of Points per MLS
	Appropriate grade-level acquisition of vocabulary	• Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 9–10 reading and content, choosing flexibly from a range of strategies. • Demonstrate understanding of figurative language, word relationships, and nuances in word meanings. • Acquire and use accurately general academic and domain-specific words and phrases, sufficient for reading, writing, speaking, and listening at the college and career readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression.	2	3–5

Table 2.32. Actual Point Distributions for the Summer 2014 English I Operational Form

Reporting Category	Target	Actual
	#Items/Points (SR)	#Items/Points (SR)
Develop and apply skills and strategies to the reading process	13–17	17
Develop and apply skills and strategies to comprehend, analyze, and evaluate fiction, poetry, and drama	10–14	9
Develop and apply skills and strategies to comprehend, analyze, and evaluate nonfiction	11–15	14
Total #Items/Points	**40**	**40**

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Table 2.33. Actual Point Distributions for the Fall 2014 English I Operational Form

	Blueprint Target				Actual			
	# Items		# Points		# Items		# Points	
Reporting Category	**SR**	**WP**	**SR**	**WP**	**SR**	**WP**	**SR**	**WP**
Reading – Claim 1a	15		15		15		15	
Reading – Claim 1b	15		15		15		15	
Writing – Claim 2a		2		8		2		8
Writing – Claim 2b	5	1	5	2	5	1	5	2
Total #Items/Points	**35**	**3**	**45**	**10**	**35**	**3**	**35**	**10**

Table 2.34. Actual Point Distributions for the Spring 2015 English I Operational Form

	Blueprint Target				Actual			
	# Items		# Points		# Items		# Points	
Reporting Category	**SR**	**WP**	**SR**	**WP**	**SR**	**WP**	**SR**	**WP**
Reading – Claim 1a	15		15		15		15	
Reading – Claim 1b	15		15		15		15	
Writing – Claim 2a		2		8		2		8
Writing – Claim 2b	5	1	5	2	5	1	5	2
Total #Items/Points	**35**	**3**	**45**	**10**	**35**	**3**	**35**	**10**

2.4.5. Algebra II

Summer 2014:

The Algebra II Assessment measures a student's ability to solve problems by applying mathematical concepts. The three strands assessed on the Algebra II Assessment are as follows:

- Numbers and Operations
- Algebraic Relationships
- Data and Probability

The 40 SR items are aligned to the strands listed above. Table 2.35 contains targets for the CLE point distribution on the Algebra II operational form for Summer 2014. Some Big Ideas are not represented in this table because they are not assessed at this course level.

Table 2.37 contains actual point distributions for the Summer 2014 operational form.

Fall 2014 and Spring 2015:

Beginning in Fall 2014, the strands being assessed changed from three strands to four stands:

- Number and Quantity
- Algebra
- Functions
- Statistics and Probability

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The 40 SR items are aligned to two strands, Algebra and Functions.

Table 2.36 contains targets for the CLE point distribution on the Algebra II operational forms for Fall 2014 and Spring 2015. Tables 2.38 and 2.39 contain actual point distributions for the Fall 2014 and Spring 2015 operational forms, respectively.

Table 2.35. Target Point Distributions for the Algebra II Operational Forms—Summer 2014

Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
Numbers and Operations Strand				
Understand numbers, ways of representing numbers, relationships among numbers, and number systems	Read, write, and compare numbers	Compare and order rational and irrational numbers, including finding their approximate locations on a number line	1	3–4
	Represent and use real numbers	Use real numbers and various models, drawings, etc. to solve problems	3	4–5
Algebraic Relationships Strand				
Understand patterns, relations, and functions	Create and analyze patterns	Generalize patterns using explicitly or recursively defined functions	2	2–3
	Classify objects and representations	Compare and contrast various forms of representations of patterns	3	2–3
	Identify and compare functions	Compare properties of linear, exponential, logarithmic, and rational functions	2	2–3
	Describe the effects of parameter changes	Describe the effects of parameter changes on functions	2	2–3
Represent and analyze mathematical situations and structures using algebraic symbols	Represent mathematical situations	Use symbolic algebra to represent and solve problems that involve exponential, quadratic and logarithmic relationships	3	2–3
	Describe and use mathematical manipulation	Describe and use algebraic manipulations, inverse, or composition of functions	2	1–2
	Use equivalent forms	Use and solve equivalent forms of equations and inequalities	2	2–3
	Use systems	Use and solve systems of linear and quadratic equations or inequalities with two variables	3	2–3

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Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
Use mathematical models to represent and understand quantitative relationships	Use mathematical models	Identify quantitative relationships and determine the type(s) of functions that might model the situation to solve the problem	2	2–3
Analyze change in various contexts	Analyze change	Analyze exponential and logarithmic functions by investigating rates of change, intercepts, and asymptotes	3	3–4
Data and Probability Strand				
Formulate questions that can be addressed with data and collect, organize, and display relevant data to answer them	Represent and interpret data	Select and use appropriate graphical representation of data and, given one-variable quantitative data, describe its shape and calculate summary statistics	3	2–3
Select and use appropriate statistical methods to analyze data	Describe and analyze data	Apply statistical measures of center to solve problems	3	2–3
	Represent data algebraically	Given a scatterplot, determine the type of function which models the data	2	1–2
Understand and apply basic concepts of probability	Apply basic concepts of probability	Describe the concepts of sample space and probability distribution	2	1–2
	Use and describe compound events	Use and describe the concepts of conditional probability and independent events and how to compute the probability of a compound event	2	2–3

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Table 2.36. Target Point Distributions for the Algebra II Operational Forms—Fall 2014 and Spring 2015

Claim	Anchors	Missouri Learning Standards (MLS)	DOK Limit	Range of Points per MLS
Number & Quantity				
Number & Quantity	Complex Number System	• Use the relation i2 = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers. • Solve quadratic equations with real coefficients that have complex solutions	2	0–4
Algebra				
Algebra	Seeing Structure in Expressions	• Interpret expressions that represent a quantity in terms of its context • Use the structure of an expression to identify ways to rewrite it. For example, see x4 – y4 as (x2)2 – (y2)2, thus recognizing it as a difference of squares that can be factored as (x2 – y2)(x2 + y2) • Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression	3	16–22
	Arithmetic with Polynomials and Rational Expressions	• Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials • Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. • Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.		
	Creating Equations	• Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. • Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. • Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.		

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Claim	Anchors	Missouri Learning Standards (MLS)	DOK Limit	Range of Points per MLS
	Reasoning with Equations and Inequalities	• Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. • Solve quadratic equations in one variable. • Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. • Graph the solutions to a linear inequality in two variables as a half plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.		
Functions				
Functions	Interpreting Functions	• Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. • Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. • Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).	3	18–24
	Building Functions	• Identify the effect on the graph of replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. • Find inverse functions.		
	Linear, Quadratic and Exponential Models	• Distinguish between situations that can be modeled with linear functions and with exponential functions. • Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). • Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. • For exponential models, express as a logarithm the solution to abct = d where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using technology.		

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Claim	Anchors	Missouri Learning Standards (MLS)	DOK Limit	Range of Points per MLS
Stats & Probability				
Stats & Probability	Interpreting Categorical and Quantitative Data Using Probability to Make Decisions	• Represent data with plots on the real number line (dot plots, histograms, and box plots). • Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. • Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling. • Evaluate and compare strategies on the basis of expected values.	3	0–6

Table 2.37. Actual Point Distributions for the Summer 2014 Algebra II Operational Form

Reporting Category	Target #Items/Points (SR)	Actual #Items/Points (SR)
Numbers and Operations	7–9	8
Algebraic Relationships	20–30	22
Data and Probability	10–13	10
Total #Items/Points	**40**	**40**

Table 2.38. Actual Point Distributions for the Fall 2014 Algebra II Operational Form

Reporting Category	Target #Items/Points (SR)	Actual #Items/Points (SR)
Number and Quantity	0–4	0
Algebra	16–22	16
Function	18–24	24
Stats and Probability	**0–6**	**0**

Table 2.39. Actual Point Distributions for the Spring 2015 Algebra II Operational Form

Reporting Category	Target #Items/Points (SR)	Actual #Items/Points (SR)
Number and Quantity	0–4	0
Algebra	16–22	17
Function	18–24	23
Stats and Probability	**0–6**	**0**

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2.4.6. Geometry

Summer 2014:

The Geometry Assessment measures a student's ability to solve problems by applying mathematical concepts. The three strands assessed on the Geometry Assessment are as follows:

- Algebraic Relationships
- Geometric and Spatial Relationships
- Measurement

The 40 SR items are aligned to the strands listed above. Table 2.40 contains targets for the CLE point distribution on the Geometry operational form for Summer 2014. Some Big Ideas are not represented in this table because they are not assessed at this course level.

Table 2.42 contains actual point distributions for the Summer 2014 operational form.

Fall 2014 and Spring 2015:

Beginning in Fall 2014, the strands being assessed for Geometry changed from three strands to two strands:

- Geometry
- Statistics and Probability

The 40 SR items are aligned to Geometry. Table 2.41 contains targets for the CLE point distribution on the Geometry operational forms. Tables 2.43 and 2.44 contain actual point distributions for the Fall 2014 and Spring 2015 operational forms, respectively.

Table 2.40. Target Point Distributions for the Geometry Operational Forms—Summer 2014

Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
Algebraic Relationships Strand				
Understand patterns, relations, and functions	Create and analyze patterns	Generalize patterns using explicitly or recursively defined functions	2	1–2
	Classify objects and representations	Compare and contrast various forms of representations of patterns	3	1–2
	Identify and compare functions	Understand and compare the properties of linear and nonlinear functions	2	1–2
Represent and analyze mathematical situations and structures using algebraic symbols	Describe and use mathematical manipulation	Apply appropriate properties of exponents to simplify expressions and solve equations	2	1–2

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Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
Use mathematical models to represent and understand quantitative relationships	Use mathematical models	Identify quantitative relationships and determine the type(s) of functions that might model the situation to solve the problem	2	2–3
Analyze change in various contexts	Analyze change	Analyze linear and quadratic functions by investigating rates of change, intercepts, and zeros	3	2–3
Geometric and Spatial Relationships Strand				
Analyze characteristics and properties of two- and three-dimensional geometric shapes and develop mathematical arguments about geometric relationships	Describe and use geometric relationships	Use inductive and deductive reasoning to establish the validity of geometric conjectures, prove theorems, and critique arguments made by others	3	6–7
Specify locations and describe spatial relationships using coordinate geometry and other representational systems	Use coordinate systems	Make conjectures and solve problems involving two-dimensional objects represented with Cartesian coordinates	3	6–7
Apply transformations and use symmetry to analyze mathematical situations	Use transformations on objects	Use and apply constructions and the coordinate plane to represent translations, reflections, rotations, and dilations of objects	2	3–4
	Use symmetry	Identify types of symmetries of two- and three-dimensional figures	2	3–4
Use visualization, spatial reasoning, and geometric modeling to solve problems	Recognize and draw three-dimensional representations	Draw and use vertex-edge graphs or networks to find optimal solutions and draw representations of three-dimensional geometric objects from different perspectives	3	4–5
	Draw and use visual models	Draw or use visual models to represent and solve problems	3	
Measurement Strand				
Apply appropriate techniques, tools, and formulas to determine measurements	Use angle measurement	Solve problems of angle measure, including those involving triangles or other polygons and of parallel lines cut by a transversal	2	4–5

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Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
	Apply geometric measurements	Determine the surface area and volume of geometric figures, including cones, spheres, and cylinders	2	3–4
	Use relationships within a measurement system	Use unit analysis to solve problems	2	

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Table 2.41. Target Point Distributions for the Geometry Operational Forms—Fall 2014 and Spring 2015

Claim	Anchors	Missouri Learning Standards (MLS)	DOK Limit	Range of Points per MLS
Geometry				
Geometry	Congruence	• Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. • Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. • Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself. • Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another. • Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent. • Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions. • Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints. • Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point. • Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.	3	34–40

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Claim	Anchors	Missouri Learning Standards (MLS)	DOK Limit	Range of Points per MLS
	Similarity, Right Triangles and Trigonometry	• Verify experimentally the properties of dilations given by a center and a scale factor • Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides. • Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar. • Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. • Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.		
	Circles	• Prove that all circles are similar. • Identify and describe relationships among inscribed angles, radii, and chords.		
	Expressing Geometric Properties with Equations	• Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation. • Use coordinates to prove simple geometric theorems algebraically. • Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems • Find the point on a directed line segment between two given points that partitions the segment in a given ratio • Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula		
	Geometric Measurement and Dimensions	• Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems • Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects		
	Linear, Quadratic and Exponential Models	• Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios)		
Stats & Probability				
Stats & Probability	Conditional Probability and the Rules of Probability	• Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems • Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects	3	0–6
	Using Probability to Make Decisions			

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Table 2.42. Actual Point Distributions for the Summer 2014 Geometry Operational Form

Reporting Category	Target #Items/Points (SR)	Actual #Items/Points (SR)
Algebraic Relationships	7–12	8
Geometric and Spatial Relationships	22–27	24
Measurement	7–9	8
Total #Items/Points	**40**	**40**

Table 2.43. Actual Point Distributions for the Fall 2014 Geometry Operational Form

Reporting Category	Target #Items/Points (SR)	Actual #Items/Points (SR)
Geometry	40	40
Total #Items/Points	**40**	**40**

Table 2.44. Actual Point Distributions for the Spring 2015 Geometry Operational Form

Reporting Category	Target #Items/Points (SR)	Actual #Items/Points (SR)
Geometry	40	40
Total #Items/Points	**40**	**40**

2.4.7. Government

The Government Assessment measures a student's ability to understand our history and participate in our civic life as citizens and consumers. The Government forms consist of 40 SR items that are aligned to the following strands:

- Principles of Constitutional Democracy
- Principles and Processes of Governance Systems

Table 2.45 contains targets for the CLE point distribution on the Government operational forms. Some Big Ideas are not represented in this table because they are not assessed at this course level. Tables 2.46, 2.47, and 2.48 contain actual point distributions for the Summer 2014, Fall 2014, and Spring 2015 operational forms, respectively.

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Table 2.45. Target Point Distributions for the Government Operational Forms

Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
Principles of Constitutional Democracy Strand				
Knowledge of the principles expressed in documents shaping constitutional democracy in the United States	Principles of constitutional democracy in the United States	Apply the following principles of constitutional democracy to historical and contemporary issues: a. checks and balances b. separation of powers c. federalism d. representation e. popular sovereignty f. due process of law g. judicial review	3	2–4
		Determine the civic responsibilities of individual citizens	2	2–4
		Assess the changing roles of government: a. philosophy b. limits c. duties	2	2–4
		Describe the historical foundations of the U.S. governmental system as reflected in the following documents: a. Magna Carta b. Enlightenment writings of Hobbes, Locke, Rousseau, Montesquieu, and the Social Contract Theory c. Mayflower Compact d. Declaration of Independence e. Articles of Confederation	3	2–4
		Identify and give examples of democracies and republics	2	2–4
	Role of citizens and government in carrying out constitutional principles	Explain the relevance and connection of constitutional principles in the following documents: a. U.S. Constitution b. Federalist Papers c. Amendments to the Constitution, emphasizing the Bill of Rights d. Key Supreme Court decisions, *Marbury v. Madison*, *McCulloch v. Maryland*, *Miranda v. Arizona*, *Plessy v. Ferguson*, *Brown v. Topeka Board of Education*	3	2–4

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Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
Principles and Processes of Governance Systems Strand				
Knowledge of principles and processes of governance systems	Principles and purposes of government	Describe the structure of government and the purposes of laws (with emphasis on the federal and state governments) in general	1	4–5
		Explain the importance of the following principles of government: a. limited government b. majority rule and minority rights c. constitution and civil rights d. checks and balances e. merits of the above principles	2	4–5
	Processes of governmental systems	Explain the processes pertaining to: a. selection of political leaders (with an emphasis on presidential and parliamentary systems) b. functions and styles of leadership (including authoritarian, democratic, and laissez-faire) c. governmental systems d. how laws and rules are made, enforced, changed, and interpreted	2	4–5
		Evaluate the roles and influence of political parties and interest groups	3	4–5

Table 2.46. Actual Point Distributions for the Summer 2014 Government Operational Form

Reporting Category	Target #Items/Points (SR)	Actual #Items/Points (SR)
Principles of Constitutional Democracy	18–22	20
Principles and Processes of Governance Systems	18–22	20
Total #Items/Points	**40**	**40**

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Table 2.47. Actual Point Distributions for the Fall 2014 Government Operational Form

Reporting Category	Target #Items/Points (SR)	Actual #Items/Points (SR)
Principles of Constitutional Democracy	18–22	20
Principles and Processes of Governance Systems	18–22	20
Total #Items/Points	**40**	**40**

Table 2.48. Actual Point Distributions for the Spring 2015 Government Operational Form

Reporting Category	Target #Items/Points (SR)	Actual #Items/Points (SR)
Principles of Constitutional Democracy	18–22	20
Principles and Processes of Governance Systems	18–22	20
Total #Items/Points	**40**	**40**

2.4.8. American History

The American History Assessment measures a student's ability to understand U.S. history and participate in U.S. civic life as citizens and consumers. The American History forms consist of 40 SR items that are aligned to the Missouri, United States, and World History strand. Individual CLEs within that strand report out to the following categories:

- History
- Government
- Economics
- Geography

Table 2.49 contains targets for the CLE point distribution on the American History operational forms. Some Big Ideas are not represented in this table because they are not assessed at this course level. Tables 2.50, 2.51, and 2.52 contain actual point distributions for the Summer 2014, Fall 2014, and Spring 2015 operational forms, respectively.

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Table 2.49. Target Distributions for the Am. History Operational Forms

Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
Missouri, United States, and World History Strand				
Knowledge of continuity and change in the history of Missouri and the United States	Understand the migrations of people from many regions to North America	Describe the migrations of people from many regions of the world and the interactions of cultures and religious traditions that have contributed to America's history from Reconstruction to the present: a. motivations for immigration b. challenges to immigrants	3	3–4
	Political development in the United States	Analyze the evolution of American democracy, its ideas, institutions, and political processes from Reconstruction to the present, including: a. Reconstruction b. struggle for civil rights c. expanding role of government d. expanding participation in political processes	3	3–4
	Understanding economic concepts	Apply the following major economic concepts in the context of the historical period studied: a. natural resources, labor, and capital resources b. supply and demand (shortages and surpluses) c. business cycle d. government regulation and deregulation e. unemployment and full employment f. inflation and deflation g. savings and investment h. profit	3	2
	Principles and purposes of government	Explain the importance of the following principles of government since Reconstruction a. majority rule and minority rights b. constitution and civil rights c. checks and balances	2	4
	Processes of governmental systems	Analyze the roles and influence of political parties and interest groups since Reconstruction to the present	3	4

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Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
Knowledge of continuity and change in the history of Missouri and the United States	Economic development in the United States	Describe the historical development of the American economy, including a. impact of geographic factors b. role of the frontier and agriculture c. impact of technological change and urbanization on land, resources, society, politics, and culture d. changing relationships between government and the economy	2	3–4
	Understanding the roles of people, business, and government in the economic system of the United States	Analyze the roles people, business, labor unions, and government play in the U.S. economy: a. how monopolies affect people's lives and how they are regulated b. how boycotts, strikes, and embargoes affect trade and people's options c. monetary policy (why the Federal Reserve System influences interest rates and money supply) d. fiscal policy (government taxation and spending)	3	2
	Understanding functions and effects of economic institutions	Survey the functions and effects of major economic institutions of the U.S. economy, such as corporations, labor unions, and financial institutions	2	2
	Understanding the roles of the government in the U.S. economy	Identify the roles of government in the U.S. economy (defining and protecting property rights, maintaining competition, promoting goals such as full employment, stable prices, growth, and justice)	2	2
	Understanding relationships within places	Distinguish major patterns and issues with regard to population distribution, demographics, settlements, migrations, and cultures in the United States.	2	4
	Understanding relationships between and among regions	List and explain criteria that give regions their identities in different periods of U.S. history. Explain how and why regions change.	2	4

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Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
Knowledge of continuity and change in the history of Missouri and the United States	Foreign and domestic policy developments	Describe and evaluate the evolution of U.S. domestic and foreign policies from Reconstruction to the present, including a. isolationism b. immigration policy c. Manifest Destiny d. imperialism e. two world wars f. Cold War g. New Deal h. global interdependence	3	3–4
	Causes, comparisons, and results of major twentieth-century wars	Examine the wars of the twentieth century pertinent to U.S. history, including causes, comparisons, consequences, and peace efforts	2	3–4

Table 2.50. Actual Point Distributions for the Summer 2014 Am. History Operational Form

Reporting Category	Target #Items/Points (SR)	Actual #Items/Points (SR)
History	14–18	16
Government	7–9	8
Economics	7–9	8
Geography	7–9	8
Total #Items/Points	**40**	**40**

Table 2.51. Actual Point Distributions for the Fall 2014 Am. History Operational Form

Reporting Category	Target #Items/Points (SR)	Actual #Items/Points (SR)
History	14–18	12
Government	7–9	12
Economics	7–9	8
Geography	7–9	8
Total #Items/Points	**40**	**40**

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Table 2.52. Actual Point Distributions for the Spring 2015 Am. History Operational Form

Reporting Category	Target #Items/Points (SR)	Actual #Items/Points (SR)
History	14–18	12
Government	7–9	12
Economics	7–9	8
Geography	7–9	8
Total #Items/Points	**40**	**40**

2.5. Development of Test Items

Content-related evidence of validity supporting test interpretation is presented in terms of how the MO EOC Assessments were assembled. Detailed information regarding both item-development procedures and content coverage is included in this section.

The forms for the Fall 2008 through the Spring 2015 administrations were constructed using items field tested in Spring 2008, Spring 2009, or Spring 2010. During the process of building the forms for the operational test administrations, statistical characteristics (i.e., p-values and point-biserial correlations) were monitored to ensure that the statistical properties of the forms were similar within each content area and across operational test forms for fall, spring, and summer.

Riverside Publishing test development specialists created a detailed item and passage development plan based on the blueprints for each content area. The plans included the number of items necessary for each assessed CLE, as well as an outline of the review process for developed items and passages. This process included internal Riverside Publishing reviews, DESE item review, and a content and bias review by Missouri educators.

2.5.1. Item Writing

Missouri educators, DESE staff members, Regional Instructional Facilitators (curriculum and assessment specialists housed in each of Missouri's nine Regional Professional Development Centers), and Riverside Publishing test development specialists created all the test items, including the PEs. English II passages and WPs and English I passages were developed by item writers trained by Riverside Publishing, Riverside Publishing test development specialists, and DESE staff. These passages were developed and refined prior to the item-writing workshops. Requirements to be an item writer included experience in classroom teaching and expert content knowledge.

In September 2007 and June 2008, Riverside Publishing conducted item-writing workshops to develop SR items for English II, Algebra I, and Biology as well as PEs for Algebra I and Biology. In January 2008, Riverside Publishing conducted item-writing workshops to develop SR items for Algebra II, Geometry, Government, and American History. These workshops were conducted at the Assessment Resource Center (ARC) in Columbia, MO. Participants in the workshops included Missouri educators, DESE staff, Regional Instructional Facilitators, and Riverside Publishing test development specialists. The workshops were held over a five-day period and were conducted with 15–20 teacher participants per content area. Teacher participants were selected by DESE to represent school districts throughout Missouri. The content developed at the workshops was based on the Missouri Show-Me Standards and CLEs.

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The English II participants wrote SR items associated with the passages that had been developed prior to the item-writing workshops. The Algebra I and Biology participants wrote SR items and PEs along with rubrics. Biology PEs consist of a science investigation scenario and several associated CR items and were written based on an existing Science PE development template that specified the types of tasks and numbers of items that compose a PE.

In March 2008, Riverside Publishing conducted item-writing workshops to develop SR items for English I. English I participants wrote SR items associated with the passages that had been developed prior to the item-writing workshops.

During the item-writing workshops, Riverside Publishing test development specialists conducted training sessions with the item writers and provided instructions on avoiding bias and stereotyping of groups and individuals based on gender, race, ethnicity, religion, age, language, socioeconomic group, and disability. Riverside Publishing test development specialists also trained item writers to write items that adhere to the principles of universal design, making the items accessible to the widest range of students. For example, items and passages were written using clear and concise language, and all art, graphs, and tables were labeled and were not overly crowded with extraneous information. Instruction was also provided on developing items at particular cognitive levels based on Norman Webb's DOK levels.

Riverside Publishing test development specialists trained item writers to enter content into the company's electronic content management system. During training, each item writer wrote several items and received feedback on them. Participants also received feedback through the content management system as Riverside Publishing test development specialists responded to teachers' items as they were submitted. As items were produced, they were continuously reviewed, revised, edited, and evaluated by Riverside Publishing test development specialists and DESE staff. Item writers who generated high-quality work on or ahead of schedule were given additional assignments.

As items were written, they were tracked according to the item development plan. Riverside Publishing kept careful records to maintain a workflow that generated items in assessment strands and CLEs as required by the test blueprint. All items and passages went through several rounds of internal reviews, including content and editorial reviews. Riverside Publishing test development specialists reviewed each item with respect to alignment, clarity, and correspondence with item specifications.

2.5.2. Universal Design

Riverside Publishing test development specialists were experienced in employing the principles of universal design in item development so that all students have equal access to the assessments. Riverside Publishing included these principles when training Missouri teachers to write the items.

According to the NCEO Synthesis Report 44 (Thompson, Johnstone, & Thurlow, 2002) universally designed assessments have seven elements:

1. Inclusive assessment population
2. Precisely defined constructs

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3. Accessible, nonbiased items
4. Amenable to accommodations
5. Simple, clear, and intuitive instructions and procedures
6. Maximum readability and comprehensibility
7. Maximum legibility

All items for the MO EOC Assessments were developed with these elements in mind. Riverside Publishing ensured the development of MO EOC items in accordance with these principles in the following manner:

- Items were developed to include a wide array of contexts and cultures. These item types may make students feel more included, increase motivation, and avoid bias.

- The test and item specifications served as a model for precisely defining the constructs that the tests would measure. These specifications indicated to the item writer, content reviewer, and test development specialists exactly what was to be measured. The item could assess a particular part of a standard or a combination of elements within a standard. The reviews served as a method for eliminating items that included assessment of knowledge outside the standard. For example, a Mathematics item should have nonmathematical vocabulary below grade level, otherwise the item might also be assessing reading ability, introducing construct-irrelevant variance.

- The review of items, which included Missouri teachers from diverse ethnic and geographic backgrounds, served to ensure that all items were accessible to as many students as possible.

- Riverside Publishing staff members trained Missouri teachers to create clear and simple instructions so that students would have a clear understanding of the task needed to answer an item. Teacher review committees had an opportunity to review the instructions to ensure that they were appropriate for the grade levels and content areas. To ensure the appropriateness of the level of the vocabulary, Children's Writer's Word Book and EDL Core Vocabulary were employed by test developers and item review committees.

- Finally, items with text, art, tables, maps, and diagrams were constructed with maximum legibility.

2.5.3. Content and Bias Review Process

Standard 3.6[10] addresses the importance of item review by an examination of the item statistics and the use of expert panels of judges. This section details the steps taken to ensure that the items chosen for the operational forms of the MO EOC Assessments were of high technical quality and

[10] **Standard 3.6:** The type of items, response formats, scoring procedures, and test administration procedures should be selected based on the purposes of the test, the domain to be measured, and the intended test takers. To the extent possible, test content should be chosen to ensure that intended inferences from test scores are equally valid for members of different groups of test takers. The test review process should include empirical analyses and, when appropriate, the use of expert judges to review items and response formats. The qualifications, relevant experiences, and demographic characteristics of expert judges should also be documented (p. 44).

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were free from bias. Content and bias reviews were conducted in November 2007 and July 2008 in Columbia, MO. The content review committees included DESE staff, Missouri educators from around the state, Regional Instructional Facilitators, and Riverside Publishing staff.

The content and bias review committees reviewed SR items and PE/WPs using the following criteria:

- Overall quality and syntactical clarity
- Content coverage and content appropriateness
- Alignment to the specified CLE
- Appropriate contexts
- One clearly correct answer and plausible distractors for SR items
- Freedom from bias or any racial, socioeconomic, gender, or other sensitivity issues

The bias review committee was held separately from the content review committee and focused on reviewing items on the last criterion above. Suggestions from the bias review committee were then shared with the content review committee for their review and a determination on how to incorporate the edits.

Before reviewing the items, a group training session was held with all committee members. Riverside Publishing presented a PowerPoint that described the MO EOC program, the test development process, and the content and bias review procedures. After the large-group session, the committee members went to their respective break-out rooms to discuss the week's activities in more detail. The committee members were provided with copies of the CLEs and item specifications for the courses for the items they were to review. Each Riverside Publishing content facilitator reviewed these documents with the committee and answered any questions. The committee members were given the following checklists that could be referenced throughout the review process:

For SR items:

- ☐ Does the item assess the assigned CLE?
- ☐ Is the item clear, concise, and complete?
- ☐ Does the item contain accurate and sufficient content information?
- ☐ Is the item grade-level appropriate, and are the vocabulary and syntax appropriate for the students at the intended grade? (Reference the EDL Core Vocabularies.)
- ☐ Is the item fair to all students and free of bias and sensitivity issues?
- ☐ Does the item have correct punctuation, and is it grammatically correct?
- ☐ Is the item free from spelling and typographical errors?
- ☐ Is clueing avoided within an item stem and options, as well as among items?
- ☐ Does the item stand alone? (The answer to one item should not be dependent on the content of another item.)
- ☐ Are the equations, tables, charts, graphs, and other art clear, accurate, and necessary?
- ☐ Does the item have only one correct answer?
- ☐ Does the item have unique, plausible distractors containing common errors students would make?

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- ☐ Are all the options parallel in form and arranged in logical order?
- ☐ Do all distractors contain clear rationale statements? (Mathematics and Science only)
- ☐ Is the item free from absolutes ("none of the above," "all of the above") as options and free from the use of negatives ("not," "none," "except") in the stem?
- ☐ Does the item avoid repeating words from the stem in the options?
- ☐ Does the item pose a single problem (although the solution may require more than one step)?

For PE/WPs:

- ☐ Does the item assess the assigned CLE?
- ☐ Does the item clearly specify how the student should respond?
- ☐ Does the item allow for a variety of acceptable responses for the student to get full credit?
- ☐ Is the item grade-level appropriate, and are the vocabulary and syntax appropriate for the students at the intended grade? (Reference the EDL Core Vocabularies.)
- ☐ Is the item rich enough to elicit an appropriate range of responses covering all possible score points?
- ☐ Is the item fair to all students and free of bias and sensitivity issues?
- ☐ Does the rubric clearly define an acceptable answer or answers at each score point level?

Missouri educators participated in the review process for each content area. The committee members read and reviewed each item. Discussions were held about whether the items met the criteria listed above. The committees then rejected or revised any items they deemed unsatisfactory. If there was disagreement about how to proceed with an item, the Riverside Publishing facilitator polled the group and followed the direction of the majority. Between approximately 95% and 98% of the items were accepted (as–is or with edits) by the content and bias committees. Tables 2.53 and 2.54 show the number of items reviewed in 2007 and 2008, respectively. The accepted items in Table 2.53 were placed in a pool of items from which the 2008 standalone field-test forms were built. The accepted items in Table 2.54 were placed on EFT forms in the 2009 operational administrations.

To further preserve validity, all item review sessions were held in secure meeting rooms, and all materials were confidential. Committee members were required to sign confidentiality agreements so that the integrity of the test content was not compromised. Although educators were encouraged to share information with their colleagues about the process of the item review, they were made fully aware of the expectation that any information about specific items and passages was to remain secure and confidential.

Table 2.53. 2007 Content/Bias Item Review Acceptance Rates

Test Period	Total Number of Items Presented for Review	Number of Items Accepted (as-is or with edits)	Acceptance Rate (items accepted as-is or with edits)
English II	404	398	99%
Algebra I	239	233	97%
Biology	402	365	91%

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Table 2.54. 2008 Content/Bias Item Review Acceptance Rates

Test Period	Total Number of Items Presented for Review	Number of Items Accepted (as-is or with edits)	Acceptance Rate (items accepted as-is or with edits)
English II	298	298	100%
Algebra I	288	288	100%
Biology	164	161	98%
English I	669	669	100%
Algebra II	490	488	99.5%
Geometry	488	471	97%
Government	492	474	96%
Am. History	494	470	95%

2.6. Test Form Assembly

2.6.1. Field-Test Selection and Administration

The items accepted at the content/bias review were used to build the standalone field-test forms administered in Spring 2008 and Spring 2009. Field-test items were selected so that each form met the established operational blueprint requirements for content coverage as closely as possible. For any standalone field-test form that deviated slightly from the blueprint, another field-test form made up for that difference so that the entire pool of field-tested items met the blueprint requirements.

The MO EOC Spring 2008 field test consisted of 10 SR forms per course, 10 English II WPs, 10 Algebra I PE forms, and 10 Biology PE forms. All field-test forms were reviewed and approved by DESE.

The MO EOC Spring 2009 field test consisted of 10 SR forms of 36 items each for Algebra II, Geometry, Government, and American History. English I field tested 14 unique forms with 36 items on each form. All field-test forms were reviewed and approved by DESE. Both standalone field tests were census tests of all students enrolled in courses corresponding to the MO EOC Assessments. The forms for each course were spiraled at the student level across the state.

2.6.2. Statistical Item Review

After completion of the 2008 field-test item scoring and again after completion of the 2009 field-test item scoring, Riverside Publishing test development specialists and psychometricians reviewed the statistical characteristics of the items. Riverside Publishing used classical item statistics, including n-counts, p-values, percentage choosing each response option, point-biserial correlations, and differential item functioning (DIF) analysis for the SR items. Additionally, the Rasch model was used for distractor analysis for the SR items and for DIF analysis for the PE/WPs.

During the data review, Riverside Publishing Research and Test Development staff and DESE staff reviewed student performance on the Spring 2008 field-test items for English II, Algebra I, and Biology and on the Spring 2009 field-test items for English I, Algebra II, Geometry, Government, and American History. Items were carefully reviewed with respect to their

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statistical characteristics. Item reviewers from DESE and Riverside Publishing were provided with the following information:

- Form
- Position
- Item as it appeared in the printed books
- Item alignment to the Missouri Show-Me Standards
- The p-value of the correct answer and percentage of students who selected each distractor (for SR items only)
- Mean and SD of item score (for PE/WPs only)
- Point-biserial correlation of correct response and point-biserial for each distractor (for SR items only)
- Total number of students who attempted to answer each question
- DIF using the Mantel-Haenszel (MH) (1959) procedure and the Educational Testing Service (ETS) classification (for SR items only)

Riverside Publishing and DESE staff reviewed items that were flagged because of statistics that fell outside the parameters determined by the Riverside Publishing Research staff. Table 2.55 contains the guidelines that were used for data review.

Table 2.55. Criteria for Flagged Items

Item Flagging Criteria	Indicates
If p-value of keyed response < 0.35	Difficult item
If p-value of keyed response > 0.95	Easy item
If p-value of keyed response <p-value of distractor	Possible miskey
If p-value of distractor > 0.35	Possible second correct option
If point-biserial of keyed response < 0.20	Poorly discriminating item
If point-biserial of a distractor is > 0.00	Possible second correct option
If ETS classification is B or C (from DIF analysis)	Possible bias in item

Each flagged item was reviewed, and then Riverside Publishing and DESE decided whether the item should be accepted or rejected. The review included items flagged with moderate to severe DIF (an ETS classification of B or C). A flagged item was accepted if the review team determined that the item was strong and tested students on content they were expected to know. Accepted items were then made available in the pool of items that could be used to create the operational forms. Items the review team felt were biased or inappropriate for the MO EOC Assessments were rejected. Rejected items were removed from the item pool, making them invalid for the MO EOC Assessments. Of the 690 total items reviewed for English II, Algebra I, and Biology, 91% were accepted. Of the 2,233 total items reviewed for English I, Algebra II, Geometry, Government, and American History, 93% were accepted.

2.6.3. Operational Test Selection and Administration

Riverside Publishing test development specialists selected operational items for test forms for use in each administration cycle. Using IRT item difficulty values, six equivalent operational forms and one released form were selected for each content area. The operational forms are

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administered in the summer, fall, and spring of each administration cycle according to a prescribed form rotation schedule.

The operational forms construction process was based on content requirements and statistical criteria. The steps associated with assembling the test forms included the following:

1. Determine form design. Each form includes item positions for operational items, field-test items, and/or linking items. Embedded field testing was discontinued in 2010–2011 due to budget constraints, and from 2010–2011 forward, field-test positions were occupied by field-test items that had been previously administered and scored.

2. Select items that meet content specifications. Each form was constructed based on the test specifications for that content area. The test specifications delineate the item distribution across assessment strands. They also outline the test length, type of items, and number of points to be assessed at each CLE.

3. Evaluate statistical specifications and select items to meet these specifications. Spreadsheets (form matrices) are used to ensure that the test forms meet statistical specifications. These matrices contain the following statistics: average p-values, point-biserial correlations, and DIF statistics. Riverside Publishing psychometricians conducted a review of the test forms to ensure equivalence of test difficulty across forms.

4. Review and approve test forms. Once the content and statistical specifications were met for each content area, the forms were reviewed and approved by DESE. The forms were then released for production and additional content and editorial reviews.[11]

2.7. Braille and Large Print Versions

Beyond employing the principles of universal design, all operational assessments were offered in Braille and Large Print versions for visually impaired students taking the MO EOC Assessments. To accommodate these students, two operational Paper/Pencil versions of each assessment were converted into Braille and Large Print as follows:

- English II, Algebra I, and Biology: Fall 2008 and Spring 2009
- English I, Algebra II, Geometry, Government, and American History: Fall 2009 and Spring 2013

Once the Braille and Large Print forms were created for each assessment, reviews were held with educators from Missouri who had specialized training in working with visually impaired students.

A Large Print form review for English II, Algebra I, and Biology was held in Jefferson City, MO, at the DESE offices on Sept. 29, 2008. A Braille review was held in St. Louis, MO, at the Missouri School for the Blind on Oct. 10, 2008. Braille and Large Print reviews for English I,

[11] Rasch values were not available for all items when the 2008–2009 operational forms were built.

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Algebra II, Geometry, Government, and American History were held on Sept. 17 and 18, 2009, and on March 26, 2013.

The teachers consulted the Large Print and Braille Style Guide, which was also used during form composition, and relied on their own expertise to determine whether changes to directions, passages, or items were needed, or whether items should be omitted. Riverside Publishing Braille vendor (Region IV) also reviewed the forms and made recommendations based on how items, passages, and directions would be transcribed to Braille.

Riverside Publishing and DESE reviewed the recommendations from all of these sources. It was determined that no items had to be omitted to accommodate Large Print students. For the Braille version of the form, one item from English II, one item from English I, and three items from Geometry were removed because the content of the item prohibited transcription to Braille. Students taking the Braille form were given credit for these items. The EFT items were eliminated from both versions of these forms due to the irregular testing conditions and the small sample sizes for these groups. For English II, Algebra I, and Biology, the two Braille and Large Print test versions were alternated in each administration cycle through the Spring 2014 administration. For English I, Algebra II, Geometry, Government, and American History, the first Braille and Large Print test versions to be selected were used for each operational administration since 2009–2010. The second form was used in Fall 2013 and Spring 2014.

2.8. Online Forms Construction

All items were field tested in Paper/Pencil format, and all test forms were originally developed for administration in either Paper/Pencil or online format. All items were written so that they could be presented in an online delivery system without any alterations. In 2008–2009 and 2009–2010, school districts could select either a Paper/Pencil administration or online administration for all EOC Assessments. In 2010–2011, Missouri began moving toward a full implementation of online administration of all MO EOC Assessments. English I, Algebra II, Geometry, Government, and American History were available only for online administration, whereas English II, Algebra I, and Biology continued to be available in both online and Paper/Pencil. To assist in a smooth transition to online administration of all MO EOC Assessments without interruption of data trends, Riverside Publishing completed an online comparability study of the MO EOC Assessments (see Appendix C of the *2013–2014 MO EOC Technical Report* for the full report. Based on the results of the study, the MO Technical Advisory Committee (TAC) reached a consensus that the move from paper/pencil to online administration would not affect student performance.

Beginning in 2011–2012, Questar was tasked with moving all MO EOC Assessments to an online delivery platform (with the exception of the Paper/Pencil, Braille, and Large Print test forms for students needing such accommodations). More information on the current online test administration can be found in Chapter 5.

2.9. Quality Control for Test Construction

Checklists and quality control procedures accompanied each stage of form development. Following is a list of some quality control procedures used during the assembly of the MO EOC Assessment forms:

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- Construct forms based on all content requirements noted in the test blueprint and test specifications.
- Verify correct number of items per standard or reporting category based on test blueprint.
- Review items to ensure a wide sampling of the knowledge and skills being measured.
- Ensure that all items have been through the appropriate review procedures and are approved for use by DESE.
- Check for a variety of item topics, equal distribution of males and females, ethnicities, etc.
- Verify appropriate portions of items with and without artwork.
- Check for clueing across all items on each form.
- Verify equal or nearly equal distribution of answer choices for SR items.
- Ensure that the test meets the required statistical specifications (i.e., that as many items as possible have p-values between .35 and .90 and as many items as possible have point-biserial correlations above .20).
- Consider any statistical flags or problems.
- Check statistics to ensure that the collection of items on a given form yields an overall difficulty that falls within the specified range.
- Verify that items have not been released to the public.
- Verify correct answer key for each item.
- Perform content review of form (senior staff).
- Perform statistical review of form (psychometrician/statistician).
- Send form to DESE for review and approval.

2.10. Summary

The MO EOC Assessments provide an indication of student progress toward achieving the knowledge and skills identified in the Missouri Show-Me Standards. Just as the Show-Me Standards guided the item development and selection process, the consideration of content played an equally important role in form development. Form development required a balance of both content coverage and item difficulty. As items were selected for inclusion on particular forms, every effort was made to balance the content coverage to ensure the items aligned to the Missouri Show-Me Standards and CLEs being assessed while simultaneously considering the overall difficulty of the forms.

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Chapter 3: Achievement-Level Setting

3.1. Introduction

Achievement-level setting (or standard setting) workshops for the MO EOC Assessments were conducted in 2008, 2009, and 2015. A cutpoint validation workshop was also conducted in 2015.

- The 2008 standard setting applied to English II, Algebra I, and Biology.
- The 2009 standard setting applied to English I, Algebra II, Geometry, Government, and American History.
- The 2015 standard setting applied to Physical Science.
- The 2015 cutpoint validation applied to English I, English II, Algebra I, Algebra II, and Geometry.

This chapter provides an overview of the standard setting and cutpoint validation processes. For more detailed information on the 2008 and 2009 standard settings, see Chapter 3 of the *2009–2010 MO EOC Phase I and Phase II Technical Reports* at http://dese.mo.gov/college-career-readiness/assessment/assessment-technical-support-materials. For detailed information on the 2015 standard setting, see Appendix C of this technical report. For detailed information on the 2015 cutpoint validation, see Appendix D.

One purpose of assessment is to establish clear guidelines for educational decision-making. By assigning meaning to test scores, standard setting allows policymakers, administrators, teachers, parents, and students to make statements about the level of proficiency of individual students and groups of students. Important information from the 2008, 2009, and 2015 standard setting and cutpoint validation events is provided since the cut scores established at those workshops were applied to the 2014–2015 test scores.

3.2. Goal of Standard Setting

The main goal of the standard setting events was to establish three cut scores for the MO EOC Assessments:

1. The cut score that differentiates Below Basic performance from Basic performance
2. The cut score that differentiates Basic performance from Proficient performance
3. The cut score that differentiates Proficient performance from Advanced performance

The determination of three cut scores yields four achievement levels for each assessment.

3.3. Goal of Cutpoint Validation

The main goal of the cutpoint validation was to validate the existing cut scores for the English I, English II, Algebra I, Algebra II, and Geometry Assessments.

3.4. Overview of the 2008 and 2009 Standard Settings

Consistent with the methods used for prior MAP standard setting events, the modified Angoff method allowed three distinct rounds of panelist judgments. Between the first and second rounds, Riverside Publishing provided the panelists with item-difficulty data for their consideration. Because operational data were not available in November for English II, Algebra I, and Biology,

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the item data for the 2008 standard setting were derived from the 2008 field test. Panelists were appropriately cautioned about the limitations of such data. Similarly, because operational data were not available in November for English I, Algebra II, Geometry, Government, and American History, the item data for the 2009 standard setting were derived from the Spring 2009 field test. Panelists were appropriately cautioned about the limitations of such data.

Before the last round of judgments, Riverside Publishing staff provided the panelists with statewide impact data for the assessment. These data were intended to serve as an anchor for the panelists' recommendations. Again, because actual performance data were not available, the data were based on projected statewide score distributions generated from the field tests.

Despite the limitations of the field-test data, panelists were provided with tentative data, both to mirror procedures used for establishing standards for previous Missouri assessments and to provide panelists with an "external reality check" on their evolving recommendations. Missouri TAC discussions confirmed the appropriateness of the use of these projected statewide impact data.

In addition to the caveats about item level and impact data, panel facilitators clearly communicated to the panelists that the results of their standard setting activities would be purely advisory to DESE, which would then consider the recommendations and present them to the Missouri State Board of Education for approval.

3.4.1. Panelists

Forty-six panelists participated in the 2008 standard setting workshop: 14 in English II, 15 in Algebra I, and 17 in Biology. One to three members of each panel had participated in an earlier standard setting workshop for other Missouri assessments. Most panelists had not been members of any of the committees for MO EOC development activities. More than half of each panel was comprised of active classroom teachers in the relevant content area; several other panel members were other professional educators such as administrators and curriculum coordinators. One or two members of each panel were business professionals with expertise in the relevant field.

Seventy-three panelists participated in the 2009 standard setting workshop. Three members of the English I panel and two members of the Geometry panel had participated in an earlier standard setting workshop for other Missouri assessments. A small portion (approximately 10%) of the panelists had worked on some phase of standards development or assessment development at the state level. The remaining panelists were involved in leadership activities in their individual districts as they implemented the MO EOC Assessments and aligned curriculum to the CLEs. More than half of each panel was comprised of active classroom teachers in the relevant content area. Several other panelists were nonteacher professional educators, such as administrators and curriculum coordinators.

3.4.2. Staffing

Staff from Questar, then a subcontractor to Riverside Publishing, planned and facilitated the 2008 and 2009 standard setting workshops with consultation with Riverside Publishing's MO EOC Assessment team. In addition to the staff from Questar, two Riverside Publishing psychometricians attended the 2008 standard setting and three Riverside Publishing psychometricians attended the 2009 standard setting. Their function was to enter panelist data,

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produce tables and reports, and oversee data quality control as well as observe activities in each of the groups. A Riverside Publishing program manager was present for the entire workshop to assist DESE staff and the panelists with logistical issues. Content area specialists from Riverside Publishing's Content Development group were present in the panel rooms to serve as resources for content-related questions. Finally, DESE curriculum staff attended the standard setting workshops to serve as content resources to the appropriate panels.

3.4.3. Test Forms Used

For the 2008 standard setting, DESE used the MO EOC Spring 2009 operational forms for the standard setting event. These forms were selected from the several available operational forms because they would be the most widely used in the 2008–2009 test administration year. The English II, Algebra I, and Biology Assessments were comprised of SR items and a PE/WP. Each English II and Algebra I form included a single PE/WP worth 4 points. On the Biology Assessment, the PE consisted of 11 CR items, each worth between 0 and 4 points (for a total of 20 points).

For the 2009 standard setting, DESE used the MO EOC Spring 2010 operational forms for the standard setting event. These forms were selected from the several available operational forms because they would be the most widely used in the 2009–2010 test administration year. Although the final printed test books were not available yet at the time of the event, Riverside Publishing staff presented the panelists with prototypes that contained all the test items in the same order and with the same "look and feel" as the final printed test books. The English I, Algebra II, Geometry, Government, and American History Assessments were composed of only SR items.

3.4.4. Development of ALDs

The MO EOC Assessments use the same achievement level labels used for previous high school MAP assessments: Advanced, Proficient, Basic, and Below Basic. For each of these levels, the achievement level descriptor (ALD) describes the specific knowledge and skills that a student at that level is able to demonstrate. As suggested by Missouri's Technical Advisory Committee (TAC), DESE conducted sessions devoted to developing draft ALDs prior to the standard setting workshops.

At the standard setting workshops, panelists devoted a significant portion of time fine-tuning the draft ALDs for each assessment. The facilitators provided the panelists with draft copies of the appropriate ALDs, copies of the MO EOC Assessment blueprint, and the appropriate CLEs. Using these materials as references and drawing on the expertise of the panelists, Questar facilitators led each panel in an extended discussion and exercise to refine and elaborate on each of the ALDs. Once this activity was complete, the panels relied on the resulting ALDs as a reference during the actual standard setting activities. The panelists were also allowed to make appropriate, though generally minor, revisions and refinements to the ALDs during and after standard setting.

3.5. Overview of the 2015 Standard Setting

Physical Science was administered for the first time in Fall 2014, so a standard setting in February 2015 took place to establish recommended cut scores using modified Angoff method. The final standard setting report for Physical Science is provided in Appendix C.

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Neither the operational data or field test data were available for the 2015 Physical Science standard setting workshop, so the impact data based on the Biology Assessment was provided as a reference. The facilitator cautioned the panelists about relying too much on these impact data since it was for a different content area. The Physical Science Assessment contains only SR items. Only one test form was constructed in 2014, which will be used as the operational form in future administrations.

3.5.1. Panelists

Seven panelists participated in the 2015 standard setting workshop for Physical Science. Panelists included classroom teachers who taught Physical Science, Biology and Chemistry in Missouri schools; had administered the MO EOC Assessments in their respective content area; and were familiar with the standards.

3.5.2. Staffing

Questar provided staff members experienced in conducting standard setting to facilitate the panelist group. The facilitator was experienced with the Angoff and modified Angoff methods, and all panelists were trained on the method prior to implementation with ample time for any questions to be addressed. Psychometricians and a statistical analyst attended the workshop to assist with data analysis, oversee data quality control, and observe the activities. A Questar program manager was present to serve as a resource for questions related to the meeting logistics. DESE was also available during the standard setting workshop.

3.5.3. Development of ALDs

Since Physical Science was administered for the first time in Fall 2014, Questar worked with DESE to create draft ALDs for Physical Science prior to the standard setting. During the workshop, the draft ALDs were used as guidelines for evaluating student performance and were beneficial to the panelists as they defined the borderline students and established recommended cut scores. Panelists also discussed and fine-tuned the draft ALDs during the meeting. At the conclusion of the standard setting, DESE collected the panelist recommendations for ALD revisions for consideration in the final wording of the Physical Science ALDs.

3.6. Overview of the 2015 Cutpoint Validation

A cutpoint validation workshop was conducted in February 2015 for English II, Algebra I, English I, Algebra II, and Geometry. Changes to the test forms were not enough to conduct a full standard setting for these content areas, so cutpoint validation occurred instead to review the existing cut scores to determine if they were still appropriate. The final cutpoint validation report is provided in Appendix D.

Because the modified Angoff method was used for the initial 2008 and 2009 standard settings, the panelists received an overview of this method prior to reviewing the cutpoints in order to understand how the cutpoints were originally set.

3.6.1. Panelists

Nineteen panelists participated in the 2015 cutpoint validation workshop. Panelists included classroom teachers who taught English Language Arts and Mathematics in Missouri schools, had

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administered the MO EOC Assessments in their respective content area, and were familiar with the standards.

3.6.2. Staffing

Questar provided staff members experienced in conducting cutpoint validation to facilitate the panelist groups. Most facilitators held doctorates in educational measurement, and all panelists were trained on the method prior to implementation with ample time for any questions to be addressed. Psychometricians and statistical analysts also attended the workshop to oversee quality control, observe the activities, and provide statistical and technical support when needed. A Questar program manager was also present, as well as DESE staff members.

3.6.3. Development of ALDs

ALDs for English I, English II, Algebra I, Algebra II, and Geometry were revised prior to the 2015 cutpoint validation workshop to align to the Missouri Learning Standards. Questar team created draft ALDs for DESE to review. Questar then reviewed the ALDs with DESE and updated them based on DESE's feedback. During cutpoint validation, the draft ALDs were used as guidelines for evaluating student performance and were beneficial to the panelists as they evaluated impact data and reviewed the cut scores. Panelists also discussed and fine-tuned the draft ALDs during the meeting. At the conclusion of the cutpoint validation, DESE collected the panelist recommendations for ALD revisions for consideration in the final wording of the ALDs

3.7. 2008 and 2009 Standard Setting Process

This section provides details about the standard setting process that took place in 2008 and 2009, although the same general activities and process were used for the 2015 standard setting workshop for Physical Science. The 2015 standard setting report is provided in Appendix C, which details the process used during the workshop.

3.7.1. General Process Overview

The first 90 minutes of the three-day session served as an introduction and overview to the general standard setting processes. First, DESE briefly outlined the session purpose and intended outcomes. Next, Questar led a brief general overview titled "What Is Standard Setting?" to ensure a common understanding of the fundamental elements of the process. Questar included a brief overview of the general process of establishing student performance standards, ground rules for panelist activities, and some key elements for the panelists to focus on when attempting to set standards. Questar also advised the panelists that their work was advisory to DESE. This introduction was a high-level overview of the standard setting process, whereas individual facilitators provided more detail about each step in the process after the panels broke into content-specific groups.

Finally, Questar provided a general overview of the ALDs and their importance to the standard setting process. Because the panels would be reviewing, editing, and expanding on draft versions of the ALDs provided by the state, it was important for panelists to understand the critical role of the ALDs in the standard setting process. Following this activity, panelists divided into content-specific panel break-out rooms where all remaining work for the sessions took place.

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3.7.2. Panelists Take the Operational Assessments

After reconvening in the content-area panels, panelists introduced themselves and signed DESE-provided confidentiality forms. Facilitators also introduced themselves and reiterated the high-level standard setting processes that Questar had discussed during the opening session. Facilitators then allowed the panelists time to take and score the appropriate operational assessment. For this activity, panelists had access to the test administration procedures, the actual test content, and all relevant scoring materials. Field-test items included in these forms were removed from the test books seen by the panelists. Because these were "live" materials, facilitators stressed the confidentiality of all of the items.

The primary purpose of this activity was to familiarize panelists with the actual, complete assessment content prior to beginning the standard setting judgments. Following this review of the tests, each panel reacted to the assessment content: difficulty, sources of challenge, scoring issues, and general and specific reactions. This exercise provided the panelists, especially those not familiar with the MO EOC Assessments, with a context concerning the definition of Proficient as conveyed by the assessments.

3.7.3. Panelists Discuss and Fine-Tune the ALDs

At the standard setting workshop, panelists devoted a significant portion of time to fine-tuning the draft ALDs for each assessment. The facilitators provided the panelists with draft copies of the appropriate ALDs, copies of the MO EOC Assessment blueprint, and the appropriate CLEs. Using these materials as references and drawing on the expertise of the panelists, the Questar facilitators led each panel in an extended discussion and exercise to refine and elaborate each of the ALDs. Once this activity was complete, the panels relied on the resulting ALDs as a reference during the actual standard setting. In addition, the panelists were allowed to make appropriate, though generally minor, revisions and refinements to the ALDs during and after standard setting.

All panels began this activity with a review of the draft ALDs for the particular content area. Separate panels of Missouri educators had developed these draft ALDs during DESE-led sessions several weeks earlier. The ALD review activity was highly interactive, with panelists suggesting changes and other refinements—both substantive and editorial—to the draft ALDs. The ultimate task was to operationalize specific student outcomes indicating performance at the Advanced, Proficient, Basic, and Below Basic levels in the content area. Panel suggestions were discussed until consensus was reached and were then recorded on the draft ALDs, a copy of which was given to each panelist or placed on chart paper displayed around the room. Panelists could later refer to these pages, along with the original drafts, during the actual judgment activities. The thoroughness of the ALD refinement activities and the extent to which the panelists, individually and as a group, internalized the ALDs significantly affected the soundness of the subsequent standard setting activities.

At the conclusion of the standard setting sessions, DESE collected the panelist recommendations for ALD revisions for consideration in the wording of the final ALDs. See the *2009–2010 MO EOC Phase I and Phase II Technical Reports* for copies of both the draft and final ALDs for the 2008 and 2009 standard setting workshops, respectively.

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3.7.4. Orientation to the Modified Angoff Procedures

After completion of the ALD activity, facilitators oriented the panels to the specific tasks involved with the modified Angoff standard setting process. The modified Angoff process required panelists to read and make judgments about each successive item in the test book using the following procedures. When reading an item, panelists were to consider the item's importance in the context of the underlying CLE, the task(s) required of the student, and the item's difficulty. They were to decide what percentage of minimally Proficient students should be able to answer the item correctly. Panelists were then to decide what percentage of minimally Advanced students would answer the item correctly. Finally, they were to decide what percentage of minimally Basic students would answer the item correctly. (While the MO EOC Assessments contain four levels of student performance, cuts are made at only three locations on the score distribution.) The panelists were instructed to consider their judgments in this order—Proficient, Advanced, and Basic—as it anchors the item judgments on the most important cut, Proficient. In addition, once panelists made their judgment for the Proficient students, they had a clearer, more defined range of values to consider for the other two cuts.

For the PE/WPs, panelists were to consider the average item score of minimally Proficient, minimally Advanced, and minimally Basic students. In other words, judgments for the PE/WPs were made as whole-point values (i.e., 1, 2, 3, etc.) rather than as percentages of students answering correctly.

The facilitators included the following important points in their presentations:

- Panelists should focus on the threshold of performance in each category.
- Panelists should review and recall what each performance descriptor means.
- Panelists should focus on MO EOC students statewide, not just in the school or district in which they work.

Finally, the facilitators explained that the panelists' judgments should be made independently and anonymously and that security of the testing materials should be maintained at all times.

The second day of the standard setting workshop began with an overview of the previous day's activities and outcomes, after which panelists took a five-item SR qualifying test concerning the standard setting procedures they were about to use. This qualifying test was used to ensure that all panelists understood the importance of the ALDs and selected elements of the modified Angoff procedure before beginning the process of making item judgments.

Before moving on to the Round 1 judgments, facilitators asked the panelists to complete and sign a form indicating that they understood the information they had received and discussed and that they felt prepared to make their Round 1 judgments. All panelists so indicated.

3.7.5. Round 1 Judgments

Round 1 judgments were completed anonymously (via judge identification numbers known only to the individual panelist and Riverside Publishing staff) and independently. Panelists indicated their judgments on specially designed scannable rating sheets developed for each content area. These rating sheets contained three fields for each test item: one for Basic, one for Proficient,

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and one for Advanced. For the SR items, each field contained a set of bubbles corresponding to the percentage of students expected to choose the correct answer.

As panelists made their judgments for each item, facilitators instructed them to "bubble in" one value for each achievement level. In other words, for Item 1, the panelist entered a number corresponding to the percentage of students expected to choose a correct answer at the minimally Basic level, a number for the minimally Proficient level, and a number for the minimally Advanced level. Panelists were constrained to choosing multiples of 5 (i.e., 5%, 10%, 15%, etc.) as they appeared on the Rating Forms. Panelists then followed this same procedure for all the remaining SR items. For the PE/WPs, each field contained bubbles corresponding to the various point values possible for the item. Panelists made a judgment about how many points a borderline student at each achievement level would score on that item (i.e., how many points a Basic student would score, how many points a Proficient student would score, and how many points an Advanced student would score).

Most panelists completed their first round of judgments within 60 minutes; however, there was no time limit for this activity, and some panelists required 90 minutes to complete their judgments. This is not unusual for the first round of judgments in a modified Angoff workshop; often some panelists are still struggling to understand the task at this point, thus requiring more time to make their judgments. After panelists completed their judgments, they turned in their rating sheets and were excused.

3.7.6. Feedback and Discussion of Round 1 Judgments

In-between Round 1 and Round 2, the Riverside Publishing psychometricians prepared reports of the Round 1 judgment results. The next session began with an overview of these reports. The first report was a table displaying all three raw score cuts as determined individually by each panelist's judgments. This table also contained the entire panel's average, median, highest, and lowest raw-score cuts, as well as the standard deviation of all the panelists' judgments for each of the three raw-score cuts. The second report contained a frequency display of all three cut scores (Basic, Proficient, and Advanced) recommended by each panelist. This bar graph displayed all the panelists' judgments on a single graph so that areas of dispersion or overlap in the raw cut scores would be apparent. These reports were anonymous; ID numbers, rather than names, were used to identify individual panelists.

Facilitators reviewed these reports with the panelists to ensure that everyone understood how to interpret the information contained in them. Using the Round 1 results, facilitators then led an extended discussion of the Round 1 judgments that focused primarily on the panelists' judgments of individual items. Facilitators actively engaged all the panelists in the discussion to gauge whether they had indicated the item percentage values that they intended, that the reasoning processes they followed in making their judgments were consistent with good practice, and that the panelists clearly understood the mechanics of making item judgments. Throughout these discussions, facilitators focused on the key elements of the standard setting process: establishing the threshold of each cut, projecting the cuts for a statewide population of these students, and focusing on the particular course and performance level of the target populations.

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Much like a jury deliberation, this discussion also allowed the panelists to hear their peers' comments and rationales for their judgments. This phase took around one to two hours depending on the session; facilitators permitted discussion to continue until they perceived that all panelists were prepared to make their second round of judgments.

Next, facilitators distributed statewide item difficulty data derived from the 2008 field test. For the SR items, the derived item difficulties were item p-values. For the PE/WPs, the item difficulties were average item scores. Facilitators advised the panelists that caution should be taken in interpreting the item difficulty data since the data were collected during a standalone field test (and student motivation may not have been the same as it would be on an operational assessment). Facilitators also explained that these data were relevant, but not critical, to the process of setting standards.

3.7.7. Round 2 Judgments

During Round 2, panelists again made judgments independently about the percentage of students at the threshold of each achievement level that would answer each item correctly. Panelists could maintain their Round 1 judgments or revise them as they deemed appropriate. Before beginning Round 2, panelists were once more reminded of the key elements of the process and were asked to focus specifically on the ALDs for their assessment. Again, there was no time limit, although this round required significantly less time than did Round 1 because the panelists more clearly understood the judgment process. They were also increasingly familiar with the specific items for which they were making the judgments, and many panelists had begun to formulate some or all of their Round 2 item judgments during the discussion of the Round 1 results.

After panelists completed their Round 2 judgments and recorded their recommendations on their rating sheets, they submitted the forms and were excused. After all rating sheets were collected, Riverside Publishing psychometricians prepared the reports of the Round 2 judgments.

3.7.8. Feedback and Discussion of Round 2 Judgments

When the panels reconvened, facilitators presented the results of the Round 2 judgments. The reports showing the Round 2 results were used to guide another discussion of specific items. The presentation and discussion at this stage were similar to, although more focused than, those following Round 1.

Following this discussion, facilitators provided panelists with estimated statewide impact data (i.e., the percentage of students statewide whose performance would likely be labeled Below Basic, Basic, Proficient, or Advanced if the panels' Round 2 judgments were adopted). The panels' median Round 2 judgments were used to determine cut scores for this report. Again, facilitators advised the panelists that the impact data were relevant to, but not essential for, setting performance standards. (This cautionary information was especially important in the case of MO EOC Assessments, as the data were not grounded in an operational administration of the assessments.)

When facilitators were comfortable that all panelists were prepared to make their final recommendations, they proceeded to Round 3.

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3.7.9. Round 3 of Judgments, Meeting Evaluation, and Final Inspection of the ALDs

For Round 3, the panelists' judgments consisted of one recommended cut score for each achievement level; panelists were not required to make item-level judgments. Panelists were given unlimited time to complete their Round 3 (final) recommendations, although most completed their judgments within 20 minutes. All panelists clearly understood that only the Round 3 judgments counted as their recommendations and that the three rounds were not combined in any way to form the proposed cuts.

After completing their final round of judgments, panelists completed a written evaluation of the process that covered the panelists' opinions of the adequacy of the training provided and their comfort with and confidence in their judgments on a round-by-round basis. The form also contained spaces for the panelists to write other comments concerning the workshop. See the *2009–2010 MO EOC Phase I and Phase II Technical Reports* for a copy of this evaluation form.

After facilitators collected the evaluations, they allowed the panels time for a final review of the ALDs to discuss and, if necessary, fine-tune or revise the ALDs. Finally, panelists were thanked for their participation and dismissed.

3.7.10. Session Results by Panel and Round

See the *2009–2010 MO EOC Phase I and Phase II Technical Reports* for the feedback reports by round. Selected data from these graphs and tables are summarized below for ease of cross-round and cross-content-area comparison.

The standard setting literature typically considers the median recommendation to be the best indicator of a panel's judgment, as the median would not be impacted by the judgments of a few outlying panelists. In the case of the MO EOC standard setting, all median and mean cut scores are within a single rounded raw-score point for all content areas. Therefore, the choice of a measure of central tendency for these particular panels would not markedly affect the resulting cut scores.

Table 3.1 contains the median recommended cut scores for all rounds for English II, Algebra I, and Biology, and Table 3.2 contains the median recommended cut scores for all rounds for English I, Algebra II, Geometry, Government, and American History.

Table 3.1 indicates that the panels did not markedly change their typical recommended cut scores across the three rounds of judgments. This is not to say that individual panelists made the same recommendations across rounds. In fact, across the nine sets of judgments between rounds during the 2008 standard setting (three content areas with three cut scores each), the mean change in median raw cut scores was −0.5 between Rounds 1 and 2, −1.0 between Rounds 2 and 3, and −1.5 between Rounds 1 and 3. (The median raw-score change between any pair of rounds was 0.) Though the mean changes were minimal from round to round, individual panelists changed their round-to-round recommendations by as much as 17 raw-score points. Across all panels, the mean absolute value of raw cut score changes made was 1.5 between Rounds 1 and 2, 1.9 between Rounds 2 and 3, and 2.6 between Rounds 1 and 3.

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Similarly, Table 3.2 indicates that the panels did not markedly change their typical recommended cut scores across the three rounds of judgments. However, across the 15 sets of judgments between rounds (five content areas with three cut scores each), the average difference in the number of raw score points between cut scores was 0.67 between Rounds 1 and 2, 0.40 between Rounds 2 and 3, and 0.93 between Rounds 1 and 3. (The median raw-score change between any pair of rounds was 0.)

Table 3.3 provides the median recommended cut scores by round for Physical Science for easy reference, but please see Appendix C for the full report for the 2015 standard setting workshop.

Table 3.1. Median Recommended Cut Scores by Content Area and Round

	Content Area								
	English II			Algebra I			Biology		
Cut*	B	P	A	B	P	A	B	P	A
Round 1	16.5	24.5	32	13	23	32	20	35	48
Round 2	16.5	25.5	33	13	23	31	19	34	46
Round 3 / Final	15.5	24	33	13	22	31	18	32	45
# Points Possible	**39**			**39**			**55**		

* B = Basic; P = Proficient; A = Advanced

Table 3.2. Median Recommended Cut Scores by Content Area and Round

	Content Area														
	English I			Algebra II			Geometry			Government			Am. History		
Cut*	B	P	A	B	P	A	B	P	A	B	P	A	B	P	A
Round 1	18	26	32	14	23	33	17	27	33	15	25	33	18	26	32
Round 2	18	26	33	14	24	33	17	24	32	15	26	34	19	25	32
Round 3 / Final	16	25	33	16	24	33	17	24	32	15	25	34	19	25	32
# Points Possible	**40**			**40**			**40**			**40**			**40**		

* B = Basic; P = Proficient; A = Advanced

Table 3.3. Median Recommended Cut Score for Physical Science

Cut*	B	P	A
Round 1	12	23	32
Round 2	12	24	33
Round 3 / Final	12	24	33
# Points Possible	**45**		

* B = Basic; P = Proficient; A = Advanced

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As is typically the case with standard setting activities conducted over multiple rounds, the standard deviations of panelists' recommendations got smaller across rounds, indicating both an increasing level of panelist understanding of the process and increasing interpanel agreement based on group discussions between rounds of judgments. While panelists came closer to their peers in judging the most appropriate cut scores, even in Round 3—not unexpectedly—there was still a fair amount of spread in the recommended scores. That variability is especially notable in the Biology Assessment; however, this assessment is significantly longer than the others, which may partially account for the larger Round 3 variability.

Standard errors of the median judgments were computed for all cut scores across all panels. In no case did the Round 3 standard error reach a whole raw-score unit. Most were lower than half of a raw-score point. This indicates that the final median judgments were stable.

Table 3.4 summarizes the projected statewide percentages of students whose EOC scores would fall in each of the four achievement levels for English II, Algebra I, and Biology. Similarly, Table 3.5 summarizes the projected statewide percentages of students whose EOC scores would fall in each of the four achievement levels for English I, Algebra II, Geometry, Government, and American History.

Table 3.4. Projected Statewide Percentages of Students Scoring in the Various Achievement Levels on the MO EOC Assessments, 2008

Assessment	Achievement Level*			
	Below Basic	Basic	Proficient	Advanced
English II	15%	31%	39%	16%
Algebra I	18%	38%	33%	11%
Biology	12%	39%	39%	10%

*Percentages may not sum to 100% due to rounding.

Table 3.5: Projected Statewide Percentages of Students Scoring in the Various Achievement Levels on the MO EOC Assessments, 2009

Content Area	Achievement Level			
	Below Basic	Basic	Proficient	Advanced
English I	9%	34%	37%	20%
Algebra II	14%	45%	33%	8%
Geometry	18%	30%	38%	14%
Government	12%	44%	34%	10%
Am. History	23%	32%	30%	15%

3.7.11. Results of Panelist Evaluations

See the *2009–2010 MO EOC Phase I and Phase II Technical Reports* for the data collected from panelists on the evaluation form. Overall, these data indicate that the panelists understood what was expected of them and were comfortable with the process and the resulting cut scores.

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3.8. 2015 Cutpoint Validation Process

This section presents the process used for the 2015 cutpoint validation workshop for English I, English II, Algebra I, Algebra II, and Geometry EOC Assessments. Appendix D provides the full cutpoint validation report.

3.8.1. Day 1

3.8.1.1. General Process Overview

The first part of the meeting served as a high-level introduction to the general cutpoint validation process. This introduction included an overview of the MO EOC Assessments and the purpose and intended outcomes of the standard setting and cutpoint validation. It also included an overview of the previous MO EOC standard settings using the modified Angoff method.

Panelists were also provided with a general overview of the previous and draft ALDs. The importance of the ALDs to the cutpoint validation process was explained and emphasized during group discussion. Because the panelists reviewed, edited, and expanded on the draft versions of the ALDs, it was important for panelists to understand the critical role of ALDs in the standard setting and cutpoint validation processes.

3.8.1.2. Reviewing the Operational Assessment

Next, the cutpoint validation and standard setting panelists split up into their respective panels. For each cutpoint validation panel, the facilitator began by reiterating the high-level cutpoint validation process discussed during the opening session. Panelists then reviewed the Fall 2014 operational form for the first assigned content area using Questar's online content management system. For this activity, panelists had access to the test administration procedures, the actual test content, and all relevant scoring materials.

Because these were "live" materials, the facilitator stressed the confidentiality of the items. The primary purpose of this activity was to familiarize panelists with the assessment content prior to cutpoint validation. Panelists then discussed the assessment content such as difficulty, sources of challenges, scoring issues, and general and specific reactions. This exercise provided the panelists with a context concerning the definition of different achievement levels as conveyed by the assessments.

3.8.1.3. Discussing and Fine-Tuning the ALDs

The facilitator provided panelists with draft ALDs, blueprints, and the appropriate CLEs and Missouri Learning Standards so that the panelists could discuss and fine-tune the draft ALDs for the first content area. Using these materials as references and drawing on the expertise of the panelists, the facilitator led the panelists in an extended discussion and exercise to refine and elaborate on each of the ALDs. Once this activity was complete, panelists relied on the resulting ALDs as a reference during the cutpoint validation. Panelists were also allowed to make appropriate, though generally minor, revisions and refinements to the ALDs during and after the cutpoint validation activities.

Panelists began this activity with a review of the draft ALDs. This review was highly interactive, with panelists suggesting changes and other refinements, both substantive and editorial. The ultimate task was to operationalize specific behaviors indicating performance at the Below Basic, Basic, Proficient, or Advanced levels. Panelist suggestions were discussed until consensus was

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reached and then recorded on the draft ALDs, a copy of which was given to the panelists. Panelists referred to these pages, along with the original drafts, during the actual cutpoint validation activities. The thoroughness of the ALD refinement activities and the extent to which the panelists internalized the ALDs significantly impacted the soundness of the subsequent cutpoint validation procedures.

Panelists also determined 3–5 distinguishing characteristics between each adjacent set of achievement levels, which were used to describe the borderline students (as described earlier). At the conclusion of this session, DESE collected the panelist recommendations for ALD revisions for consideration in the final wording of the ALDs. Overall, the changes in the ALDs were minor.

3.8.1.4. Presentation of Impact Data

Impact data based on the Fall 2014 operational administration showed the percentages of students statewide whose performance would likely be labeled Below Basic, Basic, Proficient, or Advanced if the existing cuts scores were adopted. The facilitator provided panelists with these estimated statewide impact data, which was presented for informational purposes and gave the panelists an opportunity for discussions and adjustments during cut score review.

Impact data from the past five years for the Fall administrations was also presented. The historical impact data provided panelists additional information about student performance distribution over an extended period of time since it is desirable to have a consistent pattern of impact data throughout the years within the same content area.

The sample size for the Fall administration is typically much smaller than the sample size for the Spring administration. Given that both item statistics and impact data were based on the Fall 2014 administration, it was possible that large random error would be associated with the item statistics and impact data due to the small sample sizes associated with the Fall student population. Therefore, the facilitator let the panelists know that the statistical information based on the Fall 2014 administration was relevant to, but not essential for, verifying existing cut scores.

Throughout the presentation of impact data, the facilitator reviewed these reports with the panelists to ensure that everyone understood how to interpret the information contained in them. The discussion focused on panelists' judgments of the form, their understanding of the ALDs, and their expectations of how students would perform at a specific achievement level. The facilitator actively engaged all the panelists in the discussion to gauge whether they found the impact data consistent with their expectations, that the reasoning process they followed in making their judgments was consistent with good practice, and that the panelists clearly understood the relationship between the ALDs, students at different achievement levels, and the current cutpoints.

Throughout these discussions, the facilitator focused on the following key elements of the cutpoint validation process:

- Evaluating the threshold (borderline) of each cutpoint
- Projecting the cutpoints for a statewide population of students who took the MO EOC Assessment using historical and current impact data

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- Evaluating the average scores for subgroups based on student performance
- Focusing on the particular content area and achievement level of students who took the MO EOC Assessment

Much like a jury deliberation, these discussions allowed the panelists to hear their peers' comments and rationales for their judgments. The facilitator permitted discussion to continue until they perceived that all panelists were prepared to make their judgments about the existing cutpoints.

3.8.1.5. Presentation of the Ordered Item Booklet (OIB)

To provide context for panelists in evaluating the current cutpoints, the ordered item booklet (OIB) was provided to the panelists for each content area using Questar's online management system. Using the Fall 2014 operational data, the order of items by difficulty was indicated by the items' theta values, which were calculated using the Rasch model. A response probability value of .67 was used to calculate the difficulty ordering. The ordered items were then presented to panelists in the OIBs.

Each selected-response (SR) item appeared in the OIB only once, whereas each performance event/writing prompt (PE/WP) item appeared in the OIB once for each score point (e.g., a 4-point PE/WP item appeared in the OIB four times). This happens because the difficulty to obtain each score point differs.

3.8.1.6. Validating the Cutpoints

Following the presentation and discussion of the impact data and OIBs, the panelists indicated on a readiness form within Questar's content management system that they understood the information they had received and that they felt prepared to make their judgments about the existing cut scores.

During cutpoint validation, items associated with current cutpoints were indicated in the OIB. Panelists were asked to consider the following while evaluating the current cutpoints:

- The borderline students (as defined by the 3–5 distinguishing characteristics between each adjacent set of achievement levels)
- Impact data for the past five years (including the Fall 2014 impact data using current cutpoints)
- Focus on the particular content area and achievement level of students who took the MO EOC Assessment

Cutpoint validation was completed anonymously and independently via identification numbers known only to the individual panelist and Questar staff. After reviewing the current cutpoints in the OIBs, panelists determined whether they agreed with the current cutpoints. If not, they provided their recommended new cutpoints using Questar's online content management system by entering the OIB number associated with the item that best represented the borderline students at each achievement level.

Presenting the OIB using the online content management system is similar to but not exactly the same as a traditional printed OIB in a binder. For example, panelists can flip through the printed OIB binder and review multiple items and pages at the same time, whereas only one item was

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allowed to be on screen using the online content management system. However, no panelist indicated that being unable to view multiple items simultaneously on screen hindered his or her ability to validating the cutpoints.

The median cut scores for the content area of focus was considered the group-recommended cut scores for the cutpoint validation. Impact data based on the group-recommended cut scores were obtained and presented to the panelists after validation for the content area was complete.

3.8.2. Day 2

The second day began with panelists reviewing the operational form for the second content area, followed by discussing and fine-tuning the ALDs and presentation of impact data and OIBs for this content area. Given the experience and familiarity with Questar's online management system from the previous day, these activities required less time than the first content area. Panelists also had more understanding of the cutpoint validation process and became increasingly more familiar with the process as the day proceeded. After indicating on a readiness form within the online content management system that they understood the information they had received and discussed, panelists made their recommendation for the second content area.

Similar to the first content area, Questar's psychometricians and statistical analysts obtained the median cut scores based on the cutpoint validation and compared those to the existing cutpoints.

For the third content area for Panel 2, the panelists first reviewed the operational form, followed by discussing and fine-tuning the ALDs and presentation of impact data and OIBs. After indicating on the readiness form that they understood the information they had received and discussed, panelists made their recommendations for the third content area.

Once again, Questar's psychometricians and statistical analysts obtained the median cut scores based on the cutpoint validation and compared those to the existing cutpoints.

Once cutpoint validation for all content areas was complete, the facilitator presented the updated impact data based on the group-recommended cut scores. The facilitator also led a discussion while reviewing the updated impact data. Specifically, panelists discussed their expectations of the impact data, their overall impression of the cutpoint validation process, and their confidence level about the three cutpoints for each content area. Panelists were also given the opportunity to change their final cutpoint one more time if they needed to.

3.8.2.1. Evaluation Survey

After a thorough discussion of the final impact data based on the group-recommended cutpoints, individual panelists completed an evaluation survey that focused on the panelists' understanding of the cutpoint validation process and their confidence in their judgments. The survey also contained an open-ended question for the panelists to provide comments concerning the workshop.

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3.8.3. Cutpoint Validation Results

Table 3.6 presents the recommended cut scores from the cutpoint validation workshop. These new cuts will be used for future assessments.

Table 3.6. Cutpoint Validation Results

	Basic			Proficient			Advanced		
Content Area	**Theta**	**RS**	**SS**	**Theta**	**RS**	**SS**	**Theta**	**RS**	**SS**
English I	-0.55	18	175	0.58	27	199	2.01	37	232
English II	-0.69	17	180	0.45	27	198	2.06	38	225
Algebra I	-0.14	13	190	0.46	19	203	1.63	32	226
Algebra II	0.26	16	197	0.85	21	208	1.92	29	228
Geometry	-0.23	16	185	0.38	21	199	1.64	30	225

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Chapter 4: Item Analysis

4.1. Introduction

Item analyses were conducted for the MO EOC Assessments in English II, Algebra I, Biology, English I, Algebra II, Geometry, Government, American History, and Physical Science for 2014–2015. This chapter presents the summary information, which includes mean item scores and discrimination indices, at the item level for each content area.

The item summary statistics presented in this section (i.e., p-values, point-biserial correlations, and omit rates) are based on the operational administrations that included responses from 2,944 students for Summer 2014, 27,360 students for Fall 2014, and 300,894 students for Spring 2015 across all content areas. Differential item functioning (DIF) analyses were conducted for each content area for the Summer 2014, Fall 2014, and Spring 2015 administrations.

For SR items, item difficulty is the proportion of students who gave correct responses to the item (also referred to as p-value).For PE/WP items, the mean score is the average of the scores students who responded to these items. The discrimination index is the point-biserial correlation between the item score and the total score based on the remaining items (also referred to as corrected point-biserial correlation).

Table 4.1 lists the number of students by content area for each administration that were used in the analyses.

Table 4.1. N-Count per Content Area for Each Administration

Test Period	Content Area	N-Count
Summer 2014	English II	879
	Algebra I	77
	Biology	174
	English I	324
	Algebra II	164
	Geometry	362
	Government	107
	Am. History	857
	Total	**2,944**
Fall 2014	English II	5,130
	Algebra I	767
	Biology	660
	English I	3,169
	Algebra II	624
	Geometry	2,432
	Government	762
	Am. History	13,816
	Total	**27,360**

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Test Period	Content Area	N-Count
Spring 2015	English II	62,738
	Algebra I	20,885
	Biology	11,309
	English I	62,575
	Algebra II	17,914
	Geometry	62,304
	Government	11,256
	Am. History	45,701
	Physical Science	6,212
	Total	**300,894**

4.2. Analysis of Forms for Each End-of-Course Assessment

Tables 4.2 – 4.26 summarize item difficulty, discrimination, and omit rates for the items that composed each assessment for the Summer 2014, Fall 2014, and Spring 2015 operational administrations (items in field-test slots are not included in the tables). For SR items, the p-value is the proportion of students who answered the item correctly. For the PE/WPs, the mean value is the average student score on that item. The item discrimination, or corrected point-biserial correlation, is the correlation between students' item scores and their total scores on the remaining test items. Both item difficulty and item discrimination are expressed in the raw score metric.

When building a test form for the MO EOC Assessment, care is taken to refrain from choosing items with p-values less than 0.30 or greater than 0.95, or with negative point biserials. When p-values and point biserials are out of range, the answer keys are checked to verify that they are correct.

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Table 4.2. Item Statistics for English II, Summer 2014

N-Count: 879

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.62	0.21	0.00
2	0.81	0.32	0.00
3	0.60	0.34	0.00
4	0.83	0.38	0.00
5	0.78	0.29	0.00
6	0.47	0.28	0.00
7	0.62	0.35	0.00
8	0.47	0.30	0.01
9	0.60	0.33	0.01
10	0.50	0.34	0.00
11	0.68	0.33	0.00
12	0.66	0.43	0.00
24	0.68	0.47	0.01
25	0.59	0.39	0.01
26	0.52	0.26	0.01
27	0.54	0.43	0.01
28	0.42	0.21	0.01
29	0.27	0.14	0.01
30	0.45	0.36	0.01
31	0.47	0.37	0.01
32	0.51	0.31	0.01
33	0.52	0.27	0.01
34	0.61	0.29	0.01
35	0.57	0.32	0.01
36	0.57	0.37	0.01
37	0.41	0.22	0.01
38	0.52	0.31	0.01
39	0.63	0.42	0.01
40	0.46	0.38	0.01
41	0.39	0.34	0.01
43	0.78	0.40	0.01
44	0.43	0.29	0.01
45	0.53	0.20	0.01
46	0.42	0.31	0.01
47	0.60	0.50	0.01
PE*	2.53	0.43	0.02

*The English II PE is worth a total of 4 raw score points.

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Table 4.3. Item Statistics for Algebra I, Summer 2014

N-Count: 77

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.48	0.16	0.00
2	0.66	0.41	0.00
3	0.42	0.51	0.00
4	0.68	0.44	0.00
5	0.41	0.49	0.00
10	0.55	0.32	0.00
11	0.59	0.55	0.00
12	0.82	0.34	0.00
13	0.67	0.44	0.00
14	0.60	0.42	0.00
15	0.51	0.05	0.00
16	0.19	0.33	0.00
17	0.34	0.26	0.00
18	0.69	0.50	0.00
19	0.67	0.38	0.00
20	0.77	0.33	0.00
21	0.59	0.32	0.00
26	0.53	0.37	0.00
27	0.45	0.38	0.00
28	0.59	0.39	0.00
29	0.22	0.28	0.00
30	0.62	0.35	0.00
31	0.59	0.41	0.00
32	0.23	0.40	0.00
33	0.81	0.37	0.00
34	0.71	0.46	0.00
35	0.40	0.41	0.00
36	0.67	0.55	0.00
37	0.76	0.33	0.00
38	0.40	0.32	0.00
43	0.66	0.38	0.00
44	0.88	0.20	0.00
45	0.34	0.27	0.00
46	0.62	0.37	0.00
47	0.59	0.24	0.00
PE*	1.33	0.68	0.00

*The Algebra I PE is worth a total of 4 raw score points.

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Table 4.4. Item Statistics for Biology, Summer 2014

N-Count: 174

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.66	0.45	0.00
2	0.51	0.23	0.00
3	0.70	0.25	0.00
4	0.64	0.46	0.00
5	0.65	0.15	0.00
10	0.53	0.41	0.00
11	0.32	0.13	0.00
12	0.62	0.23	0.00
13	0.54	0.32	0.00
14	0.28	0.20	0.00
15	0.42	0.31	0.00
16	0.60	0.43	0.00
17	0.36	0.33	0.00
18	0.72	0.51	0.00
19	0.52	0.30	0.00
20	0.48	0.28	0.00
21	0.15	-0.08	0.00
26	0.59	0.41	0.00
27	0.73	0.44	0.00
28	0.53	0.50	0.00
29	0.41	0.38	0.00
30	0.72	0.46	0.00
31	0.67	0.36	0.00
32	0.49	0.18	0.00
33	0.41	0.17	0.00
34	0.42	0.05	0.00
35	0.43	0.16	0.00
36	0.51	0.37	0.00
37	0.68	0.51	0.00
38	0.56	0.31	0.00
43	0.53	0.38	0.00
44	0.30	0.27	0.00
45	0.51	0.28	0.00
46	0.41	0.23	0.00
47	0.48	0.12	0.00
PE1*	0.63	0.40	0.00
PE2	0.62	0.40	0.00
PE3	0.67	0.37	0.00
PE4	0.41	0.29	0.00
PE5	0.83	0.39	0.00

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PE6	1.35	0.54	0.00
PE7	0.73	0.34	0.00
PE8	0.34	0.40	0.00
PE9	0.73	0.52	0.00
PE10	0.47	0.34	0.00
PE11	0.48	0.39	0.00
PE12	0.62	0.36	0.00
PE13	0.45	0.44	0.00

*PE1 = 1 pt. PE4 = 1pt. PE7 = 1 pt. PE10 = 2 pts. PE13 = 1 pt.
PE2 = 1 pt. PE5 = 3 pts. PE8 = 1 pt. PE11 = 1 pt.
PE3 = 1 pt. PE6 = 4 pts. PE9 = 1 pt. PE12 = 2 pts.

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Table 4.5. Item Statistics for English I, Summer 2014

N-Count: 324

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.69	0.16	0.00
2	0.58	0.32	0.00
3	0.84	0.41	0.00
4	0.41	0.26	0.00
5	0.54	0.42	0.00
6	0.41	0.36	0.00
7	0.55	0.25	0.00
8	0.85	0.41	0.00
9	0.80	0.28	0.00
10	0.80	0.28	0.00
11	0.55	0.33	0.00
12	0.74	0.63	0.00
13	0.76	0.38	0.00
14	0.60	0.49	0.00
15	0.82	0.30	0.00
16	0.41	0.39	0.00
29	0.37	0.26	0.00
30	0.51	0.48	0.00
31	0.53	0.38	0.00
32	0.68	0.55	0.00
33	0.62	0.27	0.00
34	0.55	0.40	0.00
35	0.82	0.47	0.00
36	0.56	0.50	0.00
37	0.60	0.38	0.00
38	0.49	0.38	0.00
39	0.62	0.53	0.00
40	0.54	0.42	0.00
41	0.36	0.10	0.00
42	0.45	0.41	0.00
43	0.38	0.15	0.00
44	0.42	0.27	0.00
45	0.32	0.32	0.01
46	0.56	0.35	0.00
47	0.61	0.49	0.00
48	0.73	0.56	0.00
49	0.35	0.30	0.00
50	0.37	0.31	0.00
51	0.38	0.25	0.00
52	0.50	0.45	0.01

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Table 4.6. Item Statistics for Algebra II, Summer 2014

N-Count: 164

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.44	0.41	0.00
2	0.48	0.28	0.00
3	0.60	0.24	0.00
4	0.14	0.27	0.00
5	0.32	0.22	0.00
6	0.42	0.27	0.00
7	0.36	0.28	0.00
8	0.19	0.39	0.00
9	0.35	0.25	0.00
10	0.38	0.11	0.00
16	0.38	0.21	0.00
17	0.22	0.33	0.00
18	0.32	0.34	0.00
19	0.66	0.25	0.00
20	0.49	0.28	0.00
21	0.34	0.36	0.00
22	0.58	0.17	0.00
23	0.27	0.26	0.00
24	0.35	0.06	0.00
25	0.42	0.40	0.00
26	0.43	0.28	0.00
27	0.52	0.15	0.01
28	0.51	0.15	0.00
29	0.32	0.46	0.00
30	0.25	0.19	0.00
31	0.23	0.21	0.00
32	0.30	0.22	0.00
33	0.42	-0.01	0.00
34	0.53	0.27	0.00
35	0.38	0.34	0.00
41	0.49	0.31	0.00
42	0.45	0.29	0.00
43	0.62	0.16	0.00
44	0.40	0.29	0.00
45	0.44	0.37	0.00
46	0.35	0.07	0.00
47	0.45	0.09	0.00
48	0.25	0.29	0.00
49	0.26	0.35	0.00
50	0.26	0.21	0.00

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Table 4.7. Item Statistics for Geometry, Summer 2014

N-Count: 362

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.61	0.02	0.00
2	0.82	0.28	0.00
3	0.42	0.32	0.01
4	0.44	0.38	0.01
5	0.68	0.08	0.00
6	0.59	0.33	0.01
7	0.66	0.44	0.00
8	0.37	0.27	0.01
9	0.64	0.47	0.01
10	0.38	0.47	0.01
16	0.36	0.25	0.01
17	0.71	0.42	0.01
18	0.53	0.39	0.01
19	0.23	0.18	0.00
20	0.55	-0.09	0.00
21	0.49	0.29	0.00
22	0.67	0.43	0.00
23	0.68	0.37	0.00
24	0.45	0.33	0.00
25	0.63	0.52	0.00
26	0.47	0.32	0.00
27	0.50	0.54	0.00
28	0.50	0.46	0.00
29	0.49	0.30	0.00
30	0.59	0.27	0.00
31	0.50	0.48	0.00
32	0.29	0.45	0.00
33	0.59	0.17	0.00
34	0.60	0.56	0.00
35	0.38	0.54	0.00
41	0.50	0.25	0.00
42	0.50	0.15	0.00
43	0.41	-0.07	0.00
44	0.48	0.36	0.00
45	0.29	0.46	0.00
46	0.37	0.34	0.00
47	0.41	0.12	0.00
48	0.53	0.24	0.00
49	0.49	0.36	0.00
50	0.49	0.44	0.00

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Table 4.8. Item Statistics for Government, Summer 2014

N-Count: 107

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.67	0.39	0.00
2	0.54	0.09	0.00
3	0.38	0.22	0.00
4	0.84	0.49	0.00
5	0.60	0.34	0.01
6	0.85	0.46	0.01
7	0.75	0.43	0.01
8	0.60	0.32	0.01
9	0.73	0.45	0.01
10	0.77	0.54	0.01
16	0.57	0.46	0.01
17	0.37	0.21	0.01
18	0.67	0.30	0.01
19	0.72	0.47	0.01
20	0.81	0.38	0.01
21	0.70	0.45	0.01
22	0.65	0.46	0.01
23	0.53	0.34	0.01
24	0.57	0.40	0.01
25	0.63	0.49	0.01
26	0.66	0.53	0.01
27	0.68	0.49	0.01
28	0.51	0.17	0.01
29	0.74	0.51	0.01
30	0.74	0.56	0.01
31	0.76	0.49	0.01
32	0.61	0.52	0.01
33	0.63	0.42	0.01
34	0.71	0.51	0.01
35	0.77	0.34	0.01
41	0.58	0.43	0.01
42	0.61	0.35	0.01
43	0.79	0.52	0.01
44	0.53	0.32	0.01
45	0.79	0.43	0.01
46	0.57	0.47	0.01
47	0.48	0.28	0.01
48	0.68	0.49	0.01
49	0.60	0.51	0.01
50	0.54	0.46	0.01

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Table 4.9. Item Statistics for Am. History, Summer 2014

N-Count: 857

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.85	0.31	0.00
2	0.87	0.15	0.00
3	0.54	0.29	0.00
4	0.56	0.35	0.01
5	0.68	0.28	0.00
6	0.66	0.27	0.01
7	0.57	0.25	0.01
8	0.54	0.27	0.00
9	0.61	0.35	0.00
10	0.59	0.33	0.00
16	0.43	0.24	0.01
17	0.48	0.31	0.00
18	0.45	0.20	0.00
19	0.45	0.33	0.00
20	0.47	0.20	0.00
21	0.53	0.43	0.00
22	0.79	0.27	0.00
23	0.29	0.19	0.00
24	0.51	0.40	0.00
25	0.50	0.16	0.00
26	0.32	0.36	0.00
27	0.28	0.28	0.00
28	0.29	0.10	0.00
29	0.52	0.35	0.00
30	0.30	0.10	0.00
31	0.66	0.25	0.00
32	0.34	0.23	0.00
33	0.36	0.11	0.00
34	0.38	0.20	0.00
35	0.55	0.26	0.00
41	0.34	0.23	0.00
42	0.55	0.26	0.00
43	0.32	0.35	0.00
44	0.80	0.22	0.00
45	0.31	0.25	0.00
46	0.64	0.49	0.00
47	0.72	0.34	0.00
48	0.71	0.44	0.00
49	0.42	0.12	0.00
50	0.63	0.37	0.01

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Table 4.10. Item Statistics for English II, Fall 2014

N-Count: 5,130

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.74	0.37	0.00
2	0.38	0.19	0.00
3	0.74	0.34	0.00
4	0.44	0.30	0.00
5	0.68	0.39	0.00
6	0.86	0.43	0.00
7	0.63	0.45	0.00
14	0.60	0.32	0.00
15	0.49	0.28	0.00
16	0.72	0.44	0.00
17	0.62	0.39	0.00
18	0.32	0.21	0.00
19	0.64	0.50	0.01
20	0.30	0.26	0.00
21	0.51	0.34	0.00
22	0.66	0.53	0.00
23	0.33	0.22	0.00
24	0.69	0.44	0.00
31	0.76	0.52	0.00
32	0.66	0.59	0.00
33	0.47	0.16	0.00
34	0.71	0.55	0.00
35	0.52	0.45	0.00
36	0.77	0.52	0.00
37	0.56	0.39	0.00
38	0.69	0.55	0.00
39	0.38	0.29	0.00
40	0.78	0.53	0.00
41	0.65	0.50	0.00
42	0.53	0.35	0.00
43	0.57	0.47	0.00
44	0.46	0.36	0.00
45	0.44	0.23	0.00
46	0.25	-0.11	0.00
47	0.80	0.53	0.01
PE1*	2.59	0.70	0.01
PE2	2.57	0.69	0.01
PE3	1.69	0.56	0.01

*PE1 = 4 pts. PE2 = 4 pts. PE3 = 2 pts.

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Table 4.11. Item Statistics for Algebra I, Fall 2014

N-Count: 767

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.26	0.29	0.00
2	0.28	0.39	0.00
4	0.37	0.20	0.01
5	0.58	0.38	0.00
6	0.88	0.32	0.00
8	0.39	0.11	0.00
10	0.22	0.00	0.00
11	0.12	0.23	0.00
12	0.42	0.32	0.00
13	0.74	0.44	0.00
14	0.53	0.45	0.00
16	0.27	0.29	0.01
17	0.29	0.11	0.00
18	0.69	0.46	0.00
20	0.34	0.48	0.00
21	0.60	0.40	0.00
22	0.42	0.21	0.00
23	0.58	0.42	0.00
24	0.60	0.38	0.00
25	0.35	0.45	0.00
26	0.23	0.35	0.00
27	0.41	0.50	0.00
28	0.31	0.20	0.00
29	0.42	0.23	0.00
31	0.68	0.36	0.00
32	0.41	0.52	0.00
33	0.30	0.09	0.00
34	0.44	0.24	0.00
36	0.43	0.40	0.00
37	0.22	0.40	0.00
38	0.45	0.36	0.00
40	0.23	0.12	0.00
41	0.30	0.10	0.00
42	0.46	0.47	0.00
43	0.60	0.36	0.00
44	0.28	0.06	0.00
46	0.47	0.24	0.00
48	0.37	0.36	0.00
49	0.48	0.44	0.00
50	0.78	0.30	0.00

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PE1*	0.87	0.61	0.01
PE2	0.66	0.68	0.01
PE3	0.42	0.59	0.01
PE4	0.89	0.62	0.01

*PE1 = 2 pts. PE3 = 1 pt.
PE2 = 4 pts. PE4 = 3 pts.

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Table 4.12. Item Statistics for Biology, Fall 2014

N-Count: 660

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.73	0.42	0.00
2	0.69	0.46	0.00
3	0.88	0.27	0.00
4	0.54	0.37	0.00
5	0.69	0.46	0.00
10	0.60	0.41	0.00
11	0.66	0.45	0.00
12	0.50	0.32	0.00
13	0.59	0.53	0.00
14	0.46	0.41	0.00
15	0.53	0.20	0.00
16	0.64	0.46	0.00
17	0.84	0.47	0.00
18	0.57	0.55	0.00
19	0.41	0.46	0.00
20	0.31	0.21	0.00
21	0.49	0.22	0.00
26	0.65	0.56	0.00
27	0.61	0.41	0.00
28	0.34	0.59	0.00
29	0.47	0.35	0.00
30	0.33	0.23	0.00
31	0.40	0.38	0.00
32	0.48	0.48	0.00
33	0.57	0.48	0.00
34	0.51	0.49	0.00
35	0.60	0.43	0.00
36	0.57	0.49	0.00
37	0.49	0.41	0.00
38	0.61	0.44	0.00
43	0.61	0.28	0.00
44	0.54	0.38	0.00
45	0.39	0.37	0.00
46	0.54	0.42	0.00
47	0.72	0.55	0.01
PE1*	0.58	0.42	0.01
PE2	0.73	0.51	0.01
PE3	0.68	0.54	0.01
PE4	2.15	0.71	0.01
PE5	0.92	0.60	0.01

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PE6	1.04	0.53	0.01
PE7	0.98	0.58	0.01
PE8	0.54	0.57	0.01
PE9	0.56	0.63	0.01
PE10	0.82	0.59	0.01
PE11	0.63	0.59	0.01

*PE1 = 1 pt. PE4 = 4 pts. PE7 = 2 pts. PE10 = 3 pts.
PE2 = 1 pt. PE5 = 2 pts. PE8 = 1 pt. PE11 = 2 pts.
PE3 = 1 pt. PE6 = 2 pts. PE9 = 1 pt.

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Table 4.13. Item Statistics for English I, Fall 2014

N-Count: 3,169

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.83	0.41	0.00
2	0.67	0.30	0.00
3	0.43	0.04	0.00
4	0.66	0.32	0.00
5	0.74	0.49	0.00
6	0.94	0.41	0.00
7	0.82	0.53	0.00
8	0.82	0.52	0.00
9	0.86	0.48	0.00
10	0.69	0.36	0.00
11	0.70	0.46	0.00
12	0.86	0.45	0.00
13	0.56	0.30	0.00
14	0.19	0.09	0.00
15	0.34	0.20	0.00
16	0.20	0.21	0.00
17	0.69	0.38	0.00
18	0.72	0.34	0.00
19	0.52	0.33	0.00
20	0.35	0.10	0.00
21	0.71	0.24	0.00
22	0.67	0.28	0.00
23	0.83	0.37	0.00
24	0.49	0.47	0.00
25	0.33	0.31	0.00
26	0.38	0.21	0.00
27	0.63	0.28	0.00
28	0.27	0.19	0.00
29	0.57	0.30	0.00
30	0.84	0.44	0.00
31	0.59	0.49	0.00
32	0.66	0.36	0.00
33	0.64	0.40	0.00
34	0.60	0.47	0.00
35	0.61	0.35	0.00
PE1*	3.05	0.66	0.00
PE2	3.01	0.66	0.00
PE3	1.85	0.55	0.00

*PE1 = 4 pts. PE2 = 4 pts. PE3 = 2 pts.

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Table 4.14. Item Statistics for Algebra II, Fall 2014

N-Count: 624

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.71	0.43	0.00
2	0.81	0.26	0.00
3	0.37	0.44	0.00
4	0.66	0.27	0.00
5	0.71	0.53	0.00
6	0.51	0.47	0.00
8	0.68	0.43	0.00
10	0.78	0.39	0.00
11	0.87	0.41	0.00
12	0.78	0.40	0.00
13	0.48	0.38	0.00
14	0.47	0.39	0.00
15	0.71	0.39	0.00
16	0.38	0.20	0.00
17	0.54	0.33	0.00
18	0.37	0.20	0.00
19	0.54	0.51	0.00
20	0.74	0.45	0.00
21	0.51	0.23	0.00
22	0.72	0.29	0.00
23	0.70	0.46	0.00
24	0.62	0.37	0.00
27	0.66	0.33	0.00
28	0.51	0.49	0.00
29	0.63	0.34	0.00
30	0.67	0.29	0.00
31	0.76	0.51	0.00
34	0.35	0.34	0.00
37	0.37	0.45	0.00
39	0.51	0.33	0.00
40	0.73	0.50	0.00
41	0.71	0.38	0.00
42	0.42	0.37	0.00
44	0.52	0.32	0.00
45	0.57	0.52	0.00
46	0.67	0.45	0.00
47	0.84	0.33	0.00
48	0.31	0.32	0.00
49	0.49	0.45	0.00
50	0.65	0.23	0.00

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Table 4.15. Item Statistics for Geometry, Fall 2014

N-Count: 2,432

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.83	0.39	0.00
2	0.57	0.42	0.00
3	0.36	0.34	0.00
4	0.55	0.27	0.00
5	0.74	0.26	0.00
6	0.63	0.37	0.00
7	0.43	0.41	0.00
8	0.27	0.36	0.00
9	0.86	0.24	0.00
10	0.77	0.38	0.00
11	0.44	0.19	0.01
12	0.81	0.40	0.00
13	0.57	0.41	0.00
14	0.45	0.45	0.00
15	0.91	0.19	0.00
16	0.67	0.41	0.00
17	0.51	0.33	0.00
18	0.57	0.42	0.00
19	0.73	0.44	0.00
20	0.53	0.18	0.00
21	0.65	0.37	0.00
22	0.67	0.39	0.00
23	0.81	0.32	0.00
24	0.56	0.47	0.00
25	0.69	0.35	0.00
26	0.80	0.41	0.00
27	0.60	0.35	0.00
28	0.81	0.39	0.00
29	0.32	0.32	0.00
30	0.60	0.37	0.00
31	0.64	0.40	0.00
32	0.87	0.38	0.00
33	0.54	0.47	0.00
34	0.58	0.34	0.00
35	0.72	0.26	0.00
36	0.56	0.46	0.00
37	0.33	0.22	0.00
38	0.28	0.31	0.00
39	0.73	0.40	0.00
40	0.26	0.27	0.00

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Table 4.16. Item Statistics for Government, Fall 2014

N-Count: 762

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.79	0.42	0.00
2	0.61	0.47	0.00
3	0.83	0.39	0.00
4	0.73	0.28	0.00
5	0.91	0.26	0.00
6	0.79	0.34	0.00
7	0.80	0.41	0.00
8	0.77	0.42	0.00
9	0.63	0.37	0.00
10	0.51	0.22	0.00
16	0.57	0.20	0.00
17	0.69	0.34	0.00
18	0.77	0.38	0.00
19	0.69	0.30	0.00
20	0.58	0.22	0.00
21	0.78	0.14	0.00
22	0.35	0.21	0.00
23	0.30	0.28	0.00
24	0.70	0.30	0.00
25	0.68	0.47	0.00
26	0.46	0.33	0.00
27	0.42	0.12	0.00
28	0.56	0.38	0.00
29	0.66	0.44	0.00
30	0.69	0.41	0.00
31	0.32	0.19	0.00
32	0.50	0.52	0.00
33	0.39	0.25	0.00
34	0.69	0.39	0.00
35	0.44	0.35	0.00
41	0.55	0.46	0.00
42	0.72	0.29	0.00
43	0.70	0.52	0.00
44	0.50	0.27	0.00
45	0.84	0.45	0.00
46	0.73	0.40	0.00
47	0.52	0.22	0.00
48	0.83	0.38	0.00
49	0.73	0.35	0.00
50	0.82	0.31	0.00

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Table 4.17. Item Statistics for Am. History, Fall 2014

N-Count: 13,816

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.85	0.29	0.00
2	0.56	0.44	0.00
3	0.83	0.36	0.00
4	0.56	0.50	0.00
5	0.52	0.26	0.00
6	0.79	0.38	0.00
7	0.75	0.41	0.00
8	0.57	0.42	0.00
9	0.41	0.28	0.00
10	0.72	0.34	0.00
16	0.56	0.26	0.00
17	0.80	0.38	0.00
18	0.54	0.33	0.00
19	0.67	0.38	0.00
20	0.44	0.50	0.00
21	0.61	0.38	0.00
22	0.50	0.43	0.00
23	0.39	0.11	0.00
24	0.55	0.35	0.00
25	0.56	0.33	0.00
26	0.58	0.23	0.00
27	0.44	0.19	0.00
28	0.52	0.43	0.00
29	0.68	0.35	0.00
30	0.44	0.42	0.00
31	0.26	0.28	0.00
32	0.41	0.23	0.00
33	0.44	0.31	0.00
34	0.61	0.33	0.00
35	0.62	0.37	0.00
41	0.59	0.36	0.00
42	0.72	0.34	0.00
43	0.58	0.07	0.00
44	0.58	0.38	0.00
45	0.45	0.27	0.00
46	0.65	0.28	0.00
47	0.72	0.38	0.00
48	0.59	0.24	0.00
49	0.42	0.33	0.00
50	0.66	0.40	0.00

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Table 4.18. Item Statistics for English II, Spring 2015

N-Count: 62,738

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.55	0.07	0.00
2	0.78	0.39	0.00
3	0.90	0.39	0.00
4	0.58	0.22	0.00
5	0.93	0.32	0.00
6	0.81	0.37	0.00
7	0.87	0.39	0.00
14	0.73	0.45	0.00
15	0.82	0.28	0.00
16	0.79	0.47	0.00
17	0.38	0.16	0.00
18	0.72	0.31	0.00
19	0.59	0.31	0.00
20	0.75	0.39	0.00
21	0.54	0.23	0.00
22	0.69	0.29	0.00
23	0.61	0.35	0.00
24	0.36	0.20	0.00
31	0.82	0.32	0.00
32	0.66	0.24	0.00
33	0.69	0.48	0.00
34	0.35	0.14	0.00
35	0.62	0.12	0.00
36	0.46	0.19	0.00
37	0.60	0.37	0.00
38	0.59	0.35	0.00
39	0.58	0.33	0.00
40	0.75	0.50	0.00
41	0.71	0.51	0.00
42	0.81	0.51	0.00
43	0.42	0.36	0.00
44	0.80	0.41	0.00
45	0.72	0.48	0.00
46	0.65	0.33	0.00
47	0.87	0.39	0.00
PE1*	3.01	0.46	0.00
PE2	3.01	0.49	0.00
PE3	1.90	0.42	0.00

*PE1 = 4 pts. PE2 = 4 pts. PE3 = 2 pts.

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Table 4.19. Item Statistics for Algebra I, Spring 2015

N-Count: 20,885

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.56	0.30	0.00
2	0.49	0.07	0.00
4	0.41	0.29	0.00
5	0.95	0.23	0.00
6	0.54	0.47	0.00
8	0.42	0.26	0.00
10	0.81	0.43	0.00
11	0.50	0.32	0.00
12	0.20	0.37	0.00
13	0.56	0.41	0.00
14	0.50	0.32	0.00
16	0.64	0.48	0.00
17	0.44	0.38	0.00
18	0.51	0.41	0.00
20	0.61	0.42	0.00
21	0.65	0.33	0.00
22	0.28	0.16	0.00
23	0.75	0.40	0.00
24	0.35	0.11	0.00
25	0.56	0.13	0.00
26	0.44	0.24	0.00
27	0.91	0.23	0.00
28	0.85	0.36	0.00
29	0.45	0.41	0.00
31	0.53	0.33	0.00
32	0.41	0.29	0.00
33	0.60	0.42	0.00
34	0.70	0.43	0.00
36	0.51	0.40	0.00
37	0.75	0.40	0.00
38	0.54	0.47	0.00
40	0.37	0.24	0.00
41	0.57	0.27	0.00
42	0.75	0.46	0.00
43	0.49	0.30	0.00
44	0.54	0.13	0.00
45	0.46	0.37	0.00
48	0.59	0.38	0.00
49	0.68	0.52	0.00
50	0.39	0.33	0.00
*PE1	1.45	0.64	0.01
PE2	1.05	0.41	0.01
PE3	0.83	0.53	0.01

*PE1 = 4 pts. PE2 = 2 pts. PE3 = 4 pts.

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Table 4.20. Item Statistics for Biology, Spring 2015

N-Count: 11,309

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.93	0.36	0.00
2	0.93	0.27	0.00
3	0.85	0.26	0.00
4	0.79	0.44	0.00
5	0.85	0.35	0.00
10	0.85	0.37	0.00
11	0.80	0.51	0.00
12	0.82	0.46	0.00
13	0.76	0.24	0.00
14	0.63	0.38	0.00
15	0.61	0.27	0.00
16	0.81	0.35	0.00
17	0.65	0.34	0.00
18	0.64	0.53	0.00
19	0.72	0.39	0.00
20	0.82	0.42	0.00
21	0.59	0.36	0.00
26	0.67	0.37	0.00
27	0.73	0.31	0.00
28	0.76	0.51	0.00
29	0.66	0.45	0.00
30	0.77	0.48	0.00
31	0.63	0.38	0.00
32	0.42	0.15	0.00
33	0.55	0.35	0.00
34	0.62	0.33	0.00
35	0.44	0.06	0.00
36	0.59	0.38	0.00
37	0.58	0.36	0.00
38	0.44	0.19	0.00
43	0.55	0.38	0.00
44	0.61	0.39	0.00
45	0.39	0.32	0.00
46	0.40	0.23	0.00
47	0.43	0.23	0.00
PE1*	0.70	0.43	0.00
PE2	0.63	0.39	0.00
PE3	0.63	0.44	0.00
PE4	1.73	0.56	0.00
PE5	1.15	0.41	0.00

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PE6	2.13	0.46	0.00
PE7	2.72	0.61	0.00
PE8	1.21	0.46	0.00
PE9	0.98	0.21	0.00
PE10	0.97	0.19	0.00

*PE1 = 1 pt. PE4 = 3 pts. PE7 = 4 pts. PE10 = 1 pt.
PE2 = 1 pt. PE5 = 2 pts. PE8 = 3 pts.
PE3 = 1 pt. PE6 = 3 pts. PE9 = 1 pt.

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Table 4.21. Item Statistics for English I, Spring 2015

N-Count: 62,304

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.83	0.38	0.00
2	0.65	0.32	0.00
3	0.41	0.01	0.00
4	0.64	0.27	0.00
5	0.70	0.43	0.00
6	0.95	0.29	0.00
7	0.83	0.44	0.00
8	0.81	0.45	0.00
9	0.88	0.44	0.00
10	0.68	0.33	0.00
11	0.74	0.41	0.00
12	0.83	0.43	0.00
13	0.56	0.26	0.00
14	0.18	-0.02	0.00
15	0.33	0.16	0.00
16	0.19	0.20	0.00
17	0.68	0.28	0.00
18	0.70	0.34	0.00
19	0.52	0.32	0.00
20	0.32	0.11	0.00
21	0.73	0.16	0.00
22	0.71	0.30	0.00
23	0.82	0.34	0.00
24	0.42	0.45	0.00
25	0.30	0.29	0.00
26	0.35	0.11	0.00
27	0.64	0.34	0.00
28	0.28	0.15	0.00
29	0.56	0.24	0.00
30	0.86	0.36	0.00
31	0.58	0.44	0.00
32	0.68	0.36	0.00
33	0.58	0.39	0.00
34	0.61	0.43	0.00
35	0.61	0.31	0.00
PE1*	2.94	0.52	0.00
PE2	2.93	0.52	0.00
PE3	1.84	0.43	0.00

*PE1 = 4 pts. PE2 = 4 pts. PE3 = 2 pts.

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Table 4.22. Item Statistics for Algebra II, Spring 2015

N-Count: 17,914

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.39	0.36	0.00
2	0.63	0.34	0.00
3	0.43	0.25	0.00
4	0.73	0.31	0.00
5	0.61	0.44	0.00
6	0.38	0.22	0.00
8	0.37	0.44	0.00
10	0.46	0.33	0.00
11	0.71	0.46	0.00
12	0.79	0.42	0.00
13	0.85	0.32	0.00
14	0.77	0.35	0.00
15	0.76	0.43	0.00
16	0.40	0.35	0.00
17	0.91	0.21	0.00
18	0.69	0.31	0.00
19	0.77	0.31	0.00
20	0.77	0.35	0.00
21	0.71	0.45	0.00
22	0.67	0.27	0.00
23	0.70	0.34	0.00
24	0.75	0.34	0.00
27	0.34	0.27	0.00
28	0.69	0.43	0.00
29	0.30	0.18	0.00
30	0.41	0.44	0.00
31	0.48	0.19	0.00
34	0.65	0.36	0.00
37	0.69	0.44	0.00
39	0.39	0.31	0.00
40	0.66	0.35	0.00
41	0.52	0.41	0.00
42	0.59	0.39	0.00
44	0.36	0.33	0.00
45	0.34	0.29	0.00
46	0.50	0.28	0.00
47	0.82	0.37	0.00
48	0.65	0.24	0.00
49	0.64	0.41	0.00
50	0.48	0.28	0.00

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Table 4.23. Item Statistics for Geometry, Spring 2015

N-Count: 62,304

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.84	0.34	0.00
2	0.57	0.33	0.00
3	0.39	0.29	0.00
4	0.47	0.31	0.00
5	0.74	0.18	0.00
6	0.56	0.30	0.00
7	0.37	0.37	0.00
8	0.24	0.34	0.00
9	0.85	0.25	0.00
10	0.66	0.36	0.00
11	0.32	0.14	0.00
12	0.80	0.34	0.00
13	0.52	0.39	0.00
14	0.36	0.36	0.00
15	0.91	0.25	0.00
16	0.56	0.36	0.00
17	0.51	0.33	0.00
18	0.50	0.41	0.00
19	0.70	0.39	0.00
20	0.51	0.23	0.00
21	0.63	0.37	0.00
22	0.66	0.34	0.00
23	0.79	0.26	0.00
24	0.45	0.40	0.00
25	0.64	0.38	0.00
26	0.68	0.38	0.00
27	0.54	0.31	0.00
28	0.72	0.36	0.00
29	0.22	0.28	0.00
30	0.49	0.34	0.00
31	0.59	0.31	0.00
32	0.80	0.36	0.00
33	0.48	0.44	0.00
34	0.51	0.31	0.00
35	0.68	0.25	0.00
36	0.43	0.38	0.00
37	0.32	0.21	0.00
38	0.26	0.32	0.00
39	0.66	0.38	0.00
40	0.15	0.21	0.00

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Table 4.24. Item Statistics for Government, Spring 2015

N-Count: 11,256

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.84	0.43	0.00
2	0.92	0.29	0.00
3	0.76	0.43	0.00
4	0.85	0.29	0.00
5	0.71	0.29	0.00
6	0.79	0.28	0.00
7	0.67	0.43	0.00
8	0.85	0.30	0.00
9	0.79	0.38	0.00
10	0.63	0.24	0.00
16	0.29	0.27	0.00
17	0.62	0.15	0.00
18	0.39	0.21	0.00
19	0.56	0.18	0.00
20	0.38	0.35	0.00
21	0.70	0.18	0.00
22	0.40	0.28	0.00
23	0.34	0.22	0.00
24	0.46	0.31	0.00
25	0.47	0.42	0.00
26	0.26	0.19	0.00
27	0.70	0.34	0.00
28	0.77	0.31	0.00
29	0.63	0.40	0.00
30	0.63	0.44	0.00
31	0.46	0.34	0.00
32	0.54	0.20	0.00
33	0.67	0.43	0.00
34	0.61	0.49	0.00
35	0.47	0.31	0.00
41	0.80	0.42	0.00
42	0.86	0.43	0.00
43	0.76	0.48	0.00
44	0.84	0.40	0.00
45	0.67	0.50	0.00
46	0.84	0.37	0.00
47	0.76	0.41	0.00
48	0.67	0.36	0.00
49	0.73	0.45	0.00
50	0.78	0.32	0.00

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Table 4.25. Item Statistics for Am. History, Spring 2015

N-Count: 45,701

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.83	0.32	0.00
2	0.59	0.40	0.00
3	0.80	0.35	0.00
4	0.56	0.50	0.00
5	0.57	0.20	0.00
6	0.83	0.39	0.00
7	0.78	0.41	0.00
8	0.54	0.44	0.00
9	0.40	0.33	0.00
10	0.74	0.30	0.00
16	0.58	0.28	0.00
17	0.82	0.40	0.00
18	0.62	0.38	0.00
19	0.65	0.36	0.00
20	0.46	0.46	0.00
21	0.63	0.36	0.00
22	0.49	0.42	0.00
23	0.44	0.22	0.00
24	0.54	0.31	0.00
25	0.62	0.33	0.00
26	0.54	0.27	0.00
27	0.49	0.21	0.00
28	0.57	0.44	0.00
29	0.66	0.33	0.00
30	0.40	0.40	0.00
31	0.26	0.32	0.00
32	0.41	0.29	0.00
33	0.44	0.35	0.00
34	0.61	0.32	0.00
35	0.67	0.38	0.00
41	0.55	0.41	0.00
42	0.76	0.35	0.00
43	0.56	0.09	0.00
44	0.55	0.36	0.00
45	0.44	0.26	0.00
46	0.59	0.33	0.00
47	0.69	0.40	0.00
48	0.56	0.29	0.00
49	0.39	0.39	0.00
50	0.66	0.40	0.00

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Table 4.26. Item Statistics for Physical Science, Spring 2015

N-Count: 6,212

Item #	P-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.85	0.30	0.00
2	0.72	0.30	0.00
3	0.68	0.29	0.00
4	0.71	0.19	0.00
5	0.76	0.24	0.00
6	0.66	0.28	0.00
7	0.55	0.19	0.00
8	0.47	0.43	0.00
9	0.55	0.36	0.00
10	0.20	0.05	0.00
11	0.53	0.02	0.00
12	0.68	0.34	0.00
13	0.50	0.27	0.00
14	0.51	0.41	0.00
15	0.42	0.26	0.00
16	0.43	0.15	0.00
17	0.48	0.18	0.00
18	0.58	0.30	0.00
19	0.60	0.30	0.00
20	0.40	0.28	0.00
21	0.75	0.20	0.00
22	0.45	0.27	0.00
23	0.53	0.31	0.00
24	0.44	0.35	0.00
25	0.68	0.25	0.00
26	0.07	0.13	0.00
27	0.27	0.24	0.00
28	0.38	0.24	0.00
29	0.41	0.37	0.00
30	0.36	0.12	0.00
31	0.57	0.32	0.00
32	0.58	0.24	0.00
33	0.47	0.39	0.00
34	0.27	0.12	0.00
35	0.29	0.21	0.00
36	0.29	0.05	0.00
37	0.21	0.15	0.00
38	0.17	0.05	0.00
39	0.45	0.37	0.00
40	0.18	0.07	0.00
41	0.39	0.22	0.00
42	0.20	0.14	0.00
43	0.24	0.25	0.00
44	0.12	-0.08	0.00
45	0.14	0.01	0.00

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4.3. Speededness

The consequence of time limits on students' scores is called speededness. A test is speeded if examinees taking it score lower than they would have had the test not been timed. Most speededness statistics are based on the number of items that were not attempted by students. For the purpose of this analysis, if a student did not attempt the last item on any of the separately timed subsections of the test, it was assumed that the student might not have reached the item because he or she ran out of time.

The MO EOC Assessments were not designed to be speeded tests. Rather, they were intended to be "power tests"; that is, students are expected to have ample time to finish all items and prompts.

Item omit rates, especially for items appearing later in a test, are a gauge of potential test speededness. The "Omit Rate" column in Tables 4.2 – 4.26 shows the percentage of students who omitted each SR item for each MO EOC Assessment. It is clear from the tables that the omit rates are negligible or zero for the majority of items.

4.4. Differential Item Functioning (DIF)

Differential item functioning (DIF) occurs when an item has difficulty measures that vary substantially across subgroups of examinees with comparable ability. DIF was examined using the Mantel-Haenszel (MH) (1959) procedure for SR items and WINSTEPS for the PE/WPs. The Mantel-Haenszel method is a nonparametric approach to DIF. In the MH procedure, total raw scores are held constant while an odds ratio is estimated. In practice, the odds ratio is generally converted to the delta metric, and the Educational Testing Service (ETS) categorization is applied to flag the significance of DIF effects (Dorans & Holland, 1992).

With the groups matched on raw score, the comparable examinees can be placed in j 2 × 2 tables of group by item response, where j equals the number of levels of the matching variable. For these analyses, if j equals each observed score category of the k-item tests, with $j = 0, 1, 2,\ldots, k$, then one 2 × 2 table for a given item with score category j can be represented as the following:

	Correct	Incorrect	Total
Reference	y_j	x_j	m_j
Focal	y'_j	x'_j	m'_j
Total	n_j	n'_j	N_j

The Delta MH test statistic and variance have the following form:

$$DeltaMH = 2.35\ln\frac{\left[\sum_{j=0}^{K}\frac{\left(y_j x'_j - y'_j x_j\right)}{N_j}\right]}{\sum_{j=0}^{K}\frac{y'_j x_j}{N_j}}$$

where y_j, x_j, y'_j, and x'_j are the frequency counts of cells of the 2 × 2 tables, and N_j is the total n for the cells.

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The critical values of the ETS categorizations are 1.00 and 1.50 on the delta scale for categories A (negligible DIF), B (slight to moderate DIF), and C (moderate to severe DIF). Specifically, if the absolute value of delta is smaller than 1.00, the item is categorized as A. If the absolute value of delta is larger than or equal to 1.50, the item is classified as C. Otherwise items are categorized as B. In both the A and C categories, statistical significance is set at the 5% level for a single item.

Results of the DIF analyses for the items contained in the Summer 2014, Fall 2014, and Spring 2015 operational administrations are summarized in Tables 4.27, 4.28, and 4.29, respectively. In these analyses, male and white students were used as the reference group, and female, black, and Hispanic students were considered the focal group.

Table 4.27. Frequency Distribution of DIF Categories for the Summer 2014 Operational Assessments

			SR Items*					PE/WPs*				
Content Area	**Group****	**N-Count*****	**A****	**B****	**B–****	**C****	**C–****	**A****	**B****	**B–****	**C****	**C–****
Summer 2014												
English II	M/F	221/141	--	--	--	--	--	--	--	--	--	--
	W/B	156/166	--	--	--	--	--	--	--	--	--	--
	W/H	156/25	--	--	--	--	--	--	--	--	--	--
Algebra I	M/F	458/421	32	1	1	--	1	1	--	--	--	--
	W/B	526/286	30	1	3	--	1	1	--	--	--	--
	W/H	526/43	--	--	--	--	--	--	--	--	--	--
Biology	M/F	164/160	--	--	--	--	--	--	--	--	--	--
	W/B	131/133	--	--	--	--	--	--	--	--	--	--
	W/H	131/50	--	--	--	--	--	--	--	--	--	--
English I	M/F	87/77	--	--	--	--	--					
	W/B	90/31	--	--	--	--	--					
	W/H	90/36	--	--	--	--	--					
Algebra II	M/F	39/38	--	--	--	--	--					
	W/B	47/19	--	--	--	--	--					
	W/H	47/10	--	--	--	--	--					
Geometry	M/F	52/55	--	--	--	--	--					
	W/B	54/38	--	--	--	--	--					
	W/H	54/11	--	--	--	--	--					
Government	M/F	413/444	36	2	1	--	1					
	W/B	573/155	--	--	--	--	--					
	W/H	573/62	--	--	--	--	--					
Am. History	M/F	72/102	--	--	--	--	--					
	W/B	104/24	--	--	--	--	--					
	W/H	104/38	--	--	--	--	--					

Note: Classifications with a negative sign ("–") favor the reference group, while classifications with no sign favor the focal group.

*The Mantel-Haenszel procedure is applied for the SR items.
**DIF categories: A, negligible; B, slight to moderate; and C, moderate to severe.
***DIF was not performed when the focal group n-count was less than 200.
****DIF contrast groups: M/F, male versus female; W/B, white versus black; and W/H, white versus Hispanic.

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Table 4.28. Frequency Distribution of DIF Categories for the Fall 2014 Operational Assessments

Content Area	Group****	N-Count***	SR Items*					PE/WPs*				
			A**	B**	B–**	C**	C–**	A**	B**	B–**	C**	C–**
Fall 2014												
English II	M/F	1,311/1,121	33	1	1	--	--	3	--	--	--	--
	W/B	1,373/774	32	2	1	--	--	3	--	--	--	--
	W/H	1,373/151	--	--	--	--	--	--	--	--	--	--
Algebra I	M/F	2,566/2,564	40	--	--	--	--	4	--	--	--	--
	W/B	3,595/1,045	38	--	1	--	1	3	--	--	1	--
	W/H	3,595/252	39	--	1	--	--	4	--	--	--	--
Biology	M/F	1,664/1,505	33	1	--	--	1	10	--	--	--	--
	W/B	2,000/787	35	--	--	--	--	10	--	--	--	--
	W/H	2,000/189	--	--	--	--	--	--	--	--	--	--
English I	M/F	313/311	33	--	--	1	1	3	--	--	--	--
	W/B	508/55	--	--	--	--	--	--	--	--	--	--
	W/H	508/32	--	--	--	--	--	--	--	--	--	--
Algebra II	M/F	365/402	40	--	--	--	--					
	W/B	595/73	--	--	--	--	--					
	W/H	595/42	--	--	--	--	--					
Geometry	M/F	385/377	34	2	1	1	2					
	W/B	568/93	--	--	--	--	--					
	W/H	568/42	--	--	--	--	--					
Government	M/F	6,972/6,844	40	--	--	--	--					
	W/B	10,072/2,414	40	--	--	--	--					
	W/H	10,072/622	40	--	--	--	--					
Am. History	M/F	372/288	33	2	3	2	--					
	W/B	501/84	--	--	--	--	--					
	W/H	501/34	--	--	--	--	--					

Note: Classifications with a negative sign ("–") favor the reference group, while classifications with no sign favor the focal group.

*The Mantel-Haenszel procedure is applied for the SR items and WINSTEPS for the PE/WPs.
**DIF categories: A, negligible; B, slight to moderate; and C, moderate to severe.
***DIF was not performed when the focal group n-count was less than 200.
****DIF contrast groups: M/F, male versus female; W/B, white versus black; and W/H, white versus Hispanic.

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Table 4.29. Frequency Distribution of DIF Categories for the Spring 2015 Operational Assessments

Content Area	Group***	N-Count	SR Items*					PE/WPs*				
			A**	B**	B–**	C**	C–**	A**	B**	B–**	C**	C–**
Spring 2015												
English II	M/F	31,359/30,945	35	--	--	--	--	2	--	1	--	--
	W/B	47,482/9,100	34	1	--	--	--	2	1	--	--	--
	W/H	47,482/2,860	35	--	--	--	--	3	--	--	--	--
Algebra I	M/F	31,585/31,153	40	--	--	--	--	3	--	--	--	--
	W/B	47,460/9,202	40	--	--	--	--	3	--	--	--	--
	W/H	47,460/3,138	40	--	--	--	--	3	--	--	--	--
Biology	M/F	31,627/30,948	34	--	1	--	--	10	--	--	--	--
	W/B	47,697/9,075	34	--	1	--	--	10	--	--	--	--
	W/H	47,697/2,919	34	--	1	--	--	10	--	--	--	--
English I	M/F	8,938/8,976	35	--	--	--	--	2	--	1	--	--
	W/B	15,124/1,463	34	--	1	--	--	3	--	--	--	--
	W/H	15,124/677	33	1	--	--	1	3	--	--	--	--
Algebra II	M/F	9,707/11,178	37	--	3	--	--					
	W/B	17,453/1,428	39	--	1	--	--					
	W/H	17,453/752	40	--	--	--	--					
Geometry	M/F	5,359/5,897	38	--	2	--	--					
	W/B	9,676/706	39	1	--	--	--					
	W/H	9,676/436	39	1	--	--	--					
Government	M/F	23,137/22,564	39	--	1	--	--					
	W/B	34,999/6,711	40	--	--	--	--					
	W/H	34,999/1,979	40	--	--	--	--					
Am. History	M/F	5,736/5,573	37	--	3	--	--					
	W/B	9,956/645	37	--	2	--	1					
	W/H	9,956/340	39	--	1	--	--					
Physical Science	M/F	3,200/3,012	43	--	1	--	1					
	W/B	5,581/278	41	1	2	1	--					
	W/H	5,581/193	--	--	--	--	--					

Note: Classifications with a negative sign ("–") favor the reference group, while classifications with no sign favor the focal group.

*The Mantel-Haenszel procedure is applied for the SR items and WINSTEPS for the PE/WPs.
**DIF categories: A, negligible; B, slight to moderate; and C, moderate to severe.
***DIF contrast groups: M/F, male versus female; W/B, white versus black; and W/H, white versus Hispanic.

4.5. Summary

The item analyses provided in this chapter show that the MO EOC Assessments have sound psychometric properties. For example, p-values show that MO EOC Assessment items measure achievement across a broad range of difficulty. In addition, item discrimination values show that most items are appropriately correlated with the total test score and thus contribute to distinguishing between lower-performing and higher-performing students. In addition, very few students omitted items during testing. The low percentage of students omitting SR items provides evidence that the test is a power test of the students' skills and not a speeded test. Finally, DIF statistics based on data from the 2014–2015 operational administrations show the items to be generally free from statistical bias.

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Chapter 5: Test Administration

5.1. Introduction

This chapter contains information about DESE and Questar processes that ensure the standardized administration of the MO EOC Assessments. The Standards (AERA, APA, & NCME, 1999) state, "For tests designed to assess the examinee's knowledge, skills, or abilities, standardization helps to ensure that all examinees have the same opportunity to demonstrate their competencies" (p. 61). In other words, careful attention to the details of information dissemination, Test Examiner training, accommodations and modifications, and test security help ensure that students taking the MO EOC Assessments in different locations and under different circumstances have comparable opportunities for success.

The EOC Test Administration Manual contains detailed information about the testing guidelines, materials handling, and standardized administration instructions for the MO EOC Assessments. While this manual is not included here, much of the information contained in this chapter can be found in it.

Questar uses its online assessment platform to manage and deliver the MO EOC Online Assessments. This platform has two components:

- Student Test Delivery – The online testing student client is a small-footprint, secure browser application that is downloaded to the students' workstations to allow uninterrupted testing and failsafe protection of student responses in the event of a connection loss.
- Administration and Reporting System – The online testing system administration system is a web application that allows districts, schools, and teachers/proctors to manage their students and assessments.

For the MO EOC Assessments, the 2011–2012 administration year was the first in which districts were required to use an online delivery format unless a Paper/Pencil, Braille, or Large Print version was required for a student as indicated in the student's Individualized Education Program (IEP) and marked as an accommodation on the online test administration site. The Test Administration Manual contains information specific to the registration for and administration of the MO EOC Assessments. This process was continued for the 2014–2015 administration year.

5.2. Students for Whom the MO EOC Assessments are Appropriate

The responsibility and authority for testing students in the MO EOC Assessments at the appropriate time in the course of instruction belongs to the local district. The MO EOC Assessments are based on Missouri Learning Standards rather than on GLEs. Therefore, when the content of the Missouri Learning Standards is covered in the local school district's curriculum, the test may be administered regardless of student grade level or course name.

5.2.1. Students with Individualized Education Programs (IEPs)

A student with disabilities, as classified under the Individuals with Disabilities Education Act (IDEA), has an IEP that, in part, governs whether a particular assessment is appropriate for the student. In the case of the MO EOC Assessments, decisions about whether a student with a

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disability will participate in the assessments are made by the student's IEP team and are documented in the IEP. All students must take required EOC Assessments. If, however, a student's disability qualifies him or her to take the MAP-Alternate Assessment (MAP-A) for students with severe cognitive disabilities, that student will not participate in the MO EOC Assessments.

5.2.2. Students with Individual Accommodation Programs

Students with Individual Accommodation Programs (IAPs) are considered disabled under Section 504 of the 1973 Rehabilitation Act. These students are not served under IDEA and are not documented with a particular designation for the MO EOC Assessment. However, professionals who are knowledgeable about a student's disability and educational needs should make accommodation decisions for the student as they would for a student with an IEP.

5.2.3. English Language Learner (ELL) Students

Students who have been in the United States for 12 cumulative months or less since school age at the time of test administration may be exempted by the local school district from taking the English I and English II Assessments. The students must, however, participate in other required MO EOC Assessments, although their scores do not count for school accountability purposes.

5.3. Students for Whom a School or District is Accountable

For accountability purposes, Missouri must include the results for any student who is eligible to take the MO EOC Assessments and has been enrolled at least one full academic year in a school (for school accountability) or district (for district accountability) without transferring out of the building or district for a significant period of time and re-enrolling. A full academic year is defined as the last Wednesday in September through the MO EOC Assessment administration. A significant period of time is considered "one more than half of the eligible days between the last Wednesday in September and the test administration." DESE obtains enrollment information from the Missouri Student Information System (MOSIS) data that are reported by school districts. This rule applies to the building and district summary levels independently. For example, a student who is coded as "In building less than a year," but was in the district a full academic year is excluded from the building totals but is included in the district totals.

5.4. Dissemination of Testing Materials and Information

All test administration information, including the Test Administration Manual and training webinars, were posted to the online test administration site for District Test Coordinators, School Test Coordinators, Examiners, and Information Technology Coordinators. One week prior to the start of the testing window, Questar distributed all password information for the online system by e-mail to district and school level users participating in the current EOC administration. Districts had the opportunity to order the Braille and Large Print editions of the assessment from Questar. The District Test Coordinator downloaded and printed the accommodated Paper/Pencil test edition through the online administration site, as needed for students in the district. The District Test Coordinator was responsible for inventorying all Paper/Pencil materials, as well as disseminating the online test information to the test administrators. The District Test Coordinator was also responsible for answering all district questions about test procedures and the online assessment platform. If the District Test Coordinator needed assistance with a question, he/she could contact Questar's Missouri Customer Service through the designated phone number and/or e-mail address.

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5.5. District and Test Examiner Training

Both Questar and DESE were responsible for training the district staff on EOC test administration. DESE provided two standardized training webinars, scripts, and PowerPoint presentations on the Test Administration Manual, state procedures, and general testing issues. One training session was provided for Test Coordinators and the other was provided for Test Examiners. These training resources were available both on the DESE website and on the online test administration site. Appendix A contains the two PowerPoint presentations for Fall 2014 and Spring 2015.

Questar provided training on the online assessment platform. Questar training contained propriety information and was only available on the test administration site. All Test Coordinators and Test Examiners were to view these standardized trainings prior to test administration. The District Test Coordinator was allowed to provide supplemental training on local issues, (e.g., schedules). Both DESE and Questar were available to answer any questions the districts may have about the MO EOC Assessment administration.

5.6. Test Security

The MO EOC Assessment test books (Paper/Pencil, Large Print, and Braille) and online assessments were secure. Test Coordinators were instructed to keep the materials in a locked room or cabinet at all times when not in use. No testing materials may be photocopied, duplicated, scanned, or made accessible to personnel who were not responsible for testing. Additionally, written or oral discussion of specific MO EOC Assessment items breaches the security and integrity of the test. In accordance with the Standards, the Test Administration Manual contained explicit instructions about test security for Test Coordinators and Test Examiners.[12]

Standardized training was required for all District and School Test Coordinators, Examiners, translators, proctors, and any district staff who had responsibilities in testing. Each test book shipped to the district or downloaded and printed by the district contained secure barcode information for tracking purposes. Questar used this information to ensure that districts used the materials assigned to them for testing and returning all of their secure materials after the completion of testing. The Paper/Pencil forms included a bar code on each page of the document. Upon return to Questar, the barcode information on each test was verified. Questar then followed up with the appropriate district(s) regarding any missing materials to ensure return or destruction (if materials were contaminated).

When the tests were delivered online, Test Examiners did not have access to the student screens for the online assessment, only to the test administrator features. Students had unique, secure logins to access the MO EOC Assessments they were registered for, and these logins were disabled after the student had tested. For tests with multiple sessions (those including a PE/WP), the students also had a Session Access code given to them by the teacher at the start of the session to ensure that students accessed the correct session of the test. Test items, as well as student responses, were encrypted during transmission to and from student computers.

[12] **Standard 5.7:** Test users have the responsibility of protecting the security of test materials at all times (p. 64).

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5.6.1. Detection and Prevention of Testing Irregularities

To protect the validity and fairness of scores on the MO EOC assessments, DESE has implemented measures to prevent and detect cheating. Possible cheating violations on the MO EOC Assessments include the following:

- Copying and reviewing MO EOC Assessment items with students
- Cueing students during testing either verbally or with written materials on the classroom walls
- Cueing students nonverbally, such as tapping or nodding the head
- Using a calculator on an EOC Assessment that does not allow calculator use, unless specified by the student's IEP
- Using a calculator that contains stored equations or connects to the Internet
- Splitting sessions into two parts
- Ignoring the standardized directions in the test books
- Paraphrasing parts of the assessment to students
- Changing or completing (or allowing other school personnel to change or complete) student answers
- Allowing accommodations that are not written in the Individualized Education Program (IEP)
- Allowing accommodations for students who do not have an IEP
- Allowing students to use dictionaries on parts of the MO EOC Assessment other than the WP
- Defining terms on the test
- Allowing students to access cell phones or other electronic devices during testing

To detect cheating, DESE has implemented the following steps for the MO EOC Assessments:

1. School officials, parents, and other interested parties call or email DESE to report a testing concern or allegation.
2. A narrative of the conversation, if reported orally, is written and read back to the individual reporting the concern.
3. The superintendent of the district in which the allegation is made is then contacted and read the narrative or email.
4. A letter is sent to confirm the conversation and to ask the superintendent to investigate the claim.
5. An MO EOC Assessment Quality Assurance Concern District Response Report is sent for the superintendent to use for replying to the allegation.

DESE also implemented a self-monitoring process whereby District Test Coordinators completed a Quality Assurance (QA) self-monitoring form.[13] This QA process was issued to District Test Coordinators in an administrative memo.[14] The form was designed to be used by District Test Coordinators as part of their regular supervision process throughout the assessment window, and it allowed districts to monitor and strengthen their administration of the MO EOC Assessments. The questions on the form were designed to focus attention and help districts examine important areas of assessment training, administration, and test security.

[13] View the QA form online at http://dese.mo.gov/sites/default/files/asmt-eoc-self-qa-2014.pdf.
[14] View the memo online at http://dese.mo.gov/sites/default/files/am/documents/CCR-14-001.pdf.

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District Test Coordinators were asked to complete one MO EOC quality assurance form for one EOC classroom. Regarding cheating prevention, the form asked District Test Coordinators to "Explain the district's test security plan" and answer the question, "What preventative measures are taken to curb cheating within the computer lab?" District Test Coordinators were urged to report testing irregularities or concerns immediately to the Assessment Section at assessment@dese.mo.gov or (573) 751-3545. DESE also performed onsite spot checks of quality assurance procedures during the Spring testing window.

When testing irregularities were reported, DESE was able to request that Questar perform statistical analyses to detect and flag unusual response patterns. DESE then worked with districts to establish procedures for follow-up decisions appropriate to the situation.

5.7. Test Administration

5.7.1. Test Organization

Students took the MO EOC Assessments in one or two sessions depending on the content area. The MO EOC Assessments for Summer 2014, Fall 2014, and Spring 2015 for English II, Algebra I, and Biology contained SR items and a PE/WP. Algebra II, Geometry, Government, American History, and Physical Science contained only SR items. English I contained only SR items in Summer 2014 but included a PE/WP beginning in Fall 2014. All assessments were administered online unless the student's IEP specified a Braille/Large Print or Paper/Pencil administration. Each SR item consisted of a stem followed by four response options, and the student clicked an answer choice. The tests were not timed. Students were encouraged to complete an online practice test of the online assessment platform prior to testing. This practice test included instructions on how to use the tools in the system and practice questions for the students.

5.7.2. Test and Ancillary Materials

District Test Coordinators or School Test Coordinators were responsible for providing all MO EOC Assessment materials to Test Examiners. The materials provided by Questar and/or DESE included the following:

- *Test Administration Manual* (electronic copy)
- Large Print, and/or Braille test materials
- Return kit materials for accommodated test materials
- Accommodated Paper/Pencil test booklet (printed from the online assessment platform by the school district)

Students taking an accommodated version of the MO EOC Assessments needed the following additional materials, which were not provided by Questar or DESE:

- No. 2 pencils
- Scratch paper

For the online assessment, each student needed a computer with a monitor, mouse, and keyboard, or a tablet device. Adequate space should have been left between workstations. Students could use scratch, grid, or draft paper and a writing utensil while taking the online assessment. The Test Examiner needed the following:

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- A computer for logging on to the test administrator interface
- A writing board and utensil

Additionally, students taking either the Paper/Pencil or online version were allowed to use a calculator for the Algebra I, Algebra II, and Geometry Assessments. (This was not required.)

Calculators could not contain stored equations or functions at the time of the EOC Mathematics Assessments. Test Examiners were responsible for ensuring and verifying that calculators with the ability to store functions and equations (e.g., a graphing or a scientific calculator) had the memory cleared before and after each Mathematics Assessment.

Calculators could not have internet connectivity or be able to connect to anyone inside or outside the classroom during testing. Students could not use a calculator on a laptop or other portable computer, pocket organizer, cell phone, device with a typewriter-style keyboard, electronic writing pad, or pen-input device unless a particular assistive device was required for a student and was specified on his or her IEP.

5.7.3. Preparing the Test Administration Site and the Students

Before students began the assessment using the online system, a representative of the district or school was responsible for the following tasks:

- Read the entire Test Administration Manual
- Review the DESE and Questar trainings regarding the EOCs
- Run a workstation readiness test on each workstation used for testing
- Ensure that the online test delivery system is downloaded to each workstation for test delivery
- Provide an upload to DESE (precode file) of all students that will be testing for the current administration of the EOCs (the precode file is a data file containing one record per student and each student is assigned a unique MOSIS ID. The purpose of the data file is to identify students, Examiners, and content areas for testing.)
- Input identification information for students who were not included in the precode file
- Specify district testing windows within the Missouri statewide test administration window

Additionally, the Test Examiner was responsible for setting and verifying class information and setting students' testing status codes and/or accommodations information in the online system.

Students were NOT allowed to use electronic devices such as cellular phones, digital cameras, gaming devices, or scanners during the testing session. However, students could use calculators during the Algebra I, Algebra II, and Geometry test sessions. (See section 5.7.2 for more information regarding calculator usage and restrictions.)

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5.7.4. Directions for Administration

In accordance with Standard 5.1,[15] specific standardized directions for administration were printed in the Test Administration Manual. Directions to be read aloud to the students were printed in bold type and had a callout arrow in the margin for clarity. Information for the teacher that should not be read aloud was in italic type. Figure 5.1 provides an example of a script from the 2014–2015 Test Administration Manual for the Government EOC Assessment.

Figure 5.1. Example Script from the Test Administration Manual for the Government EOC Assessment

Government Assessment Online

Directions for Administering

SAY **For the questions in this test, you will select an answer from a list of given choices. Remember to check that the circle that goes with the answer you chose is filled in after you click it. Your score on these questions will depend on how well you follow directions and show your understanding of Government. Click the Help button for instructions on how to use the system tools.**

There are several important things to remember:

1. **Read each question carefully and think about the answer. Then choose the one answer that you think is best.**
2. **If you do not know the answer to a question, mark it for review, skip it, and go on. You may return to it later.**
3. **When you finish the test, you may check your work.**

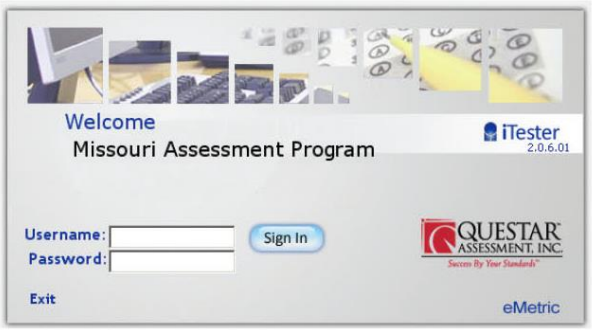
SAY **On your desktop, locate the icon titled "iTester_MOEOC."**

Double-click this icon and the program will launch. Once the program has opened, you will see the login page for iTester Student.

Do not enter anything until you have been instructed to do so.

Can everyone see the login page?

An example of the login page is below. Please be sure all students are on this page before proceeding with instructions.



Assist students as needed. The next step is to walk the students through logging into iTester Student. The username for all students is their MOSIS ID. For each content area tested, the student will receive a unique password.

[15] **Standard 5.1:** Test administrators should follow carefully the standardized procedures for administration and scoring specified by the test developer, unless the situation or a test taker's disability dictates that an exception should be made (p. 63).

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5.8. Accommodations and Modifications

A student's IEP team had the responsibility and authority to determine individual accommodations to support and ensure his or her participation in the MO EOC Assessments. Students who were English language learners (ELLs) were also able to receive allowable accommodations to support and ensure participation in the MO EOC Assessments. Allowable accommodations were intended to assist the student by reducing the effects of his or her disability without reducing performance expectations. Allowable accommodations for the MO EOC Assessments included, but were not limited to, the following:

- A student may receive a modified version of the testing materials, such as the Braille, Large Print, or Paper/Pencil edition.
- A teacher may present the test content to a student in a nonstandard way, such as by reading it aloud in English or in the student's native language, paraphrasing it, or using sign language. For the English I and English II Assessments, this will result in the lowest obtainable scale score (LOSS).
- A student may be allowed additional time to complete one or more sessions of the assessment.
- A student may use an assistive communicative device.
- A student may be tested individually or in a small group.
- A student may be allowed to use a computer, another word-processing device, or a teacher scribe to record his or her responses.
- A student may use other assistive materials such as a bilingual dictionary.

Modifications are alterations in the test that change construct-related requirements. The resulting information may not be equal to the information that might be obtained without modifications. The following modifications for the MO EOC Assessments were able to be provided:

- Oral reading of the assessment, including paraphrasing questions
- Oral reading in native language
- Use of a bilingual dictionary for the English I or English II Assessment

In accordance with Standard 5.2,[16] Test Examiners indicated an accommodation, when allowed by a student's IEP and used for the MO EOC Assessment, by checking the appropriate box(es) for the student in the online test administration site.

Tables 5.1, 5.2, and 5.3 contain information about the percentage of students who received each type of allowable accommodation for each MO EOC Assessment for Summer 2014, Fall 2014, and Spring 2015, respectively. The most prevalent type of accommodation for the Summer 2014 administration across all MO EOC Assessments was testing in a small group. The most prevalent type of accommodation for the Fall 2014 and Spring 2015 administrations across all MO EOC Assessments was "Oral Reading Any—not Embedded." See Appendix B for a list of accommodation codes from the 2014–2015 Test Administration Manual.

[16] **Standard 5.2:** Modifications or disruptions of standardized test administration procedures or scoring should be documented (p. 63).

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Table 5.1. Frequency and Percentage of Students Receiving Each Type of Allowable Accommodation on the Summer 2014 MO EOC Assessments

Accommodation	English II		Algebra I		Biology		English I	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Braille	--	--	--	--	--	--	--	--
Large Print	--	--	--	--	--	--	--	--
Oral Reading	--	--	9	1.02	7	2.16	--	--
Oral Reading— Blind/Partial Sight	--	--	--	--	--	--	--	--
Signing of Assessment	--	--	--	--	--	--	--	--
Paraphrasing	--	--	--	--	--	--	--	--
Other Administrations	--	--	--	--	--	--	--	--
Oral Reading in Native Language	--	--	3	0.34	--	--	--	--
Extended Time	--	--	--	--	--	--	--	--
Administered Using More Than Allotted Periods	6	1.66	14	1.59	11	3.40	--	--
Other Timing	--	--	5	0.57	--	--	--	--
Use of Scribe	--	--	--	--	--	--	--	--
Use of Calculator, Math Tables, etc.	--	--	--	--	1	0.31	--	--
Using Bilingual Dictionary	--	--	--	--	--	--	--	--
Other Response	--	--	--	--	--	--	--	--
Testing Individually	--	--	8	0.91	1	0.31	--	--
Testing in Small Group	7	1.93	13	1.48	12	3.70	1	0.61
Other Setting	--	--	--	--	--	--	--	--

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Table 5.1 (cont.). Frequency and Percentage of Students Receiving Each Type of Allowable Accommodation on the Summer 2014 MO EOC Assessments

Accommodation	Algebra II		Geometry		Government		Am. History	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Braille	--	--	--	--	--	--	--	--
Large Print	--	--	--	--	--	--	--	--
Oral Reading	--	--	--	--	10	1.17	2	1.15
Oral Reading— Blind/Partial Sight	--	--	--	--	--	--	--	--
Signing of Assessment	--	--	--	--	--	--	--	--
Paraphrasing	--	--	--	--	--	--	--	--
Other Administrations	--	--	--	--	--	--	--	--
Oral Reading in Native Language	--	--	--	--	--	--	--	--
Extended Time	--	--	--	--	--	--	--	--
Administered Using More Than Allotted Periods	--	--	--	--	4	0.47	2	1.15
Other Timing	--	--	--	--	1	0.12	--	--
Use of Scribe	--	--	--	--	--	--	--	--
Use of Calculator, Math Tables, etc.	--	--	--	--	--	--	--	--
Using Bilingual Dictionary	--	--	--	--	--	--	--	--
Other Response	--	--	--	--	--	--	--	--
Testing Individually	--	--	--	--	2	0.23	--	--
Testing in Small Group	1	1.30	2	1.87	15	1.75	2	1.15
Other Setting	--	--	--	--	--	--	--	--

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Table 5.2. Frequency and Percentage of Students Receiving Each Type of Allowable Accommodation on the Fall 2014 MO EOC Assessments

Accommodation	English II		Algebra I		Biology		English I	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Braille	--	--	--	--	--	--	1	0.16
Large Print	1	0.04	3	0.06	3	0.10	1	0.16
Oral Reading	2	0.08	--	--	--	--	1	0.16
Oral Reading— Blind/Partial Sight	15	0.62	--	--	--	--	--	--
Oral Reading—Paper/Pencil Only	1	0.04	--	--	--	--	--	--
Signing of Assessment	1	0.04	--	--	2	0.06	--	--
Paper Based Assessment—Paper/Pencil Only	3	0.12	2	0.04	3	0.10	--	--
Oral Reading in Native Language ELA	--	--	--	--	--	--	--	--
Use of Scribe	5	0.21	5	0.10	7	0.22	1	0.16
Speech to Text Online not Embedded	--	--	--	--	--	--	--	--
Abacus	--	--	--	--	--	--	--	--
Multiplication Table	--	--	1	0.02	--	--	--	--
Specialized Calculator	--	--	4	0.08	3	0.10	--	--
Alternate Response	--	--	--	--	--	--	--	--
Oral Reading Assistive Technology	1	0.04	12	0.23	9	0.28	--	--
Oral Reading Any—not Embedded	15	0.62	65	1.27	49	1.55	9	1.44
Color Contrast—Paper/Pencil	--	--	--	--	--	--	--	--
Color Overlay—Paper/Pencil	--	--	--	--	--	--	--	--
Magnification	--	--	--	--	--	--	--	--
Masking	--	--	--	--	--	--	--	--
Translation	--	--	2	0.04	23	0.73	--	--
Oral Reading in Native Language Non ELA	7	0.29	44	0.86	44	1.39	--	--
Use of Scribe Non ELA Writing without IEP or 504	--	--	2	0.04	1	0.03	--	--
Bilingual Dictionary on Writing Performance Task for ELL	1	0.04	2	0.04	15	0.47	--	--
Other Setting	109	4.48	237	4.62	144	4.54	27	4.33

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Table 5.2 (cont.). Frequency and Percentage of Students Receiving Each Type of Allowable Accommodation on the Fall 2014 MO EOC Assessments

Accommodation	Algebra II		Geometry		Government		Am. History	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Braille	--	--	--	--	--	--	--	--
Large Print	1	0.13	--	--	4	0.03	--	--
Oral Reading	--	--	--	--	--	--	--	--
Oral Reading— Blind/Partial Sight	--	--	--	--	--	--	--	--
Oral Reading—Paper/Pencil Only	--	--	--	--	--	--	--	--
Signing of Assessment	--	--	--	--	2	0.01	--	--
Paper Based Assessment—Paper/Pencil Only	--	--	--	--	3	0.02	--	--
Oral Reading in Native Language ELA	--	--	--	--	--	--	--	--
Use of Scribe	--	--	3	0.39	9	0.07	--	--
Speech to Text Online not Embedded	--	--	--	--	--	--	--	--
Abacus	--	--	--	--	--	--	--	--
Multiplication Table	--	--	--	--	--	--	--	--
Specialized Calculator	--	--	--	--	--	--	--	--
Alternate Response	--	--	--	--	--	--	--	--
Oral Reading Assistive Technology	--	--	--	--	40	0.29	--	--
Oral Reading Any—not Embedded	1	0.13	15	1.97	161	1.17	25	3.79
Color Contrast—Paper/Pencil	--	--	--	--	--	--	--	--
Color Overlay—Paper/Pencil	--	--	--	--	--	--	--	--
Magnification	--	--	--	--	--	--	--	--
Masking	--	--	--	--	--	--	--	--
Translation	--	--	--	--	4	0.03	--	--
Oral Reading in Native Language Non ELA	--	--	--	--	119	0.86	4	0.61
Use of Scribe Non ELA Writing without IEP or 504	--	--	--	--	1	0.01	--	--
Bilingual Dictionary on Writing Performance Task for ELL	--	--	--	--	--	--	--	--
Other Setting	3	0.39	33	4.33	479	3.47	35	5.30

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Table 5.3. Frequency and Percentage of Students Receiving Each Type of Allowable Accommodation on the Spring 2015 MO EOC Assessments

Accommodation	English II		Algebra I		Biology		English I	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Braille	3	0.01	4	0.01	3	0.01	--	--
Large Print	21	0.03	21	0.03	20	0.03	4	0.02
Oral Reading	149	0.24	--	--	--	--	47	0.26
Oral Reading— Blind/Partial Sight	905	1.45	--	--	--	--	301	1.68
Oral Reading—Paper/Pencil Only	4	0.01	--	--	--	--	--	--
Signing of Assessment	27	0.04	20	0.03	14	0.02	9	0.05
Paper Based Assessment—Paper/Pencil Only	64	0.10	53	0.08	46	0.07	5	0.03
Oral Reading in Native Language ELA	5	0.01	--	--	--	--	--	--
Use of Scribe	74	0.12	59	0.09	49	0.08	27	0.15
Speech to Text Online not Embedded	4	0.01	11	0.02	9	0.01	1	0.01
Abacus	2	0.00	12	0.02	8	0.01	--	--
Multiplication Table	8	0.01	136	0.22	30	0.05	4	0.02
Specialized Calculator	42	0.07	169	0.27	103	0.17	8	0.05
Alternate Response	3	0.01	2	0.00	5	0.01	--	--
Oral Reading Assistive Technology	192	0.31	461	0.74	598	0.96	71	0.40
Oral Reading Any—not Embedded	478	0.77	1,381	2.20	1,432	2.29	132	0.74
Color Contrast—Paper/Pencil	1	0.00	6	0.01	1	0.00	6	0.03
Color Overlay—Paper/Pencil	1	0.00	7	0.01	1	0.00	6	0.03
Magnification	7	0.01	5	0.01	16	0.03	9	0.05
Masking	--	--	--	--	--	--	--	--
Translation	6	0.01	26	0.04	25	0.04	1	0.01
Oral Reading in Native Language Non ELA	211	0.34	577	0.92	647	1.03	101	0.56
Use of Scribe Non ELA Writing without IEP or 504	8	0.01	23	0.04	27	0.04	1	0.01
Bilingual Dictionary on Writing Performance Task for ELL	108	0.17	53	0.08	51	0.08	24	0.13
Other Setting	3,709	5.95	3,732	5.95	3,674	5.87	1,065	5.95

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Table 5.3 (cont.). Frequency and Percentage of Students Receiving Each Type of Allowable Accommodation on the Spring 2015 MO EOC Assessments

Accommodation	Algebra II		Geometry		Government		Am. History		Physical Science	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Braille	1	0.01	--	--	5	0.01	--	--	--	--
Large Print	6	0.03	--	--	11	0.02	7	0.06	3	0.05
Oral Reading	--	--	--	--	--	--	--	--	--	--
Oral Reading— Blind/Partial Sight	--	--	--	--	--	--	--	--	--	--
Oral Reading—Paper/Pencil Only	--	--	--	--	--	--	--	--	--	--
Signing of Assessment	1	0.01	--	--	11	0.02	12	0.11	1	0.02
Paper Based Assessment—Paper/Pencil Only	9	0.04	--	--	51	0.11	--	--	1	0.02
Oral Reading in Native Language ELA	--	--	--	--	--	--	--	--	--	--
Use of Scribe	2	0.01	3	0.03	32	0.07	5	0.04	2	0.03
Speech to Text Online not Embedded	--	--	--	--	10	0.02	10	0.09	--	--
Abacus	6	0.03	8	0.07	1	0.00	1	0.01	4	0.06
Multiplication Table	11	0.05	9	0.08	1	0.00	2	0.02	18	0.29
Specialized Calculator	2	0.01	4	0.04	25	0.06	12	0.11	12	0.19
Alternate Response	--	--	--	--	1	0.00	--	--	--	--
Oral Reading Assistive Technology	17	0.08	23	0.20	536	1.17	135	1.19	84	1.35
Oral Reading Any—not Embedded	50	0.24	66	0.59	1,094	2.39	232	2.05	132	2.13
Color Contrast—Paper/Pencil	--	--	--	--	--	--	--	--	--	--
Color Overlay—Paper/Pencil	--	--	--	--	1	0.00	--	--	--	--
Magnification	--	--	1	0.01	6	0.01	--	--	2	0.03
Masking	--	--	--	--	--	--	--	--	--	--
Translation	3	0.01	1	0.01	13	0.03	--	--	--	--
Oral Reading in Native Language Non ELA	8	0.04	32	0.28	477	1.04	105	0.93	51	0.82
Use of Scribe Non ELA Writing without IEP or 504	2	0.01	2	0.02	18	0.04	--	--	--	--
Bilingual Dictionary on Writing Performance Task for ELL	--	--	1	0.01	42	0.09	1	0.01	2	0.03
Other Setting	150	0.72	249	2.21	2,764	6.05	666	5.89	377	6.07

5.9. Materials Handling and Return

The Test Administration Manual contained detailed instructions for how schools and districts should collect and package the Paper/Pencil, Braille, and/or Large Print testing materials at the end of the test administration. For Test Examiners, these activities included, but were not limited to, the following:

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- Collecting test books from the students using the accommodated editions
- Returning all used and unused test books to the School Test Coordinator
- Collecting all scratch paper used during testing
- Properly handling all contaminated test books (i.e., books having contact with bodily fluids such as blood or with any potentially hazardous material)

For School Test Coordinators, these activities included, but were not limited to, the following:

- Collecting testing materials from the Test Examiners
- Returning all test books (scorable and nonscorable) to the District Test Coordinator
- Destroying all unused answer sheets and other nonsecure testing materials

After receiving the scorable and nonscorable test books from the School Test Coordinators, District Test Coordinators completed the following steps:

- Verify 100% return of test books
- Complete the Test Book Accountability Form and fax it to Questar

For the online system, the student needed to click the Submit button once he or she had finished testing to submit the test for scoring. No additional information was needed from the Test Examiner after the student had completed the test. All demographic information was edited or added by the test administrator before the student started the assessment.

5.9.1. Questar's Secure Material Check-In Procedures

Questar adhered to strict quality assurance procedures in order to ensure that all accommodated version test booklets were returned and accounted for. The check-in procedures included multiple steps to ensure that no test booklets were overlooked. All staff members received thorough and specific training before they participated in the check-in of test booklets.

Upon receipt of accommodated test booklets from the school districts, boxes were kept in a secure location and remained sealed until check-in. If a box had to be opened for any reason, it was immediately resealed.

Two teams checked in the secure materials. The first team prepared the test booklets for scanning. One district box was opened at a time, and secure test booklets were separated from ancillary materials and stacked on carts to be checked in. This process was repeated for all boxes for a district to ensure that all materials returned to Questar at the same time were checked in at the same time. Once the first team filled the cart(s) with all the secure materials from a district, the cart(s) was passed to a second team.

The second team checked in each test booklet by scanning the secure barcode into Questar's database. Operators worked in teams of two at computers equipped with barcode scanners. Operator 1 counted and scanned enough secure documents to fill a storage box. The operator verified that the database collected the same number of barcodes. If there was a discrepancy, an immediate reconciliation took place. Each ID number (barcode number) had a check digit that ensured that all numbers were correctly read by the scanner and that no ID number was miskeyed

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when manually entered. If a barcode was damaged or not readable, the operator manually entered the barcode number into the system. After this process was complete, the box of secure materials was handed to Operator 2 and scanned a second time. The database verified that the same barcode numbers were read during the scanning of the box or an immediate reconciliation took place. After verification, the secure materials were placed in a Questar box for storage. The scanning system provided audible and onscreen cues to alert operators of scanning discrepancies.

Further validity checks were done before each box was sealed to ensure that there were no ID barcode scanning discrepancies and that all ID numbers were correct. The validity checks also ensured that the ID numbers and the quantity in each box matched what was entered into the database. Finally, each box was placed on a pallet and stored.

Post check-in procedures were also performed prior to notifying the districts of missing secure materials. For any district that was missing a secure material, an individual box-by-box hand search was conducted in an attempt to locate the secure material(s). If an unaccounted secure material was found, the material was then coded into the database by a Questar supervisor and Questar's Program Management team was notified. If unaccounted-for material(s) were not found during the box-by-box hand search, the material(s) was considered missing and the district was notified via the Secure Missing Material Report process. This was also communicated to DESE, who would then follow up with discretion.

5.10. Summary

The distribution, administration, and collection of the MO EOC Assessments was carefully communicated and executed in the detailed Test Administration Manual. All standards related to test security, administration, and accommodations were adhered to throughout the process. The most important steps and procedures have been covered in this chapter. Readers interested in further detail should consult the Test Administration Manual for the MO EOC Assessments.

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Chapter 6: Scoring

6.1. Introduction

The MO EOC Assessment forms were processed and scored by Questar. SR items were automatically scored against a fixed key immediately after a test is submitted by the student. Each test form is tested entering 100% correct responses and 100% incorrect responses through both desktop and tablet clients, and each test score is validated as part of a comprehensive end-to-end process culminating in final reports.

The PE/WPs were scored by Questar's qualified scorers. This chapter outlines the processes used to implement scoring materials for the PE/WPs, receive and scan student responses, hire and train scorers, score the PE/WPs, and maintain control of the quality of the scoring processes.

6.2. Scoring Requiring Human Judgment

Standard 5.9[17] relates specifically to item scoring that requires human judgment. The Standards suggest specific procedures that should be followed to ensure that handscoring of open-ended items is consistent and fair. The following sections outline the processes that were established and followed for handscoring of the PE/WPs in the MO EOC Assessments.

6.3. Scoring of the PE/WPs

Questar handscored the English II Assessments, which contained a WP, and the Algebra I and Biology Assessments, which contained PEs. The PE/WPs required students to respond with extended written answers to questions on given topics or to a series of questions regarding specific events.

The following sections outline Questar's processes for scoring of the PE/WPs in the MO EOC Assessments for 2014–2015, which was consistent for all three administrations (Summer 2014, Fall 2014, and Spring 2015). The PE/WPs were scored by human raters. Information regarding inter-rater reliability (IRR) for PE/WPs is included in Chapter 11.

6.3.1. Scorer Recruitment and Selection

Scoring quality starts with the recruitment process and extends through screening and placement (assigning scorers to prompts based on their skills and experience), training, qualification, and scoring. Questar accessed a large pool of educated candidates to professionally evaluate assessment prompts.

Questar carefully selected scorers according to their strengths and background. All scorers had, at a minimum, a four-year college degree. The following steps show an overview of key processes:

[17] **Standard 5.9:** When test scoring involves human judgment, scoring rubrics should specify criteria for scoring. Adherence to established scoring criteria should be monitored and checked regularly. Monitoring procedures should be documented (pp. 64–65).

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1. Process Timeline and Recruitment Tool: Questar used a web-based application to collect data on scorer education, prior scoring experience, and other key information to screen candidates currently in the database system.

2. Initial Screening: Candidate data was analyzed and prospective scorers prioritized.

3. Offer: Questar contacted prospective scorers detailing project requirements, timelines, and quality standards.

4. Final Documentation and Project Placement: Scorers signed confidentiality agreements agreeing to keep all information and student responses confidential. Only scorers who successfully completed training and qualifying were allowed to evaluate student responses.

6.3.2. Scorer Training and Qualification Procedures

Questar content specialists reviewed training materials provided by DESE. Questar scoring staff communicated with DESE during this process regarding item questions or clarifications.

Training materials included the following:

- Anchor Sets: The anchor set is the primary reference for scorers as they internalize the rubric during training. All scorers had access to the anchor set while scoring and were directed to refer to it regularly.

- Practice Sets: Practice sets were used to help trainees develop experience in independently applying the scoring guide or rubric to student responses. The practice sets provided guidance and practice for trainees in defining the line between score points, as well as applying the scoring criteria to a wider range of types of responses.

- Qualification Sets: All qualifying sets were used to confirm that scorer trainees had grasped the scoring criteria and were able to accurately assign the range of scores to student responses. Scorer trainees had to demonstrate acceptable performance on these sets by meeting a predetermined standard for accuracy to qualify to score MO EOC performance events and writing prompts. Questar's digital scoring system programmatically enforced qualification rules.

6.4. Scorer Training

Scorers went through online training and qualifying prior to scoring, including reviewing scoring guidelines and procedures. This training provided scorers with a clear understanding of the training materials and scoring protocols of the MO EOC Assessments. Scorers were expected to read and review annotations of the training materials with focused direction given by scoring directors or content specialists. The following are the steps used during the training of the items:

- Scoring for Questar: This gave a brief overview of what scoring is, the tools provided to help the scorers, and the individuals who would support the scorers during the project.

- Questar Scoring System: Scorers were trained on the internal scoring system.

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- Scoring the Missouri Project: Specifics were provided regarding the Missouri Project. DESE and Questar worked collaboratively so the scorers understood the project.

- Scoring the Item: This training process walked the scorers through the anchor papers, practice and qualification papers. The scorers proceeded through the qualification process and, upon qualifying, they continued on to operational scoring.

- Additional Training: Before operational scoring could begin, information on how to handle unscorable student responses as well as alert responses was provided.

Scoring started for the scorer once all of the steps were successfully completed.

6.5. Qualification

If applicants did not successfully complete the training and qualifying requirements, they were not allowed to score any MO EOC student responses. Furthermore, qualified scorers were dismissed if their scoring performance did not meet defined standards. Below are the qualification standards that must have been met in order to score the Missouri Project:

- 4-point items
  - (0–4, 1–4)
  - 2 sets of 10 papers
  - 80% perfect agreement on one of two sets
  - Scorers saw both sets. If they passed the first, the second was a review.
- 3-point items
  - (0–3)
  - 2 sets of 10 papers
  - 85% perfect agreement on one of two sets
  - Scorers saw both sets. If they passed the first, the second was a review.
- 2-point items
  - (0–2)
  - 2 sets of 10 papers
  - 95% perfect agreement on one of two sets
  - Scorers saw both sets. If they passed the first, the second was a review.
- 1-point items
  - (0–1)
  - 2 sets of 10 papers
  - 100% perfect agreement on one of two sets
  - Scorers saw both sets. If they passed the first, the second was a review.

6.5.1. Second Read Procedures

Inter-Rater Reliability (IRR) is the agreement between the first and second scores assigned to student responses. IRR measurements include exact, adjacent, and nonadjacent agreement. Guidelines for IRR are determined in accordance with customer requirements and Questar

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scoring standards for exact and adjacent agreement. Questar scoring staff used IRR statistics as one factor in determining the needs for continuing training and intervention on individual levels.

Questar's scoring system included comprehensive inter-rater reliability reports that allowed scoring directors to monitor both individual and group performance. After the first score was applied, the system automatically sent the 10th document to a different scorer for a second read. Reader one provided the score of record, and the second read was for inter-rater reliability purposes only. IRR estimates are provided in Table 11.26 in Chapter 11.

6.5.2. Scoring Monitoring and Recalibration Procedures

6.5.2.1. Read-Behinds

The process of reading behind scorers (hereafter referred to as a read-behind) was a major responsibility of Questar's content staff and a primary tool for guarding against scorer drift. Questar's scoring system's integrated read-behind tool allowed Questar staff to review the scores assigned to individual student responses by any given scorer.

Questar's content staff could perform a search for the following:

- Responses scored by a particular scorer
- Responses receiving a particular score point
- Responses with scores that agree with, are adjacent to, or are non-adjacent to each other
- Combinations of these features

Content staff reviewed responses to confirm that the scores were correctly assigned and to give customized feedback and remediation to individual scorers.

6.5.2.2. Calibration

Content staff used calibration sets as needed to reinforce scoring standards, introduce scoring decisions, or correct scoring issues and trends. The primary goal of calibration was to continue training and to reinforce the scoring standards. Calibration sets may be "on the line" between score points or might contain unusual examples that are challenging to score and therefore useful for reinforcing the scoring rubric. Online calibration sets could be given to entire groups, a subset of scorers, or individual scorers, as needed, to score independently. These annotated sample responses promoted accuracy by exploring project-specific issues, score boundaries, or types of responses that were particularly challenging to score consistently. After scoring an online calibration set, scorers could ask questions and seek clarification of the score point or annotation.

6.5.2.3. Managing Scoring Quality (Scorer Exception Processing)

Content staff, often along with a project manager or human resource representative, intervened when scorer performance statistics did not meet quality standards or a scorer violated other Questar policies. Intervention included calibration, retraining, direct counseling and review of papers, and requalification. Scorer exception processing allowed Questar's project managers to define intervals at which the scoring system would check scorer validity for exact and adjacent agreement. If scorers were below pre-set standards, staff monitoring this process would interrupt their scoring process to review anchor papers or take other steps to improve their scoring. Through this process, Questar's scoring system could provide an additional training/requalification set, and

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if performance was not improved, could lock scorers out of the scoring system. This process prevented scorers from continuing to score if standards were not maintained.

Because the system monitored scorers and provided the scorers' information quickly, Questar's content staff continually focused on quality control measures. These measures included read-behinds, calibration, and responding to questions in the review queue. Content staff was able to spend more time working directly with scorers who had questions.

6.5.2.4. Validity

Validity responses are pre-scored responses strategically interspersed in the pool of operational responses. These responses are not distinguishable from operational responses and scorers' scores are only accepted for monitoring purposes, not in replacement of the true score.

The use of validity responses provides an objective procedure that helps ensure that scorers are applying the same standards throughout the project. This procedure offers feedback on the accuracy and consistency of individual scorers and groups of scorers assigned to a given item. Questar's validity mechanism provides an objective and systematic check of accuracy. It verifies that scorers are applying the same standards throughout the project and, therefore, guards against scorer drift and ultimately group drift. This procedure provides immediate feedback on individual scorers and the group as a whole.

Validity papers are actual student responses chosen by expert readers as examples that clearly earn certain scores. Following the standards established, scoring directors assigned "true scores" to validity responses to compare how often scorers match them throughout the scoring session. The validity pool included responses encompassing the entire score range for each item. Scorers scored them without being aware they were scoring validity papers rather than operational responses. Validity responses were sent to scorers throughout the project.

Each MO EOC content area was set to contain validity papers at a frequency rate determined by the range of scores and complexity of each item. This means that each scorer would see a validity paper at varying times throughout the project. The scorers could not distinguish a validity paper from an operational response since these papers are pulled from operational scoring. The process of selecting validity papers, and keeping the pool fresh, was to select papers scored by expert readers. Questar's system allows a team leader, scoring director or content specialist to score validity items using a hierarchical approval process to ensure the score has been adequately confirmed. For instance, if a score of 3 was given by a team leader, it could not be selected for a validity response unless confirmed and approved by the scoring director. If the validity response has been chosen by the scoring director, the response must be confirmed and approved by the content specialist.

Tables 6.1 and 6.2 show validity statistics at the end of the project for the Fall 2014 and Spring 2015 administrations, respectively. Summer 2014 validity statistics are unavailable due to the low n-counts and small number of scorers. Because Summer 2014 had such low n-counts, responses were read by expert scorers such as the Scoring Director and Team Leaders. Summer 2014 did not provide enough statistical numbers to support this function.

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Table 6.1. Validity Statistics for Fall 2014

Item	N-Count	IRR Plan	IRR Actual	Variance
Algebra I – 100076683-1	5,071	95%	96%	1%
Algebra I – 100076683-2	5,071	80%	91%	11%
Algebra I – 100076683-3	5,071	100%	100%	0%
Algebra I – 100076683-4	5,071	95%	88%	3%
English I – 100085793	622	80%	72%	-8%
English II – 100085923	2,412	80%	78%	-2%
Biology 1 – 100075926	3,137	100%	100%	0%
Biology 2 – 100075936	3,135	100%	100%	0%
Biology 3 – 100075927	3,132	100%	100%	0%
Biology 4 – 100075929	3,104	80%	87%	7%
Biology 5 – 100075928	3,121	95%	96%	1%
Biology 6 – 100075933	3,088	95%	95%	0%
Biology 7 – 100075930	3,105	95%	96%	1%
Biology 8 – 100075934	3,087	100%	100%	0%
Biology 9 – 100075935	3,081	100%	100%	0%
Biology 10 – 100075937	2,981	85%	89%	4%
Biology 11 – 100075938	2,911	95%	98%	3%

Table 6.2. Validity Statistics for Spring 2015

Item	N-Count	IRR Plan	IRR Actual	Variance
Algebra I – 100076622-1	62,449	80%	98%	18%
Algebra I – 100076622-2	62,449	95%	97%	2%
Algebra I – 100076622-3	62,449	80%	82%	2%
English I – 100085793	17,951	80%	70%	-10%
English II – 100085792	62,200	80%	76%	-4%
Biology 1 – 100075983	62,433	100%	94%	-6%
Biology 2 – 100075984	62,374	100%	85%	-15%
Biology 3 – 100075985	62,387	100%	99%	-1%
Biology 4 – 100075986	62,380	85%	85%	0%
Biology 5 – 100075992	62,169	95%	80%	-15%
Biology 6 – 100075987	62.328	85%	93%	8%
Biology 7 – 100075989	62,170	80%	82%	2%
Biology 8 – 100075988	61,397	85%	71%	-14%
Biology 9 – 100075990	62,280	100%	100%	0%
Biology 10 – 100075991	62,266	100%	99%	-1%

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6.5.2.5. Validity as Review

Selected validity responses were annotated by the content staff and flagged for review. If a scorer incorrectly scored one of these responses, content staff would address this with the scorer. This feedback helped in preventing scorer drift. Once a scorer received a validity response, it was not re-administered.

6.5.2.6. Frequency Distribution

Frequency distribution, or the number or percentage of scores assigned at each score point of a rubric, was another key metric tracked and managed during scoring. Questar evaluated any anomalous scoring trends at the item and scorer level and intervened with the individuals involved. Frequency distribution reports showed a breakdown of score points assigned on a given item. Expressed in percentages, data in these reports showed how often scorers, individually and as a group, assigned each score point.

6.5.2.7. Retraining and Resetting Scores

Questar's electronic scoring system could purge the scores assigned by a scorer whose work was deemed substandard and allowed scoring leadership staff to reset scores by individual scorer, date range, or item. In those cases, the scores assigned by that individual would be cleared from the database and the affected responses would be reset. The responses would then be rerouted to qualified scorers and rescored according to the original scoring design. Questar has not had to use this process to-date during this project.

6.5.2.8. Reporting and Data Analysis

Questar's digital scoring system automatically captured and tracked all score data. By reviewing up-to-date scorer performance statistics, Questar could quickly identify particular scorers whose performance fell outside of group norms while also keeping close track of the group as a whole. Reports for use in quality monitoring and project completion status were generated and updated automatically and were available to Questar scoring leadership staff at any time via the digital scoring system. Questar's reports gave daily and cumulative statistics and provided individual and group average agreement percentages.

6.5.3. Description of the Item Types and Score Points for each Content Area

6.5.3.1. Summer 2014

English: English II was a descriptive essay prompt, with score points 1–4.
Algebra: Multi-part (3 sections) with a graphing task. 0–4 score points.

Biology:

- Item 1 – Constructed response. 0–1 score points.
- Item 2 – Constructed response. 0–1 score points.
- Item 3 – Constructed response. 0–1 score points
- Item 4 – Constructed response. 0–1 score points.
- Item 5 – Constructed response, extended response 0–3 score points.
- Item 6 – Graphing task, extended response. 0–4 score points.
- Item 7 – Constructed response. 0–1 score points.
- Item 8 – Constructed response. 0–1 score points.

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- Item 9 – Constructed response, 0–1 score points.
- Item 10 – Constructed response,. 0–2 score points.
- Item 11 – Constructed response. 0–1 score points.
- Item 12 – Constructed response. 0–2 score points.
- Item 13 – Constructed response. 0–1 score points.

6.5.3.2. Fall 2014

English:

- English I was a narrative essay prompt, with score points 1–4, 1–4 and 0–2.
- English II was an explanatory essay prompt, with score points 1–4, 1–4 and 0–2.

Algebra: Multi-part (4 sections) with a graphing task. 0–4 score points.

Biology:

- Item 1 – Constructed response. 0–1 score points.
- Item 2 – Constructed response. 0–1 score points.
- Item 3 – Constructed response. 0–1 score points.
- Item 4 – Graphing task, extended response. 0–4 score points.
- Item 5 – Constructed response. 0–2 score points.
- Item 6 – Constructed response. 0–2 score points.
- Item 7 – Constructed response. 0–2 score points.
- Item 8 – Constructed response. 0–1 score points.
- Item 9 – Constructed response. 0–1 score points.
- Item 10 – Constructed response, extended response 0–3 score points.
- Item 10 – Constructed response. 0–2 score points.

6.5.3.3. Spring 2015

English:

- English I was a narrative essay prompt, with score points 1–4, 1–4 and 0–2.
- English II was an explanatory essay prompt, with score points 1–4, 1–4 and 0–2.

Algebra: Multi-part (3 sections) with a graphing task. 0–4 score points

Biology:

- Item 1 – Constructed response. 0–1 score points.
- Item 2 – Constructed response. 0–1 score points.
- Item 3 – Constructed response. 0–1 score points.
- Item 4 – Constructed response, extended item 0–3 score points
- Item 5 – Constructed response. 0–2 score points.
- Item 6 – Constructed response, extended item 0–3 score points.
- Item 7 – Graphing task, extended response. 0–4 score points.
- Item 8 – Constructed response, extended item 0–3 score points.
- Item 9 – Constructed response. 0–1 score points.
- Item 10 – Constructed response. 0–1 score points.

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Chapter 7: Scaling and Equating

7.1. Introduction

This chapter details the scaling and equating procedures implemented for the MO EOC Assessments. The equating methods described in this chapter serve to maintain consistency of the MO EOC Assessments score scales over time and ensure that the achievement levels are applied consistently from year to year.

For the Summer 2014 administration, previously administered test forms were used for all contents areas and the RSS conversions were already in existence. However, beginning of Fall 2014, five contents areas (English I, English II, Algebra I, Algebra II, and Geometry) have updated test forms, so the post-equating was completed in 2014–2015 for those assessments.

A pre-equating model (Kolen & Brennan, 2004) has been used to produce scoring conversions for each MO EOC Assessment since the establishment of the program. This chapter begins with a description of the item response theory (IRT) models used for equating, which is followed by an overview of the scaling and equating procedures for the operational assessments.

7.2. Item Response Theory

WINSTEPS software (Linacre, 2006b) was used to perform the scaling and equating for the MO EOC Assessments during the administrations with and without PEs. WINSTEPS is designed to produce a single scale by jointly analyzing data from students' responses to both SR items and PE/WPs. SR items were calibrated using the Rasch model (Rasch, 1960; Wright & Stone, 1979), while the partial credit model (Masters, 1982) was used to calibrate the PE/WPs.

Rasch scaling is "a method for obtaining objective, fundamental, linear measures from stochastic observations of ordered category responses" (Linacre, 2006a, p. 10). One feature of the Rasch model that distinguishes it from classical test theory is the placement of estimates of a person's ability and item difficulty on the same scale. The Rasch model expresses the probability of a correct response to an item as a function of the ability of the person and the difficulty of the item. In the Rasch model, the probability of a correct response to item i, given θ, is

$$P_i(\theta) = \frac{e^{(\theta - b_i)}}{1 + e^{(\theta - b_i)}},$$

where θ = latent trait, or ability, level and b_i= the difficulty parameter for item i.

Masters (1982) developed the partial credit model as an extension of the Rasch model to handle polytomous items, or items that allow for partially correct responses (e.g., open-ended items).

For an item with possible scores ranging from zero to J, the probability of obtaining score j on item i, given θ, is

$$P_{ij}(\theta) = \frac{e^{\sum_{k=0}^{j}(\theta - d_{ik})}}{\sum_{x=0}^{J} e^{\sum_{k=0}^{j}(\theta - d_{ik})}},$$

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where d_{ij} is the difference between the overall item difficulty, b_i, and the step parameter γ_{ij} for level j of item i, and the sum of step parameters is zero across all levels of item i.

7.3. Scaling and Equating for Summer 2014

IRT pre-equating involves scaling item parameters and equating test forms based on field-test data before the forms are administered operationally.[18] The following approach was used for pre-equating the MO EOC Assessments administered in Summer 2014:

1. Calibrate all 2008 standalone field-test forms concurrently without constraint.
2. Establish the base scale through calibration of the Spring 2009 operational forms without constraint.
3. Examine the stability of the common items from the two calibrations (i.e., the operational form items).
4. Re-center the 2008 item bank to the 2009 base scale.
5. Place the 2009 embedded field-test items onto the 2009 operational scale.
6. Perform fixed calibrations on the Summer 2009, Fall 2009, and Spring 2010 operational forms.
7. Place the 2010 embedded field-test items onto the 2009 operational scale.

Detailed procedures used for conducting scaling and equating for the forms used in Summer 2014 are provided for the assessments that consist of both SR items and PEs in the *2008–2009 MO EOC Phase I Technical Report* and the *2009–2010 MO EOC Phase I Technical Report*. Similarly, detailed procedures used for conducting scaling and equating are provided for the assessments that consist of SR items only in the *2009–2010 MO EOC Phase II Technical Report*.[19]

7.3.1. Scaling Transformations

Total scores for the MO EOC Assessments administered in Summer 2014 are reported in scale scores with a range of 100–250. A scale score of 200 represents the cut point between Basic and Proficient, and a scale score of 225 represents the cut point between Proficient and Advanced. The scale score ranges for Summer 2014 are displayed in Table 7.1.

Table 7.1. Scale Score Ranges by Achievement Level—Summer 2014

Content Area	Achievement Level	Scale Score Range
English II	Below Basic	100–179
	Basic	180–199
	Proficient	200–224
	Advanced	225–250
Algebra I	Below Basic	100–176
	Basic	177–199
	Proficient	200–224
	Advanced	225–250

[18] For the 2008–2009 year, the forms were pre-equated retroactively (after the Spring 2009 operational administration) to allow for a one-time re-centering of the item pool using Spring 2009 operational data.
[19] Missouri technical reports can be found online at http://dese.mo.gov/college-career-readiness/assessment/assessment-technical-support-materials.

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Content Area	Achievement Level	Scale Score Range
Biology	Below Basic	100–176
	Basic	177–199
	Proficient	200–224
	Advanced	225–250
English I	Below Basic	100–176
	Basic	177–199
	Proficient	200–224
	Advanced	225–250
Algebra II	Below Basic	100–181
	Basic	182–199
	Proficient	200–224
	Advanced	225–250
Geometry	Below Basic	100–181
	Basic	182–199
	Proficient	200–224
	Advanced	225–250
Government	Below Basic	100–178
	Basic	179–199
	Proficient	200–224
	Advanced	225–250
Am. History	Below Basic	100–181
	Basic	182–199
	Proficient	200–224
	Advanced	225–250

According to the *2009–2010 MO EOC Phase I and Phase II Technical Reports*, the procedure used to transform raw scores to scale scores was described as the following:

To produce these scale score ranges, linear transformations were applied to theta estimates and scale scores. The following formula was used to obtain the slopes and intercepts for the transformation functions:

$$sc(y) = \left[\frac{sc(y_2) - sc(y_1)}{\theta_2 - \theta_1}\right] y + \left\{(sc(y_1) - \left[\frac{sc(y_2) - sc(y_1)}{\theta_2 - \theta_1}\right]\theta_1\right\},$$

where θ_1 and θ_2 are person parameter estimates that correspond to the cut score points, and $sc(y_1)$ and $sc(y_2)$ are scale score points. This formula was adapted from Kolen and Brennan (2004, p. 337). For both the Spring 2009 base scale for English II, Algebra I, and Biology and the Spring 2010 base scale for English I, Algebra II, Geometry, Government, and American History, sc(y1) was 200 and sc(y2) was 225. Slopes and intercepts of the transformation functions are summarized in Table 7.2. These same slopes and intercepts will be applied to all future forms for each content area.

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Table 7.2. Summary of Slopes and Intercepts of Theta to Scale Score Transformation Functions by Content Area[20]

	Basic			Proficient			Advanced				
Content Area	Raw Score	Theta	Scale Score	Raw Score	Theta	Scale Score	Raw Score	Theta	Scale Score	Slope	Intercept
English II	15	-0.71	180	24	0.51	200	33	2.04	225	16.35	191.72
Algebra I	13	-0.80	177	22	0.36	200	31	1.61	225	19.96	192.83
Biology	18	-0.69	177	32	0.51	200	45	1.79	225	19.53	189.99
English I	16	-0.44	177	25	0.58	200	33	1.70	225	22.24	187.17
Algebra II	16	-0.45	182	24	0.46	200	33	1.71	225	20.06	190.76
Geometry	17	-0.36	182	24	0.47	200	32	1.60	225	22.12	189.57
Government	15	-0.56	179	25	0.56	200	34	1.86	225	19.11	189.37
Am. History	19	-0.11	182	25	0.56	200	32	1.49	225	26.64	185.19

In addition to the above scaling transformation, the following rules were also applied:

- The raw score cut (e.g., for Proficient) was selected as the lowest raw score associated with a rounded scale score of 200. The same strategy was also followed for a scale score of 225.
- If there was no raw score associated with a rounded scale score of 200, the raw score with the highest scale score below 200 was selected as the cut score and assigned a scale score of 200. For example, if two consecutive raw scores were associated with rounded scale scores of 198 and 201, the scale score of 198 was moved up to 200. The same strategy was also followed for a scale score of 225.
- Scale scores below 100 were rounded up to 100.
- Scale scores above 250 were rounded down to 250.
- For each test, for a perfect raw score, the scale score was set to 250.

7.4. Scaling and Equating for Fall 2014 and Spring 2015

Since new test forms were developed for English I, English II, Algebra I, Algebra II, and Geometry beginning in Fall 2014, post-equating was conducted in order to put the item parameters on a common scale. Because Physical Science was first administered in Fall 2014, free calibration was completed in order to estimate the item parameters. Table 7.3 presents the scale score ranges for Fall 2014 and Spring 2015 after post-equating.

[20] Scaling transformations were adjusted when PEs were removed (see p. 113 of the *2010–2011 MO EOC Phase I Technical Report*). These transformations are irrelevant in 2012–2013 since PEs were restored to the tests. Therefore, original transformations for these tests were used as documented in the *2008–2009 MO EOC Phase I Technical Report* and the *2009–2010 MO EOC Phase I Technical Report*, found online at http://dese.mo.gov/college-career-readiness/assessment/assessment-technical-support-materials.

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Table 7.3. Scale Score Ranges by Achievement Level—Fall 2014 and Spring 2015

Content Area	Achievement Level	Scale Score Range
English II	Below Basic	100–181
	Basic	182–199
	Proficient	200–224
	Advanced	225–250
Algebra I	Below Basic	100–186
	Basic	187–199
	Proficient	200–224
	Advanced	225–250
Biology	Below Basic	100–176
	Basic	177–199
	Proficient	200–224
	Advanced	225–250
English I	Below Basic	100–179
	Basic	180–199
	Proficient	200–224
	Advanced	225–250
Algebra II	Below Basic	100–185
	Basic	186–199
	Proficient	200–224
	Advanced	225–250
Geometry	Below Basic	100–188
	Basic	189–199
	Proficient	200–224
	Advanced	225–250
Government	Below Basic	100–178
	Basic	179–199
	Proficient	200–224
	Advanced	225–250
Am. History	Below Basic	100–181
	Basic	182–199
	Proficient	200–224
	Advanced	225–250
Physical Science	Below Basic	100–167
	Basic	168–199
	Proficient	200–224
	Advanced	225–250

7.4.1. Free Calibration for Physical Science

The Physical Science form was newly created in Fall 2014. Therefore, no previous item statistics were available to be used as anchor items. As a result, free calibration (i.e., calibration without an anchor set) was performed. A small number of students took the Physical Science Assessment

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in Fall 2014, and cut scores were set through a standard setting meeting in February 2015. After the free calibration, the cut thetas established from Fall 2014 were used to create the RSS table. All items were calibrated at the same time using Winsteps 3.64.2 and estimated slope and intercept in order to establish the RSS table.

7.4.2. Post-equating

English II, English I, Algebra I, Algebra II, and Geometry were post-equated with an item stability check. English II and Algebra I were newly created forms with multiple PEs that led to the change of the total score, requiring new RSS conversion tables.

In order to link item parameters for the new PEs to the appropriate scale and obtain accurate raw score to scale score conversion tables for the new test forms, Questar performed following steps:

1. Evaluate item parameter stability for MC items.
2. Used survived MC items as anchors and calibrate PEs.
3. Estimate new slope and intercept using the new cuts from the cutpoint validation workshop.
4. Create the RSS table.

7.4.2.1. Evaluate Item Parameter Stability for MC Items

In order to evaluate whether the item parameter estimates are stable from previous administrations to the Spring 2015 administration, the displacement criterion with |.30| logits[21] was initially adopted. The displacement measure indicates the size of difference, or drift, between the parameters of the anchored items, as well as the estimated parameters of the same items obtained with free calibration without constraint (Linacre, 2009). However, after the initial item stability check, Questar had to relax the displacement criterion to |.50| because too many items had to be removed from the anchor sets that unbalanced the content of the assessments.

Winsteps 3.64 was used to estimate the displacement measurement statistic. The following steps describe the procedures used to estimate the displacement values for evaluating item parameter drift for MC items:

Step 1: Calibrate with fixed item parameters for MC items.
Step 2: Evaluate the displacement value. If the value of displacement is greater than 0.50 logits, the item will be removed from the anchor set.
Step 3: After removing unstable items from the anchor set, re-calibrate.
Step 4: Repeat Steps 1 through 3 until all unstable items are identified.
Step 5: Use the survived MC items from the previous steps as anchor items to obtain item parameters for PEs.

7.4.2.2. Estimation of the New Slope and Intercept

Because the total score range changed, it was necessary to re-estimate the slopes and intercepts for the RSS linear transformation equation in order to have consistent scale score cuts of 200 and 225 for Proficient and Advanced, respectively. The new theta cuts for Proficient and Advanced

[21] This is the logit scale used in Rasch modeling.

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were the results from the 2015 cutpoints validation. Table 7.4 shows the estimated new slopes and intercepts. These slopes and intercepts will be used for the future test administration.

Table 7.4. Theta to Scale Score Transformation with New Slopes and Intercepts

Content Area	Basic		Proficient		Advanced		Slope	Intercept
	Theta	SS	Theta	SS	Theta	SS		
English I	-0.55	180	0.58	200	2.01	225	17.55	189.76
English II	-0.69	182	0.45	200	2.06	225	15.54	192.98
Algebra I	-0.14	187	0.46	200	1.63	225	21.43	190.11
Algebra II	0.26	186	0.85	200	1.92	225	23.25	180.34
Geometry	-0.23	189	0.38	200	1.64	225	19.76	192.51
Physical Science	-1.23	168	0.14	200	1.21	225	23.43	196.62

7.4.2.3. Post-Equating Results

Tables 7.5 and 7.6 present the students' performance distribution for the 2013–2014 and 2014–2015 Fall and Spring administrations.

Table 7.5. Students Achievement Distribution Comparison Between the 2013–2014 and 2014–2015 Fall Administrations

Content Area	Achievement Level	2013–2014		2014–2015	
		N-Count	%	N-Count	%
English II	Below Basic	321	11.11	343	14.10
	Basic	947	32.79	733	30.14
	Proficient	1,255	43.46	1,082	44.49
	Advanced	365	12.64	274	11.27
	Total	2,888	100.00	2,432	100.00
Algebra I	Below Basic	818	15.08	1,209	23.57
	Basic	1,778	32.78	1,258	24.52
	Proficient	1,931	35.60	2,002	39.03
	Advanced	897	16.54	661	12.88
	Total	5,424	100.00	5,130	100.00
English I	Below Basic	118	13.20	53	8.49
	Basic	322	36.02	145	23.24
	Proficient	295	33.00	320	51.28
	Advanced	159	17.79	106	16.99
	Total	894	100.00	624	100.00
Algebra II	Below Basic	27	6.57	136	17.73
	Basic	67	16.30	133	17.34
	Proficient	193	46.96	254	33.12
	Advanced	124	30.17	244	31.81
	Total	411	100.00	767	100.00
Geometry	Below Basic	108	11.66	104	13.65

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Content Area	Achievement Level	2013–2014		2014–2015	
		N-Count	%	N-Count	%
	Basic	237	25.59	112	14.70
	Proficient	274	29.59	347	45.54
	Advanced	307	33.15	199	26.12
	Total	926	100.00	762	100.00

Table 7.6. Students Achievement Distribution Comparison Between the 2013–2014 and 2014–2015 Spring Administrations

Content Area	Achievement Level	2013–2014		2014–2015	
		N-Count	%	N-Count	%
English II	Below Basic	2,277	3.68	3,126	5.02
	Basic	12,776	20.66	12,769	20.49
	Proficient	28,611	46.27	34,970	56.13
	Advanced	18,172	29.39	11,439	18.36
	Total	61,836	100.00	62,304	100.00
Algebra I	Below Basic	6,242	9.88	11,373	18.13
	Basic	22,031	34.86	11,947	19.04
	Proficient	22,533	35.66	27,426	43.72
	Advanced	12,386	19.60	11,992	19.11
	Total	63,192	100.00	62,738	100.00
English I	Below Basic	5,799	9.61	1,113	6.21
	Basic	18,185	30.12	4,774	26.65
	Proficient	23,014	38.12	10,075	56.24
	Advanced	13,369	22.15	1,952	10.90
	Total	60,367	100.00	17,914	100.00
Algebra II	Below Basic	1,995	7.72	3,022	14.47
	Basic	7,409	28.66	4,031	19.30
	Proficient	10,274	39.74	7,896	37.81
	Advanced	6,173	23.88	5,936	28.42
	Total	25,851	100.00	20,885	100.00
Geometry	Below Basic	3,812	10.67	2,147	19.07
	Basic	8,240	23.07	2,059	18.29
	Proficient	14,972	41.91	5,189	46.10
	Advanced	8,697	24.35	1,861	16.53
	Total	35,721	100.00	11,256	100.00

7.5. Raw Score to Scale Score Conversions

Tables 7.7 – 7.31 provide the raw score to scale score conversions for Summer 2014, Fall 2014, and Spring 2015.

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Table 7.7. Raw Score to Scale Score Conversions for Summer 2014, English II

Raw Score	Scale Score	*CSEM*
0	108	30
1	128	17
2	140	12
3	147	10
4	152	9
5	157	8
6	160	7
7	163	7
8	166	7
9	169	6
10	172	6
11	174	6
12	176	6
13	178	6
14	180	6
15	182	6
16	184	6
17	186	6
18	188	6
19	190	6
20	192	6
21	194	6
22	196	6
23	198	6
24	200	6
25	202	6
26	204	6
27	206	6
28	208	6
29	211	6
30	213	7
31	216	7
32	219	7
33	225	8
34	226	8
35	230	9
36	236	10
37	243	12
38	250	17
39	250	30

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Table 7.8. Raw Score to Scale Score Conversions for Summer 2014, Algebra I

Raw Score	Scale Score	*CSEM*
0	100	37
1	114	20
2	129	15
3	138	12
4	144	11
5	150	10
6	154	9
7	158	9
8	162	8
9	165	8
10	168	8
11	171	7
12	174	7
13	177	7
14	179	7
15	182	7
16	184	7
17	186	7
18	189	7
19	191	7
20	193	7
21	196	7
22	198	7
23	200	7
24	203	7
25	205	7
26	208	7
27	211	7
28	214	8
29	217	8
30	220	8
31	225	8
32	227	9
33	231	9
34	236	10
35	242	11
36	248	12
37	250	15
38	250	21
39	250	37

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Table 7.9. Raw Score to Scale Score Conversions for Summer 2014, Biology

Raw Score	Scale Score	*CSEM*
0	100	36
1	108	20
2	122	14
3	130	12
4	137	10
5	142	9
6	146	9
7	150	8
8	153	8
9	156	7
10	159	7
11	161	7
12	164	7
13	166	7
14	168	6
15	170	6
16	172	6
17	174	6
18	177	6
19	178	6
20	180	6
21	182	6
22	183	6
23	185	6
24	187	6
25	188	6
26	190	6
27	192	6
28	193	6
29	195	6
30	197	6
31	198	6
32	200	6
33	202	6
34	203	6
35	205	6
36	207	6
37	209	6
38	210	6
39	212	6
40	214	6
41	216	6

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Raw Score	Scale Score	*CSEM*
42	218	7
43	221	7
44	225	7
45	226	7
46	228	7
47	231	8
48	235	8
49	238	9
50	243	9
51	248	10
52	250	12
53	250	14
54	250	20
55	250	36

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Table 7.10. Raw Score to Scale Score Conversions for Summer 2014, English I

Raw Score	Scale Score	*CSEM*
0	100	41
1	101	23
2	118	16
3	128	14
4	135	12
5	141	11
6	146	10
7	151	10
8	155	9
9	159	9
10	162	9
11	165	8
12	168	8
13	171	8
14	174	8
15	177	8
16	179	8
17	182	8
18	185	8
19	187	8
20	190	7
21	192	7
22	195	8
23	197	8
24	200	8
25	202	8
26	205	8
27	208	8
28	211	8
29	214	8
30	217	8
31	220	9
32	225	9
33	228	10
34	232	10
35	237	11
36	243	12
37	250	14
38	250	16
39	250	23
40	250	41

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Table 7.11. Raw Score to Scale Score Conversions for Summer 2014, Algebra II

Raw Score	Scale Score	*CSEM*
0	100	37
1	117	20
2	132	15
3	140	12
4	147	11
5	152	10
6	157	9
7	160	9
8	164	8
9	167	8
10	170	8
11	173	7
12	175	7
13	178	7
14	182	7
15	183	7
16	185	7
17	187	7
18	189	7
19	192	7
20	194	7
21	196	7
22	198	7
23	200	7
24	203	7
25	205	7
26	207	7
27	210	7
28	212	7
29	215	7
30	218	8
31	221	8
32	225	8
33	227	9
34	231	9
35	236	10
36	241	11
37	247	12
38	250	15
39	250	20
40	250	37

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Table 7.12. Raw Score to Scale Score Conversions for Summer 2014, Geometry

Raw Score	Scale Score	*CSEM*
0	100	41
1	106	23
2	122	16
3	132	13
4	139	12
5	145	11
6	150	10
7	154	9
8	158	9
9	161	9
10	165	8
11	168	8
12	171	8
13	173	8
14	176	8
15	179	8
16	182	7
17	184	7
18	186	7
19	188	7
20	191	7
21	193	7
22	196	7
23	200	7
24	201	7
25	203	7
26	206	8
27	208	8
28	211	8
29	214	8
30	217	8
31	220	9
32	225	9
33	228	9
34	232	10
35	237	11
36	242	12
37	250	13
38	250	16
39	250	22
40	250	41

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Table 7.13. Raw Score to Scale Score Conversions for Summer 2014, Government

Raw Score	Scale Score	*CSEM*
0	100	35
1	114	19
2	128	14
3	137	12
4	143	10
5	148	9
6	152	9
7	156	8
8	159	8
9	162	7
10	165	7
11	168	7
12	170	7
13	173	7
14	175	7
15	177	6
16	179	6
17	181	6
18	184	6
19	186	6
20	188	6
21	190	6
22	192	6
23	194	6
24	196	6
25	200	7
26	201	7
27	203	7
28	205	7
29	208	7
30	210	7
31	213	7
32	216	8
33	220	8
34	225	9
35	228	9
36	233	10
37	239	12
38	247	14
39	250	19
40	250	35

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Table 7.14. Raw Score to Scale Score Conversions for Summer 2014, Am. History

Raw Score	Scale Score	*CSEM*
0	100	49
1	100	27
2	102	20
3	114	16
4	123	14
5	130	13
6	136	12
7	142	12
8	146	11
9	151	11
10	155	10
11	159	10
12	162	10
13	166	10
14	169	9
15	173	9
16	176	9
17	179	9
18	182	9
19	185	9
20	188	9
21	191	9
22	194	9
23	197	9
24	200	9
25	203	9
26	206	9
27	210	9
28	213	10
29	217	10
30	221	10
31	225	11
32	229	11
33	234	11
34	239	12
35	245	13
36	250	14
37	250	16
38	250	20
39	250	27
40	250	49

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Table 7.15. Raw Score to Scale Score Conversions for Fall 2014, English II

Raw Score	Scale Score	*CSEM*
0	111	28
1	129	16
2	141	11
3	147	9
4	152	8
5	156	7
6	159	7
7	162	6
8	164	6
9	167	6
10	169	6
11	171	6
12	173	5
13	175	5
14	176	5
15	178	5
16	180	5
17	182	5
18	183	5
19	185	5
20	187	5
21	189	5
22	190	5
23	192	5
24	194	5
25	196	5
26	197	5
27	200	5
28	201	5
29	203	5
30	205	6
31	207	6
32	209	6
33	211	6
34	214	6
35	216	6
36	219	6
37	221	7
38	225	7
39	228	7
40	232	8
41	236	9
42	242	10
43	249	12
44	250	16
45	250	29

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Table 7.16. Raw Score to Scale Score Conversions for Fall 2014, Algebra I

Raw Score	Scale Score	*CSEM*
0	100	40
1	120	22
2	136	16
3	146	13
4	153	12
5	159	11
6	164	10
7	168	9
8	172	9
9	176	8
10	179	8
11	182	8
12	185	8
13	187	7
14	190	7
15	192	7
16	194	7
17	197	7
18	200	7
19	201	7
20	203	6
21	205	6
22	207	6
23	208	6
24	210	6
25	212	6
26	214	6
27	216	6
28	218	6
29	220	6
30	221	6
31	223	6
32	225	7
33	227	7
34	229	7
35	232	7
36	234	7
37	236	7
38	239	7
39	241	8
40	244	8
41	247	8

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42	250	9
43	250	9
44	250	10
45	250	11
46	250	12
47	250	14
48	250	17
49	250	23
50	250	41

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Table 7.17. Raw Score to Scale Score Conversions for Fall 2014, Biology

Raw Score	Scale Score	*CSEM*
0	100	36
1	107	20
2	121	14
3	130	12
4	137	11
5	142	10
6	146	9
7	150	8
8	153	8
9	156	8
10	159	7
11	162	7
12	164	7
13	166	7
14	169	6
15	171	6
16	173	6
17	175	6
18	177	6
19	178	6
20	180	6
21	182	6
22	184	6
23	185	6
24	187	6
25	189	6
26	190	6
27	192	6
28	193	6
29	195	6
30	197	6
31	198	6
32	200	6
33	202	6
34	203	6
35	205	6
36	207	6
37	208	6
38	210	6
39	212	6
40	214	6
41	216	6

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Raw Score	Scale Score	*CSEM*
42	218	6
43	220	7
44	223	7
45	225	7
46	228	7
47	231	8
48	234	8
49	238	9
50	242	9
51	247	10
52	250	12
53	250	14
54	250	20
55	250	36

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Table 7.18. Raw Score to Scale Score Conversions for Fall 2014, English I

Raw Score	Scale Score	*CSEM*
0	100	32
1	117	18
2	129	13
3	137	10
4	142	9
5	147	8
6	150	8
7	154	7
8	157	7
9	159	7
10	162	7
11	164	7
12	167	6
13	169	6
14	171	6
15	174	6
16	176	6
17	178	6
18	180	6
19	182	6
20	184	6
21	186	6
22	189	6
23	191	6
24	193	6
25	195	6
26	197	6
27	200	6
28	201	6
29	204	6
30	206	6
31	208	7
32	211	7
33	213	7
34	216	7
35	219	7
36	222	7
37	225	8
38	228	8
39	232	8
40	237	9
41	242	10
42	248	11
43	250	13
44	250	18
45	250	32

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Table 7.19. Raw Score to Scale Score Conversions for Fall 2014, Algebra II

Raw Score	Scale Score	*CSEM*
0	100	43
1	104	24
2	121	17
3	131	14
4	139	13
5	145	12
6	151	11
7	155	10
8	159	10
9	163	9
10	167	9
11	170	9
12	173	9
13	176	8
14	179	8
15	182	8
16	186	8
17	188	8
18	191	8
19	193	8
20	196	8
21	200	8
22	201	8
23	204	8
24	207	8
25	210	8
26	213	8
27	216	8
28	219	9
29	222	9
30	225	9
31	229	9
32	233	10
33	237	10
34	242	11
35	247	12
36	250	13
37	250	14
38	250	17
39	250	24
40	250	43

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Table 7.20. Raw Score to Scale Score Conversions for Fall 2014, Geometry

Raw Score	Scale Score	*CSEM*
0	100	36
1	118	20
2	132	15
3	141	12
4	148	11
5	154	10
6	158	9
7	162	9
8	166	8
9	169	8
10	173	8
11	176	8
12	178	7
13	181	7
14	184	7
15	186	7
16	189	7
17	191	7
18	194	7
19	196	7
20	200	7
21	201	7
22	203	7
23	205	7
24	208	7
25	210	7
26	213	7
27	216	7
28	218	7
29	221	8
30	225	8
31	227	8
32	231	8
33	235	9
34	239	9
35	243	10
36	249	11
37	250	12
38	250	15
39	250	20
40	250	36

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Table 7.21. Raw Score to Scale Score Conversions for Fall 2014, Government

Raw Score	Scale Score	*CSEM*
0	100	35
1	114	19
2	128	14
3	137	12
4	143	10
5	148	9
6	152	9
7	156	8
8	159	8
9	163	8
10	165	7
11	168	7
12	171	7
13	173	7
14	176	7
15	179	7
16	180	7
17	183	7
18	185	6
19	187	6
20	189	6
21	191	6
22	194	7
23	196	7
24	198	7
25	200	7
26	203	7
27	205	7
28	208	7
29	210	7
30	213	7
31	216	8
32	219	8
33	225	8
34	227	9
35	231	10
36	236	10
37	243	12
38	250	14
39	250	20
40	250	35

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Table 7.22. Raw Score to Scale Score Conversions for Fall 2014, Am. History

Raw Score	Scale Score	*CSEM*
0	100	49
1	100	27
2	100	20
3	111	16
4	119	15
5	127	13
6	133	12
7	138	12
8	143	11
9	148	11
10	152	10
11	156	10
12	159	10
13	163	10
14	166	9
15	170	9
16	173	9
17	176	9
18	179	9
19	182	9
20	185	9
21	188	9
22	192	9
23	195	9
24	200	9
25	201	9
26	204	9
27	208	10
28	211	10
29	215	10
30	219	10
31	225	11
32	227	11
33	232	12
34	237	12
35	243	13
36	250	14
37	250	16
38	250	20
39	250	27
40	250	49

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Table 7.23. Raw Score to Scale Score Conversions for Spring 2015, English II

Raw Score	Scale Score	*CSEM*
0	105	28
1	124	16
2	135	11
3	142	9
4	146	8
5	150	7
6	153	7
7	156	6
8	159	6
9	161	6
10	163	6
11	165	6
12	167	6
13	169	6
14	172	6
15	174	6
16	176	6
17	178	6
18	179	6
19	182	6
20	183	5
21	185	5
22	187	5
23	189	5
24	191	5
25	193	6
26	195	6
27	197	6
28	200	6
29	201	6
30	203	6
31	205	6
32	208	6
33	210	6
34	212	6
35	215	6
36	218	7
37	221	7
38	225	7
39	227	8
40	232	8
41	236	9
42	242	10
43	250	12
44	250	16
45	250	29

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Table 7.24. Raw Score to Scale Score Conversions for Spring 2015, Algebra I

Raw Score	Scale Score	*CSEM*
0	100	40
1	107	22
2	124	16
3	134	14
4	142	12
5	148	11
6	153	10
7	158	10
8	162	9
9	166	9
10	169	8
11	172	8
12	175	8
13	178	8
14	181	7
15	183	7
16	186	7
17	188	7
18	190	7
19	193	7
20	195	7
21	197	7
22	200	7
23	201	7
24	203	7
25	205	7
26	207	6
27	209	6
28	211	6
29	213	6
30	215	6
31	217	6
32	219	6
33	221	7
34	223	7
35	225	7
36	227	7
37	229	7
38	231	7
39	234	7
40	236	8
41	239	8

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42	242	8
43	245	9
44	249	9
45	250	10
46	250	11
47	250	13
48	250	16
49	250	22
50	250	39

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Table 7.25. Raw Score to Scale Score Conversions for Spring 2015, Biology

Raw Score	Scale Score	*CSEM*
0	100	36
1	111	20
2	125	14
3	134	12
4	140	10
5	145	10
6	149	9
7	153	8
8	156	8
9	159	8
10	162	7
11	165	7
12	167	7
13	170	7
14	172	6
15	174	6
16	177	6
17	178	6
18	180	6
19	182	6
20	183	6
21	185	6
22	187	6
23	189	6
24	190	6
25	192	6
26	193	6
27	195	6
28	197	6
29	198	6
30	200	6
31	201	6
32	203	6
33	205	6
34	206	6
35	208	6
36	209	6
37	211	6
38	212	6
39	214	6
40	216	6
41	218	6

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Raw Score	Scale Score	*CSEM*
42	219	6
43	221	6
44	225	6
45	226	7
46	228	7
47	231	7
48	233	8
49	237	8
50	241	9
51	245	10
52	250	12
53	250	14
54	250	20
55	250	36

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Table 7.26. Raw Score to Scale Score Conversions for Spring 2015, English I

Raw Score	Scale Score	*CSEM*
0	100	32
1	117	18
2	129	13
3	137	10
4	142	9
5	147	8
6	150	8
7	154	7
8	157	7
9	159	7
10	162	7
11	164	7
12	167	6
13	169	6
14	171	6
15	174	6
16	176	6
17	178	6
18	180	6
19	182	6
20	184	6
21	186	6
22	189	6
23	191	6
24	193	6
25	195	6
26	197	6
27	200	6
28	201	6
29	204	6
30	206	6
31	208	7
32	211	7
33	213	7
34	216	7
35	219	7
36	222	7
37	225	8
38	228	8
39	232	8
40	237	9
41	242	10
42	248	11
43	250	13
44	250	18
45	250	32

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Table 7.27. Raw Score to Scale Score Conversions for Spring 2015, Algebra II

Raw Score	Scale Score	*CSEM*
0	100	43
1	104	24
2	121	17
3	131	14
4	139	13
5	146	12
6	151	11
7	156	10
8	160	10
9	164	9
10	168	9
11	171	9
12	174	9
13	177	8
14	180	8
15	183	8
16	186	8
17	189	8
18	192	8
19	195	8
20	197	8
21	200	8
22	203	8
23	206	8
24	208	8
25	211	8
26	214	8
27	217	8
28	220	9
29	225	9
30	227	9
31	231	9
32	235	10
33	239	10
34	243	11
35	249	12
36	250	13
37	250	14
38	250	17
39	250	24
40	250	43

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Table 7.28. Raw Score to Scale Score Conversions for Spring 2015, Geometry

Raw Score	Scale Score	*CSEM*
0	100	36
1	118	20
2	132	15
3	141	12
4	148	11
5	154	10
6	158	9
7	162	9
8	166	8
9	169	8
10	173	8
11	176	8
12	178	7
13	181	7
14	184	7
15	186	7
16	189	7
17	191	7
18	194	7
19	196	7
20	200	7
21	201	7
22	203	7
23	205	7
24	208	7
25	210	7
26	213	7
27	216	7
28	218	7
29	221	8
30	225	8
31	227	8
32	231	8
33	235	9
34	239	9
35	243	10
36	249	11
37	250	12
38	250	15
39	250	20
40	250	36

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Table 7.29. Raw Score to Scale Score Conversions for Spring 2015, Government

Raw Score	Scale Score	*CSEM*
0	100	35
1	113	20
2	127	14
3	136	12
4	142	10
5	147	9
6	151	9
7	155	8
8	159	8
9	162	8
10	165	7
11	168	7
12	170	7
13	173	7
14	175	7
15	179	7
16	180	7
17	182	7
18	185	7
19	187	7
20	189	7
21	191	7
22	194	7
23	196	7
24	200	7
25	201	7
26	203	7
27	206	7
28	208	7
29	211	7
30	214	7
31	217	8
32	220	8
33	225	8
34	228	9
35	232	10
36	237	10
37	244	12
38	250	14
39	250	20
40	250	35

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Table 7.30. Raw Score to Scale Score Conversions for Spring 2015, Am. History

Raw Score	Scale Score	*CSEM*
0	100	49
1	100	27
2	105	19
3	117	16
4	125	14
5	132	13
6	138	12
7	143	11
8	148	11
9	152	10
10	156	10
11	160	10
12	163	10
13	166	9
14	170	9
15	173	9
16	176	9
17	179	9
18	182	9
19	185	9
20	187	9
21	190	9
22	193	9
23	196	9
24	200	9
25	202	9
26	205	9
27	209	9
28	212	10
29	216	10
30	219	10
31	225	10
32	227	11
33	232	11
34	237	12
35	243	13
36	250	14
37	250	16
38	250	20
39	250	27
40	250	49

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Table 7.31. Raw Score to Scale Score Conversions for Spring 2015, Physical Science

Raw Score	Scale Score	*CSEM*
0	100	43
1	100	24
2	115	17
3	126	14
4	134	13
5	140	12
6	145	11
7	150	10
8	154	10
9	158	9
10	161	9
11	165	9
12	168	9
13	171	8
14	174	8
15	177	8
16	179	8
17	182	8
18	185	8
19	187	8
20	190	8
21	192	8
22	195	8
23	197	8
24	200	8
25	203	8
26	205	8
27	208	8
28	210	8
29	213	8
30	216	8
31	219	8
32	222	8
33	225	9
34	228	9
35	232	9
36	235	9
37	239	10
38	244	10
39	249	11
40	250	12
41	250	13
42	250	15
43	250	17
44	250	24
45	250	43

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Chapter 8: Reporting

8.1. Introduction

The purpose of reporting assessment data is to communicate test results to students, parents, teachers, administrators, and other stakeholders. The MO EOC Assessment reports provide useful information for determining the performance of students in a particular district, school, or classroom. These reports help describe students' knowledge and skills with respect to a set of expectations, allowing educators to determine specific instructional needs, measure student mastery toward post-secondary readiness, provide evidence of accountability for Missouri and national programs, and evaluate educational programs. Additionally, districts may use locally designed assessments aligned to the Show-Me Standards and CLEs to provide more detailed information for each student in specific test areas.

Questar delivers a General Research File (GRF) to DESE at the end of each test administration that contains all of the raw data collected for each administration. In addition, Questar provides a Guide to Interpreting Results for DESE to post on their website that provides explanations of the CLEs and ALDs for each content area, as well as samples of the Individual Student Report (ISR) and the Student Score Label with descriptions of the information they contain. ISRs are provided in the online assessment platform for all assessment windows. Student Score Labels are provided in hard copy to districts following each administration.

For each testing event, Questar converted each student's raw score points earned into an EOC scale score, as described in Chapter 7 of this report. A student received an EOC scale score when he or she had made a valid attempt for the session. EOC scale scores range in value from 100 to 250. The EOC scale score determines the student's achievement level. For all content areas, a scale score of 200 to 224 is considered Proficient and a scale score of 225 and above is considered Advanced. Each achievement level represents standards of performance for each assessed content area: English II, Algebra I, Biology, English I, Algebra II, Geometry, Government, American History, and Physical Science.

Achievement-level scores describe what students can do in terms of the content and skills assessed. These scores provide a way to compare test results with standards of academic performance. Panels drawn from Missouri's educational, business, and professional communities recommended the raw score cuts—based on field-test data from the 2008 field test for English II, Algebra I, and Biology and the 2009 field-test forms for English I, Algebra II, Geometry, Government, and American History—to be used for each achievement level. Beginning in Fall 2014, five contents areas (English I, English II, Algebra I, Algebra II, and Geometry) adopted new test forms, therefore new cuts were established at the 2015 cutpoint validation workshop, which will be used for future administration. These cuts were reviewed and adopted by the Missouri State Board of Education. For more information on how the achievement levels were set, please see Chapter 3 of this report.

No test provides a perfect measure of a student's ability because all tests have a known standard error of measurement (SEM). The SEM represents the amount of variability that can be expected in a student's test score because of the inherent imprecision of the test. For example, if the student were tested again with a new test of comparable difficulty, he or she would likely obtain

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a slightly different score. The expected range for this new score is provided as a standard error (SE) and gives an indication of the margin of error for the reported scale score.

8.2. Individual Student Report (ISR)

The 2014–2015 Individual Student Report (ISR) provides information about performance on the MO EOC Assessment, describing the results in terms of four levels of achievement in a content area. It is used for measuring an individual student's mastery toward post-secondary readiness for the content area. It is also used in instructional planning as a point of reference during parent-teacher conferences and for permanent recordkeeping. Teachers are informed that other sources of information should be used along with this report when determining the student's areas of strength or need.

On the report, achievement-level scores describe what students can do in terms of the CLEs for the content and skills assessed by the MO EOC Assessment. A student at the Proficient or Advanced level has met the standard.

A sample of the ISR appears in Figure 8.1. A brief description of selected parts of the report is as follows:

A. The heading of the ISR includes the content area for the results being presented. A separate report is produced for each content area tested.

B. The student information section contains the biographic data for the individual student taking the assessment. Identifying information including the MOSIS ID, gender, building, and district is listed, followed by the test period.

C. The individual student's results are presented numerically as a three-digit scale score with the SE. An accompanying bar graph to the right of the scale score illustrates the achievement level obtained by the student. Achievement levels (whether Below Basic, Basic, Proficient, or Advanced) are based on the scale score ranges listed beneath the Achievement Level heading in the table.

D. The mean scale scores for the student's building and district are displayed in the two rows below the student's individual results. The mean scale score, with an associated SE, and the bar graph provide a way to view the individual's results in contrast to the group's results for the content area during the same test period.

E. The narrative describes the student performance characteristics corresponding to the obtained achievement level. The text is specific to the content area tested. At the bottom of the narrative is a URL for a website that provides additional information for all of the achievement levels for the content area.

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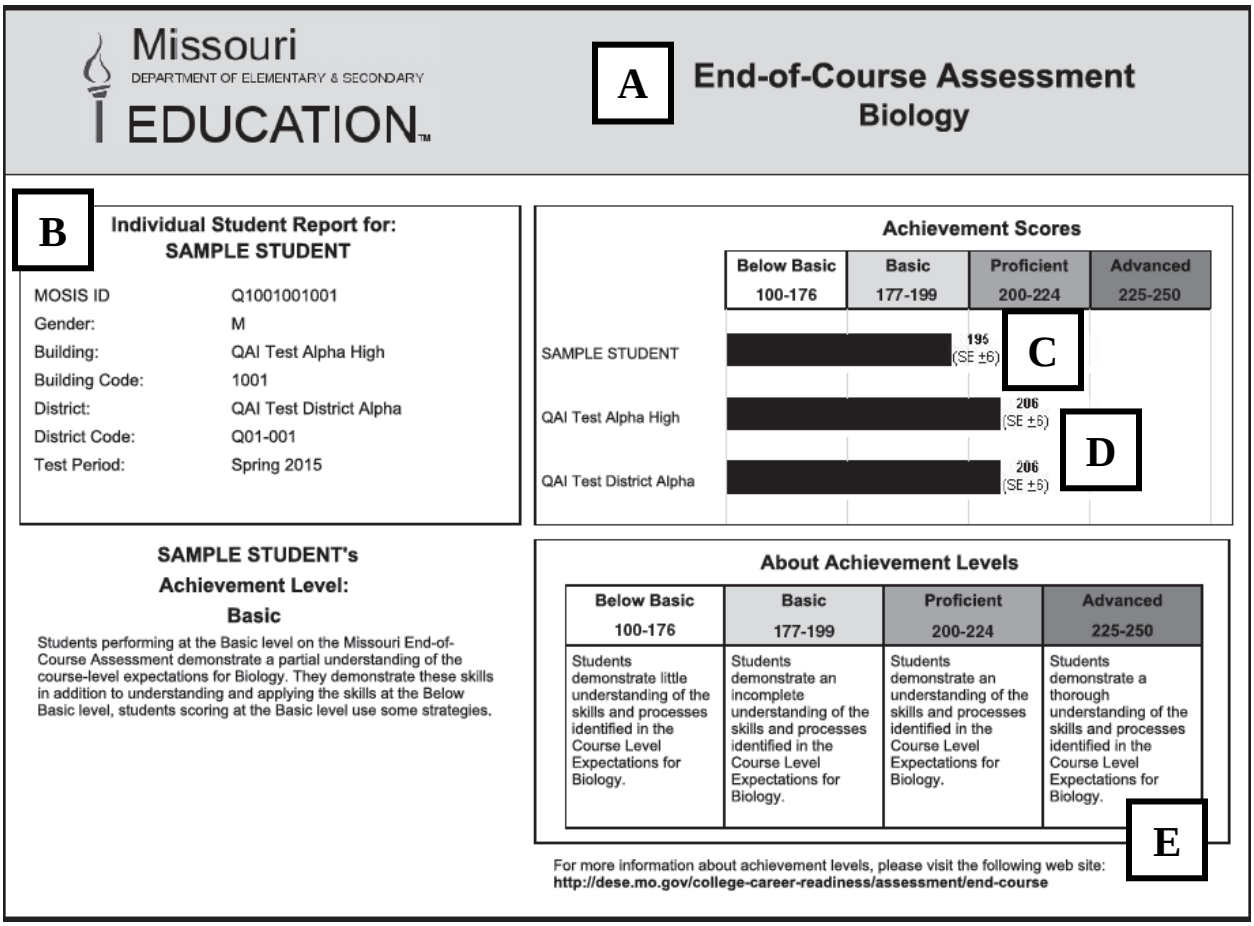
Figure 8.1. Individual Student Report (ISR)



8.3. Student Score Label

The 2014–2015 Student Score Label provides a summary of a student's results on the MO EOC Assessment. A separate label is produced for each content area tested. The individual label provides the student's biographic data, scale score, and achievement level. The labels have adhesive backing so they can be easily transferred onto the student record folders.

A sample label is shown in Figure 8.2. A brief description of selected parts of the label is as follows:

A. The left side of the label shows the student's name and identifying information.
B. The upper right side shows the content area tested. If a student has results for more than one content area, the next label is printed below the first one.
C. The lower right side shows the student's scale score and achievement level.

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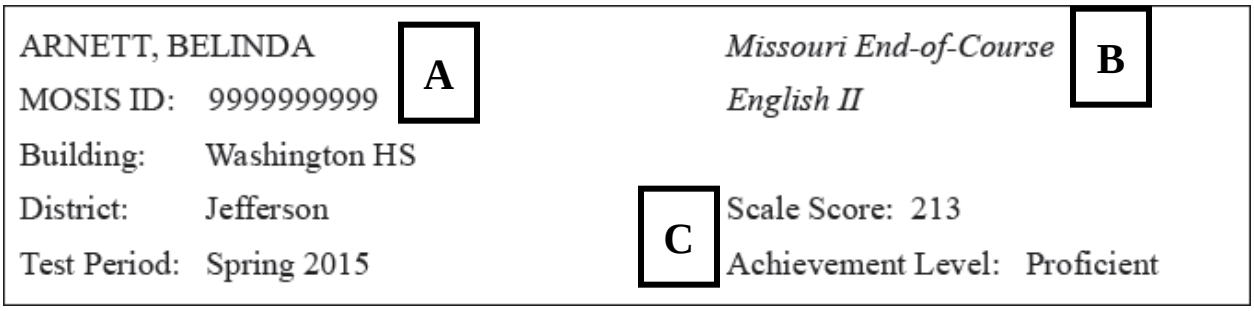
Figure 8.2. Student Score Label

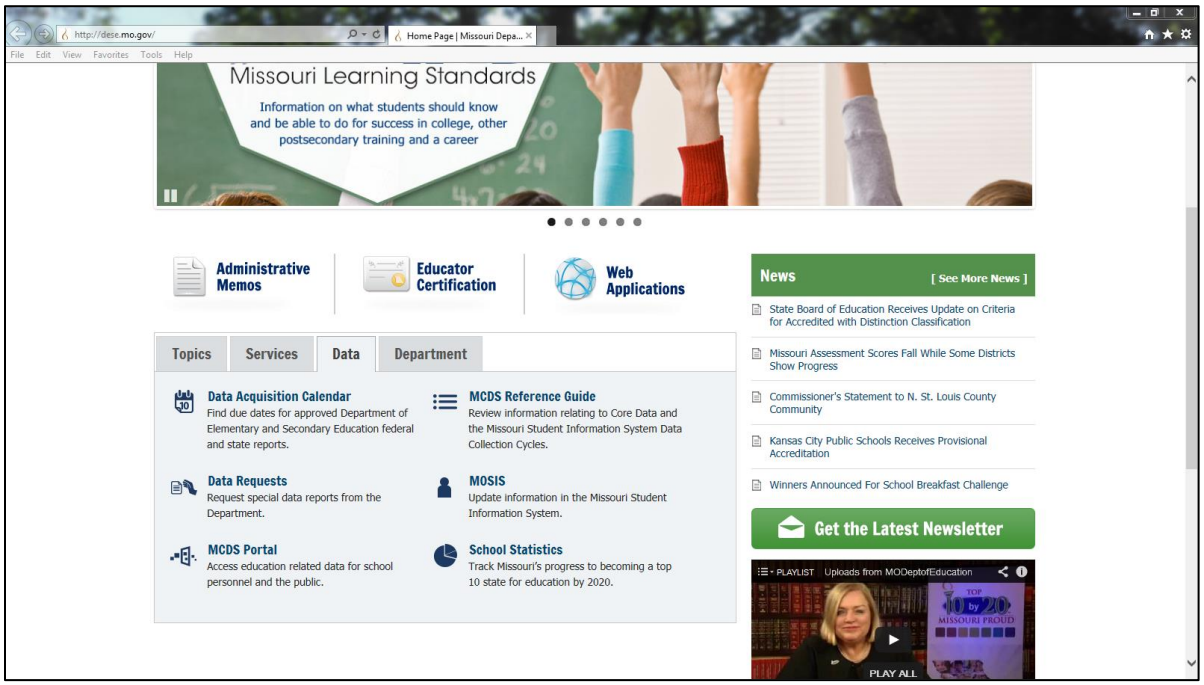


8.4. Missouri Comprehensive Data System Portal

For the first two years of MO EOC Assessment administration, summary-level EOC results were available to school district personnel in a set of standard reporting configurations through DESE's Crystal Reporting system. Reporting options included administrative reports, adequate yearly progress (AYP) reports, achievement level reports, content standard reports, and item analysis reports.

Beginning with the 2011–2012 school year, DESE transitioned all assessment reporting to the state's data portal, the Missouri Comprehensive Data System (MCDS). MCDS provides the general public with access to high-level EOC summary reports and allows school district personnel with appropriate permissions to access EOC data at a variety of levels. Through MCDS, designated district personnel are able to request on-demand, customized reports that are configured and disaggregated in ways that best meet their needs for such activities as evaluating programs, revising curriculum, and improving teaching and learning.

Users access MCDS from a link to the portal on the Department's homepage (http://dese.mo.gov/). From there, they access the data portal directly through the MCDS link.



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Secure content is available through a link at the top of the MCDS portal's homepage. District users with appropriate permissions can log in to access data. Once users have logged in, they are returned to the MCDS portal page where they can locate EOC data through the State Assessment link.

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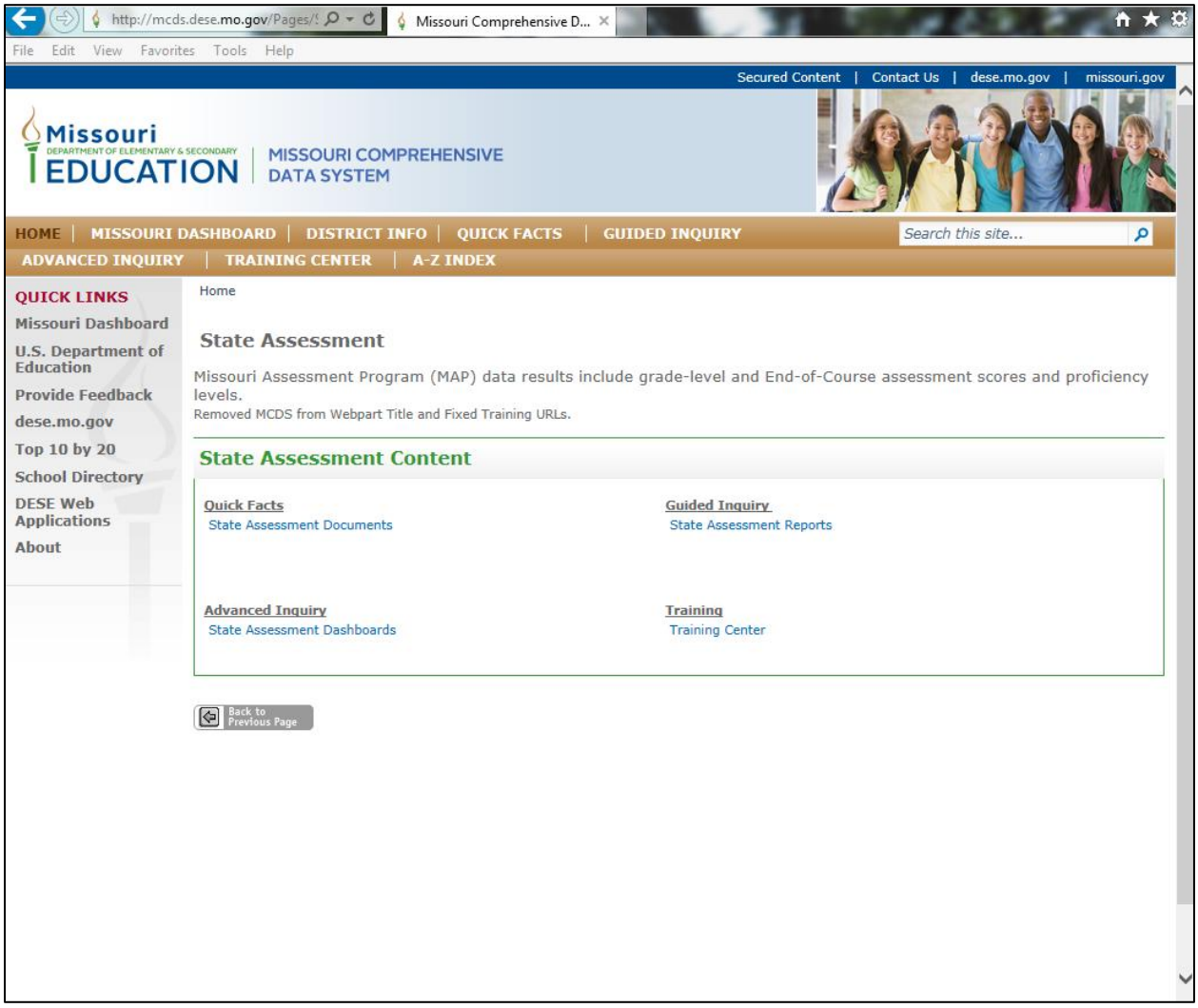
On the State Assessment page, a Guided Inquiry link allows users to create summary administrative reports, achievement level reports, and historical AYP reports. Authenticated users can also download student-level data from the Guided Inquiry link.



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An unlimited number and configuration of reports may be created through MCDS. In addition to Administrative Reports, the MCDS portal also provides an unlimited configuration of summary reports, as shown in Table 8.1, that are beyond the scope of this technical report. Additional information and training pertaining to MCDS capabilities are available on DESE's website at http://mcds.dese.mo.gov/trainingcenter/Pages/default.aspx.

Table 8.1. Reports Available on the MCDS Portal

Report Type	Report
Administrative Reports	Guided Inquiry - State Assessment Administrative: MAP Scale Score Summary
	Guided Inquiry - State Assessment Administrative: MAP Student Demographics
	Guided Inquiry - State Assessment Administrative: MAP Participation Invalidation
	Guided Inquiry - State Assessment Administrative: MAP Student Achievement Level
	Guided Inquiry - State Assessment Administrative: EOC History Report
Achievement Level Reports	Guided Inquiry - State Assessment Achievement Level - 4 Levels: Achievement Level 4 Report
	Guided Inquiry - State Assessment Achievement Level - 4 Levels: Achievement Level 4 Charts
Content Standards Report	Guided Inquiry - State Assessment Content Standard - Item Analysis: Content Standard Summary
Item Analysis Expanded Reports	Guided Inquiry - State Assessment Content Standard - Item Analysis: Content Standard IBD
	Guided Inquiry - State Assessment Content Standard - Item Analysis: Goal Process IBD

8.4.1. Administrative Reports

These reports provide student-level test data. Based on only the MO EOC Assessment results, four reports are generated: MO EOC Scale Score Summary, MO EOC Student Demographic, Student Achievement Level, and Student Report. Additionally, a historical report of the student's EOC participation is located within the Administrative Reports.

MO EOC Scale Score Summary: This report lists each student in the school or district along with his or her MOSIS ID, testing year, content area, grade level, MO EOC scale score, and achievement level.

MO EOC Student Demographic: This report lists all students in the school or district along with their date of birth (DOB), content area, MOSIS ID, district ID, and relevant demographic information, including if the student has been in the district for less than a year, if the student has been in the building for less than a year, if the student is limited English proficient (LEP), the student's race, if the student qualifies for free and reduced lunch (FRL), if the student has an individualized education program (IEP), if the student is an English-language learner (ELL)/LEP

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who has been in the school for less than one year and in the country for less than three years, if the student is an LEP/ELL Title 3, the number of months the LEP/ELL student has been in the United States, the student's disability diagnosis, and if the student is Title 1.

Student Achievement Level: This report lists all students in a school or district along with the year of testing, content area, grade-level, achievement level, and MOSIS ID.

Student Report: For each school or district, this report contains the following information: student name, DOB, MOSIS ID, content area tested, grade level, achievement level, and scale score for each content area tested.

EOC History Report: This report lists the history of MO EOC completion for all students in the school or district.

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Chapter 9: Summary Statistics

9.1. Introduction

This chapter provides descriptive statistics for the number correct raw score and for scale scores for each of the eight MO EOC Assessments from the Summer 2014, Fall 2014, and Spring 2015 administrations. Statistics include n-counts, means, standard deviations (SD), minimum and maximum values, and a variety of data disaggregation.

9.2. Descriptive Statistics for Total Raw Score

Table 9.1 summarizes the descriptive statistics for total raw score (RS) by test administration (test period) and content area; the total number of students who took the particular MO EOC Assessment (n-count); the minimum, maximum, and mean raw scores; and the SD.

Table 9.1. Descriptive Statistics for Total Raw Score

Test Period	Content Area	N-Count	Min.	Max.	Mean	SD
Summer 2014	English II	362	1	38	21.90	7.15
	Algebra I	879	1	38	20.99	7.73
	Biology	324	6	49	26.40	9.51
	English I	164	4	38	22.68	7.84
	Algebra II	77	6	38	15.60	6.14
	Geometry	107	6	38	20.29	7.37
	Government	857	1	40	25.93	8.41
	Am. History	174	8	39	20.82	6.43
Fall 2014	English II	2,432	1	44	27.08	8.72
	Algebra I	5,130	0	49	19.99	9.06
	Biology	3,169	1	55	29.10	12.57
	English I	624	4	44	29.26	7.52
	Algebra II	767	6	40	24.06	7.97
	Geometry	762	5	40	24.18	7.40
	Government	13,816	4	40	25.54	7.06
	Am. History	660	7	39	23.16	7.39
Spring 2015	English II	62,304	0	45	31.37	6.74
	Algebra I	62,738	0	50	25.59	9.20
	Biology	62,575	0	55	36.14	9.71
	English I	17,914	2	45	28.87	6.57
	Algebra II	20,885	2	40	23.80	7.27
	Geometry	11,256	3	40	22.13	7.03
	Government	45,701	0	40	25.86	6.95
	Am. History	11,309	1	40	23.26	7.53
	Physical Science	6,212	4	43	20.20	6.19

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9.3. Descriptive Statistics for Total Raw Score by Cluster

Tables 9.2 – 9.4 summarize the number correct RS—including the average raw score, the SD, and the standard error of measurement (SEM)—by test administration (test period), content area, and cluster. More information on SEM is provided in Chapter 10.

Table 9.2. Descriptive Statistics for Total Raw Score by Test Administration, Content Area, and Cluster—Summer 2014

Test Period	Content Area	Cluster	Mean	SD	SEM
Summer 2014	English II	Reading	16.73	5.72	2.46
		Writing	5.21	2.02	1.38
	Algebra I	Number and Operations	4.55	2.11	1.24
		Algebraic Relationships	11.32	4.93	2.23
		Data and Probability	5.13	1.59	1.07
	Biology	Characteristics and Interactions of Living Organisms	10.79	3.70	2.17
		Changes in Ecosystems and Interactions of Organisms with their Environments	7.30	3.04	1.57
		Scientific Inquiry	8.33	4.22	2.10
	English I	Reading	22.68	7.84	2.75
	Algebra II	Algebraic Relationships	3.49	1.60	1.31
		Data and Probability	8.14	3.72	2.13
		Numbers and Operations	3.96	2.09	1.42
	Geometry	Algebraic Relationships	3.49	1.72	1.30
		Geometric and Spatial Relationships	12.57	4.46	2.29
		Measurement	4.23	2.14	1.17
	Government	Principles and Processes of Governance Systems	12.95	4.40	1.87
		Principles of Constitutional Democracy	12.98	4.39	1.88
	Am. History	Missouri, United States, and World History	20.82	6.43	2.86

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Table 9.3. Descriptive Statistics for Total Raw Score by Test Administration, Content Area, and Cluster—Fall 2014

Test Period	Content Area	Cluster	Mean	SD	SEM
Fall 2014	English II	Reading	20.32	7.05	2.53
		Writing	6.83	2.22	0.80
	Algebra I	Number and Quantity	1.33	1.08	0.87
		Algebra	9.40	5.17	2.38
		Functions	6.35	2.90	1.65
		Statistics and Probability	2.79	1.40	0.98
	Biology	Characteristics and Interactions of Living Organisms	11.85	5.12	2.02
		Changes in Ecosystems and Interactions of Organisms with their Environments	7.68	3.10	1.55
		Scientific Inquiry	9.63	5.54	2.15
	English I	Reading	21.38	6.13	2.47
		Writing	7.89	1.95	0.76
	Algebra II	Number and Quantity	--	--	--
		Algebra	8.82	3.24	1.65
		Functions	14.53	5.04	2.10
		Statistics and Probability	--	--	--
	Geometry	Geometry	19.79	6.06	2.42
		Statistics and Probability	4.39	1.80	1.13
	Government	Principles and Processes of Governance Systems	13.16	3.94	1.87
		Principles of Constitutional Democracy	12.38	3.61	1.92
	Am. History	Missouri, United States, and World History	23.16	7.39	2.81

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Table 9.4. Descriptive Statistics for Total Raw Score by Test Administration, Content Area, and Cluster—Spring 2015

Test Period	Content Area	Cluster	Mean	SD	SEM
Spring 2015	English II	Reading	23.48	6.03	2.46
		Writing	7.93	1.23	0.56
	Algebra I	Number and Quantity	1.53	1.03	0.77
		Algebra	10.12	4.57	2.26
		Functions	10.80	3.92	2.13
		Statistics and Probability	3.14	1.23	0.97
	Biology	Characteristics and Interactions of Living Organisms	13.20	4.21	2.06
		Changes in Ecosystems and Interactions of Organisms with their Environments	10.12	2.63	1.32
		Scientific Inquiry	12.85	4.18	2.19
	English I	Reading	21.19	5.66	2.49
		Writing	7.71	1.50	0.67
	Algebra II	Number and Quantity	--	--	--
		Algebra	9.88	3.29	1.74
		Functions	13.91	4.56	2.07
		Statistics and Probability	--	--	--
	Geometry	Geometry	18.17	5.76	2.48
		Statistics and Probability	3.95	1.74	1.15
	Government	Principles and Processes of Governance Systems	12.40	3.92	1.88
		Principles of Constitutional Democracy	13.46	3.52	1.84
	Am. History	Missouri, United States, and World History	23.26	7.53	2.79
	Physical Science	Properties and Principles of Force and Motion	7.48	2.43	1.70
		Properties and Principles of Matter and Energy	12.72	4.47	2.43

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9.4. Descriptive Statistics for Scale Scores by Test Administration and Content Area

Descriptive statistics of scale scores and percentage distributions of students' achievement levels are summarized in Tables 9.5, 9.6, and Table 9.7. Table 9.5 summarizes student scale scores by each MO EOC Assessment for the Summer 2014, Fall 2014, and Spring 2015 administrations. Tables 9.6 and 9.7 lists the percentage and frequency of students in each achievement level for Summer 2014, Fall 2014, and Spring 2015.

Table 9.5. Scale Score Distributions for Each MO EOC Assessment

Descriptive Statistics						
Test Period	**Content Area**	**N-Count**	**Min.**	**Max.**	**Mean**	**SD**
Summer 2014	English II	362	128	250	196.50	16.25
	Algebra I	879	114	250	196.78	21.41
	Biology	324	146	238	190.30	17.38
	English I	164	135	250	197.44	22.79
	Algebra II	77	157	250	183.78	15.39
	Geometry	107	150	250	192.36	20.35
	Government	857	114	250	203.55	22.90
	Am. History	174	146	250	190.79	21.08
Fall 2014	English II	2,432	129	250	201.03	17.78
	Algebra I	5,130	100	250	201.24	19.43
	Biology	3,169	107	250	195.93	24.15
	English I	624	142	250	205.77	18.26
	Algebra II	767	151	250	208.82	24.46
	Geometry	762	154	250	209.99	20.35
	Government	13,816	143	250	203.72	19.04
	Am. History	660	138	250	196.83	25.92
Spring 2015	English II	62,304	105	250	208.15	16.16
	Algebra I	62,738	100	250	205.76	19.99
	Biology	62,575	100	250	210.85	17.88
	English I	17,914	129	250	204.56	15.74
	Algebra II	20,885	121	250	208.98	22.30
	Geometry	11,256	141	250	204.33	18.91
	Government	45,701	100	250	205.00	19.14
	Am. History	11,309	100	250	198.67	25.18
	Physical Science	6,212	134	250	190.20	16.83

The scale score range is 100 to 250 for every content area. Tables 9.6 and 9.7 summarize the minimum scale score needed to obtain each level of achievement for Summer 2014, Fall 2014, and Spring 2015. Note that the cut scores for the achievement levels of Proficient and Advanced are 200 and 225, respectively, for each content area.

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Table 9.6. Scale Score Cuts by Content Area—Summer 2014

Content Area	Basic	Proficient	Advanced
English II	180	200	225
Algebra I	177	200	225
Biology	178	200	225
English I	177	200	225
Algebra II	182	200	225
Geometry	182	200	225
Government	179	200	225
Am. History	182	200	225

Table 9.7. Scale Score Cuts by Content Area—Fall 2014 and Spring 2015

Content Area	Basic	Proficient	Advanced
English II	182	200	225
Algebra I	187	200	225
Biology	178	200	225
English I	180	200	225
Algebra II	186	200	225
Geometry	189	200	225
Government	179	200	225
Am. History	182	200	225
Physical Science	168	200	225

Tables 9.8, 9.9, and 9.10 show the number of participating students and the proportion in each level of achievement across years and administrations by content area. Table 9.11 shows the percentage of students in each achievement level by test administration and content area from Fall 2008 to Spring 2015, and Table 9.12 shows the percentage of students in each achievement level by content area for the entire administration year from 2008–2009 to 2014–2015. The results are only reported for groups with 10 or more students.

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Table 9.8. Achievement-Level Distributions for Each MO EOC Assessment—Summer 2014

Test Period	Content Area	Achievement Level	Freq.	%
Summer 2014	English II	Below Basic	46	12.71
		Basic	161	44.48
		Proficient	131	36.19
		Advanced	24	6.63
		Total	362	100.00
	Algebra I	Below Basic	134	15.24
		Basic	361	41.07
		Proficient	267	30.38
		Advanced	117	13.31
		Total	879	100.00
	Biology	Below Basic	69	21.30
		Basic	154	47.53
		Proficient	92	28.40
		Advanced	--	--
		Total	324	100.00
	English I	Below Basic	28	17.07
		Basic	57	34.76
		Proficient	57	34.76
		Advanced	22	13.41
		Total	164	100.00
	Algebra II	Below Basic	33	42.86
		Basic	33	42.86
		Proficient	--	--
		Advanced	--	--
		Total	77	100.00
	Geometry	Below Basic	31	28.97
		Basic	35	32.71
		Proficient	32	29.91
		Advanced	--	--
		Total	107	100.00
	Government	Below Basic	117	13.65
		Basic	232	27.07
		Proficient	315	36.76
		Advanced	193	22.52
		Total	857	100.00
	Am. History	Below Basic	56	32.18
		Basic	59	33.91
		Proficient	43	24.71
		Advanced	16	9.20
		Total	174	100.00

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Table 9.9. Achievement-Level Distributions for Each MO EOC Assessment—Fall 2014

Test Period	Content Area	Achievement Level	Freq.	%
Fall 2014	English II	Below Basic	343	14.10
		Basic	733	30.14
		Proficient	1,082	44.49
		Advanced	274	11.27
		Total	2,432	100.00
	Algebra I	Below Basic	1,209	23.57
		Basic	1,258	24.52
		Proficient	2,002	39.03
		Advanced	661	12.88
		Total	5,130	100.00
	Biology	Below Basic	728	22.97
		Basic	1,052	33.20
		Proficient	938	29.60
		Advanced	451	14.23
		Total	3,169	100.00
	English I	Below Basic	53	8.49
		Basic	145	23.24
		Proficient	320	51.28
		Advanced	106	16.99
		Total	624	100.00
	Algebra II	Below Basic	136	17.73
		Basic	133	17.34
		Proficient	254	33.12
		Advanced	244	31.81
		Total	767	100.00
	Geometry	Below Basic	104	13.65
		Basic	112	14.70
		Proficient	347	45.54
		Advanced	199	26.12
		Total	762	100.00
	Government	Below Basic	1,071	7.75
		Basic	4,695	33.98
		Proficient	5,591	40.47
		Advanced	2,459	17.80
		Total	13,816	100.00
	Am. History	Below Basic	199	30.15
		Basic	141	21.36
		Proficient	191	28.94
		Advanced	129	19.55
		Total	660	100.00

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Table 9.10. Achievement-Level Distributions for Each MO EOC Assessment—Spring 2015

Test Period	Content Area	Achievement Level	Freq.	%
Spring 2015	English II	Below Basic	3,126	5.02
		Basic	12,769	20.49
		Proficient	34,970	56.13
		Advanced	11,439	18.36
		Total	62,304	100.00
	Algebra I	Below Basic	11,373	18.13
		Basic	11,947	19.04
		Proficient	27,426	43.72
		Advanced	11,992	19.11
		Total	62,738	100.00
	Biology	Below Basic	1,878	3.00
		Basic	13,217	21.12
		Proficient	31,465	50.28
		Advanced	16,015	25.59
		Total	62,575	100.00
	English I	Below Basic	1,113	6.21
		Basic	4,774	26.65
		Proficient	10,075	56.24
		Advanced	1,952	10.90
		Total	17,914	100.00
	Algebra II	Below Basic	3,022	14.47
		Basic	4,031	19.30
		Proficient	7,896	37.81
		Advanced	5,936	28.42
		Total	20,885	100.00
	Geometry	Below Basic	2,147	19.07
		Basic	2,059	18.29
		Proficient	5,189	46.10
		Advanced	1,861	16.53
		Total	11,256	100.00
	Government	Below Basic	3,183	6.96
		Basic	12,884	28.19
		Proficient	20,965	45.87
		Advanced	8,669	18.97
		Total	45,701	100.00
	Am. History	Below Basic	2,832	25.04
		Basic	2,847	25.17
		Proficient	3,406	30.12
		Advanced	2,224	19.67
		Total	11,309	100.00
	Physical Science	Below Basic	344	5.54
		Basic	4,175	67.21
		Proficient	1,443	23.23
		Advanced	250	4.02
		Total	6,212	100.00

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Table 9.11. Percentage of Students in Each Achievement Level by Test Administration and Content Area

Content Area	Achievement Level	Test Administration									
		Fall 2008		Spring 2009		Summer 2009		Fall 2009		Spring 2010	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
English II	Below Basic	52	3.9	2,377	4.1	74	10.5	23	1.6	1,830	3.0
	Basic	258	19.6	12,321	21.4	318	45.0	325	22.9	14,260	23.0
	Proficient	693	52.6	30,403	52.7	286	40.5	884	62.2	31,658	51.1
	Advanced	314	23.8	12,593	21.8	28	4.0	190	13.4	14,163	22.9
	Total	1,317	100.0	57,694	100.0	706	100.0	1,422	100.0	61,911	100.0
Algebra I	Below Basic	141	6.3	5,368	10.0	271	21.1	208	8.4	3,733	6.2
	Basic	621	27.6	19,555	36.5	629	49.0	963	38.7	20,593	34.0
	Proficient	1,094	48.7	20,822	38.9	320	24.9	943	37.9	25,381	41.9
	Advanced	392	17.4	7,781	14.5	64	5.0	374	15.0	10,837	17.9
	Total	2,248	100.0	53,526	100.0	1,284	100.0	2,488	100.0	60,544	100.0
Biology	Below Basic	84	4.5	4,148	7.4	99	20.2	187	8.8	3,703	6.2
	Basic	576	31.1	19,435	34.9	270	55.0	706	33.3	20,890	34.9
	Proficient	954	51.4	25,538	45.8	104	21.2	867	40.9	27,984	46.7
	Advanced	241	13.0	6,611	11.9	18	3.7	362	17.1	7,327	12.2
	Total	1,855	100.0	55,732	100.0	491	100.0	2,122	100.0	59,904	100.0
English I	Below Basic	--	--	--	--	--	--	42	13.2	5,283	12.5
	Basic	--	--	--	--	--	--	118	37.1	13,254	31.3
	Proficient	--	--	--	--	--	--	105	33.0	16,699	39.5
	Advanced	--	--	--	--	--	--	53	16.7	7,081	16.7
	Total	--	--	--	--	--	--	318	100.0	42,317	100.0
Algebra II	Below Basic	--	--	--	--	--	--	48	9.1	4,266	19.5
	Basic	--	--	--	--	--	--	174	33.1	8,470	38.8
	Proficient	--	--	--	--	--	--	201	38.3	6,909	31.7
	Advanced	--	--	--	--	--	--	102	19.4	2,179	10.0
	Total	--	--	--	--	--	--	525	100.0	21,824	100.0
Geometry	Below Basic	--	--	--	--	--	--	48	8.1	5,151	19.2
	Basic	--	--	--	--	--	--	121	20.5	7,913	29.5
	Proficient	--	--	--	--	--	--	234	39.6	9,246	34.4
	Advanced	--	--	--	--	--	--	188	31.8	4,548	16.9
	Total	--	--	--	--	--	--	591	100.0	26,858	100.0
Government	Below Basic	--	--	--	--	--	--	3,179	15.0	4,628	12.5
	Basic	--	--	--	--	--	--	7,501	35.4	13,710	37.1
	Proficient	--	--	--	--	--	--	7,470	35.3	13,144	35.6
	Advanced	--	--	--	--	--	--	3,018	14.3	5,448	14.8
	Total	--	--	--	--	--	--	21,168	100.0	36,930	100.0
Am. History	Below Basic	--	--	--	--	--	--	166	23.8	10,385	31.8
	Basic	--	--	--	--	--	--	176	25.2	9,047	27.7
	Proficient	--	--	--	--	--	--	235	33.7	9,275	28.4
	Advanced	--	--	--	--	--	--	121	17.3	3,929	12.0
	Total	--	--	--	--	--	--	698	100.0	32,636	100.0

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Table 9.11 (continued). Percentage of Students in Each Achievement Level by Test Administration and Content Area

Content Area	Achievement Level	Test Administration											
		Summer 2010		Fall 2010		Spring 2011		Summer 2011		Fall 2011		Spring 2012	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
English II	Below Basic	76	16.0	145	7.9	2,548	4.0	44	14.1	386	12.8	3,323	5.4
	Basic	213	44.7	537	29.3	13,463	21.1	132	42.2	1,050	34.8	12,701	20.5
	Proficient	168	35.3	780	42.6	30,712	48.2	121	38.7	1,301	43.1	33,536	54.1
	Advanced	19	4.0	371	20.2	16,959	26.6	16	5.1	285	9.4	12,464	20.1
	Total	476	100.0	1,833	100.0	63,682	100.0	313	100.0	3,022	100.0	62,024	100.0
Algebra I	Below Basic	133	11.8	353	12.9	5,381	8.4	85	13.5	794	19.9	5,311	8.2
	Basic	562	49.9	993	36.2	18,914	29.6	335	53.3	1,212	30.3	22,278	34.6
	Proficient	340	30.2	721	26.3	26,590	41.5	167	26.6	1,116	27.9	23,244	36.1
	Advanced	91	8.1	674	24.6	13,112	20.5	42	6.7	877	21.9	13,613	21.1
	Total	1,126	100.0	2,741	100.0	63,997	100.0	629	100.0	3,999	100.0	64,446	100.0
Biology	Below Basic	89	23.2	292	12.2	3,932	6.3	56	20.1	501	16.5	4,804	7.8
	Basic	160	41.7	831	34.8	19,250	31.0	137	49.1	1,269	41.9	22,522	36.5
	Proficient	117	30.5	760	31.8	29,029	46.8	74	26.5	916	30.2	25,845	41.9
	Advanced	18	4.7	508	21.2	9,857	15.9	12	4.3	343	11.3	8,575	13.9
	Total	384	100.0	2,391	100.0	62,068	100.0	279	100.0	3,029	100.0	61,746	100.0
English I	Below Basic	37	18.9	40	12.2	4,564	10.8	57	23.2	40	18.2	4,220	9.5
	Basic	81	41.3	87	26.6	13,035	30.9	110	44.7	69	31.4	12,504	28.2
	Proficient	64	32.7	116	35.5	16,204	38.4	66	26.8	71	32.4	20,164	45.5
	Advanced	14	7.1	84	25.7	8,368	19.8	13	5.3	40	18.2	7,415	16.7
	Total	196	100.0	327	100.0	42,171	100.0	246	100.0	220	100.0	44,303	100.0
Algebra II	Below Basic	39	34.5	46	9.0	1,905	8.5	57	46.0	41	8.0	2,791	11.1
	Basic	62	54.9	155	30.3	8,606	38.2	55	44.4	112	21.8	8,229	32.7
	Proficient	10	8.8	226	44.2	9,391	41.7	10	8.1	216	42.0	10,088	40.1
	Advanced	--	--	84	16.4	2,604	11.6	--	--	145	28.2	4,042	16.1
	Total	113	100.0	511	100.0	22,506	100.0	124	100.0	514	100.0	25,150	100.0
Geometry	Below Basic	96	41.9	143	16.3	4,248	16.3	61	31.8	128	17.6	3,610	11.9
	Basic	95	41.5	227	25.9	8,783	33.7	77	40.1	140	19.2	7,659	25.3
	Proficient	34	14.8	321	36.6	10,291	39.4	45	23.4	226	31.0	15,024	49.7
	Advanced	--	--	187	21.3	2,766	10.6	--	--	235	32.2	3,958	13.1
	Total	229	100.0	878	100.0	26,088	100.0	192	100.0	729	100.0	30,251	100.0
Government	Below Basic	177	20.1	1,591	9.0	2,998	7.5	69	8.4	2,689	15.6	3,440	8.6
	Basic	304	34.5	6,540	37.2	12,622	31.6	342	41.7	6,345	36.8	15,288	38.0
	Proficient	246	27.9	7,411	42.1	17,626	44.2	297	36.2	5,778	33.5	15,391	38.3
	Advanced	154	17.5	2,047	11.6	6,661	16.7	113	13.8	2,416	14.0	6,080	15.1
	Total	881	100.0	17,589	100.0	39,907	100.0	821	100.0	17,228	100.0	40,199	100.0
Am. History	Below Basic	26	56.5	170	26.1	8,458	24.3	97	52.4	213	25.6	9,775	25.3
	Basic	--	--	165	25.3	8,842	25.4	48	26.0	209	25.2	10,146	26.3
	Proficient	10	21.7	231	35.4	13,182	37.9	36	19.5	287	34.5	14,434	37.4
	Advanced	--	--	86	13.2	2,296	12.4	--	--	122	14.7	4,216	10.9
	Total	46	100.0	652	100.0	34,778	100.0	185	100.0	831	100.0	38,571	100.0

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Table 9.11 (continued). Percentage of Students in Each Achievement Level by Test Administration and Content Area

Content Area	Achievement Level	Test Administration											
		Summer 2012		Fall 2012		Spring 2013		Summer 2013		Fall 2013		Spring 2014	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
English II	Below Basic	60	14.0	499	16.9	2,529	4.1	93	26.0	321	11.1	2,277	3.6
	Basic	198	46.3	908	30.9	15,783	25.8	114	31.8	947	32.8	12,776	20.7
	Proficient	148	34.5	1,312	44.7	31,320	51.1	124	34.5	1,255	43.5	28,611	46.3
	Advanced	22	5.2	221	7.5	11,605	19.0	28	7.8	365	12.7	18,172	29.4
	Total	428	100.0	2,940	100.0	61,237	100.0	359	100.0	2,888	100.0	61,836	100.0
Algebra I	Below Basic	161	18.2	815	20.9	4,958	7.7	195	21.8	818	15.1	6,242	9.9
	Basic	381	42.9	1,226	31.5	22,134	34.3	344	38.4	1,778	32.8	22,031	34.9
	Proficient	301	33.9	1,096	28.2	26,867	41.6	271	30.3	1,931	35.6	22,533	35.6
	Advanced	45	5.1	759	19.5	10,585	16.4	86	9.6	897	16.5	12,386	19.6
	Total	888	100.0	3,896	100.0	64,544	100.0	896	100.0	5,424	100.0	63,192	100.0
Biology	Below Basic	70	21.8	590	20.8	1,928	3.1	144	37.3	660	22.9	3,335	5.4
	Basic	175	54.6	1,049	37.0	12,804	20.5	145	37.5	951	33.0	15,994	26.1
	Proficient	64	19.9	880	31.0	31,454	50.4	82	21.2	863	29.9	29,006	47.3
	Advanced	12	3.7	318	11.2	16,169	25.9	15	3.9	411	14.3	12,940	21.1
	Total	321	100.0	2,837	100.0	62,355	100.0	386	100.0	2,885	100.0	61,275	100.0
English I	Below Basic	77	25.1	92	10.9	7,004	11.2	125	30.5	118	13.2	5,799	9.6
	Basic	132	43.0	235	27.8	17,799	28.4	173	42.2	322	36.0	18,185	30.1
	Proficient	74	24.1	381	45.0	24,615	39.3	83	20.2	295	33.0	23,014	38.2
	Advanced	24	7.8	138	16.3	13,265	21.2	29	7.0	159	17.8	13,369	22.1
	Total	307	100.0	846	100.0	62,683	100.0	410	100.0	894	100.0	60,367	100.0
Algebra II	Below Basic	71	49.3	29	6.5	2,879	12.3	22	23.2	27	6.6	1,995	7.7
	Basic	56	38.9	65	14.6	7,910	33.8	49	51.6	67	16.3	7,409	28.7
	Proficient	13	9.0	200	45.0	9,011	38.5	21	22.1	193	47.0	10,274	39.7
	Advanced	--	--	151	33.9	3,626	15.5	--	--	124	30.1	6,173	23.9
	Total	144	100.0	445	100.0	23,426	100.0	95	100.0	411	100.0	25,851	100.0
Geometry	Below Basic	106	44.0	70	9.4	4,103	13.5	87	39.1	108	11.7	3,812	10.7
	Basic	79	32.8	148	19.7	7,910	25.9	77	34.5	237	25.6	8,240	23.1
	Proficient	45	18.7	330	43.8	11,832	38.8	44	19.7	274	29.6	14,972	41.9
	Advanced	11	4.4	205	27.2	6,637	21.8	15	6.7	307	33.1	8,697	24.3
	Total	241	100.0	753	100.0	30,482	100.0	223	100.0	926	100.0	35,721	100.0
Government	Below Basic	136	16.2	1,557	9.2	4,899	11.6	101	11.6	1,982	13.0	4,181	9.4
	Basic	295	35.2	6,721	40.0	13,883	32.9	289	33.1	4,656	30.5	12,030	26.8
	Proficient	289	34.4	6,122	36.4	15,796	37.4	338	38.7	5,721	37.5	18,667	41.6
	Advanced	119	14.2	2,405	14.3	7,640	18.1	144	16.5	2,905	19.0	10,009	22.3
	Total	839	100.0	16,805	100.0	42,218	100.0	872	100.0	15,264	100.0	44,887	100.0
Am. History	Below Basic	119	45.1	361	27.3	14,232	27.2	106	40.9	459	27.9	12,485	25.0
	Basic	74	28.1	327	24.8	13,525	25.8	60	23.2	432	26.3	13,465	26.8
	Proficient	57	21.6	523	39.5	16,081	30.7	70	27.1	479	29.3	15,780	31.5
	Advanced	14	5.3	112	8.5	8,486	16.2	23	8.9	270	16.5	8,360	16.7
	Total	264	100.0	1,323	100.0	52,324	100.0	259	100.0	1,640	100.0	50,090	100.0

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Table 9.11 (continued). Percentage of Students in Each Achievement Level by Test Administration and Content Area

Content Area	Achievement Level	Administration Year					
		Summer 2014		Fall 2014		Spring 2015	
		Freq.	%	Freq.	%	Freq.	%
English II	Below Basic	46	12.7	343	14.1	3,126	5.0
	Basic	161	44.5	733	30.1	12,769	20.5
	Proficient	131	36.2	1,082	44.5	34,970	56.1
	Advanced	24	6.6	274	11.3	11,439	18.4
	Total	362	100.0	2,432	100.0	62,304	100.0
Algebra I	Below Basic	134	15.2	1,209	23.6	11,373	18.1
	Basic	361	41.1	1,258	24.5	11,947	19.0
	Proficient	267	30.4	2,002	39.0	27,426	43.7
	Advanced	117	13.3	661	12.9	11,992	19.1
	Total	879	100.0	5,130	100.0	62,738	100.0
Biology	Below Basic	69	21.3	728	23.0	1,878	3.0
	Basic	154	47.5	1,052	33.2	13,217	21.1
	Proficient	92	28.4	938	29.6	31,465	50.3
	Advanced	--	--	451	14.2	16,015	25.6
	Total	324	100.0	3,169	100.0	62,575	100.0
English I	Below Basic	28	17.1	53	8.5	1,113	6.2
	Basic	57	34.8	145	23.2	4,774	26.7
	Proficient	57	34.8	320	51.3	10,075	56.2
	Advanced	22	13.4	106	17.0	1,952	10.9
	Total	164	100.0	624	100.0	17,914	100.0
Algebra II	Below Basic	33	42.9	136	17.7	3,022	14.5
	Basic	33	42.9	133	17.3	4,031	19.3
	Proficient	--	--	254	33.1	7,896	37.8
	Advanced	--	--	244	31.8	5,936	28.4
	Total	77	100.0	767	100.0	20,885	100.0
Geometry	Below Basic	31	29.0	104	13.7	2,147	19.1
	Basic	35	32.7	112	14.7	2,059	18.3
	Proficient	32	29.9	347	45.5	5,189	46.1
	Advanced	--	--	199	26.1	1,861	16.5
	Total	107	100.0	762	100.0	11,256	100.0
Government	Below Basic	117	13.7	1,071	7.8	3,183	7.0
	Basic	232	27.1	4,695	34.0	12,884	28.2
	Proficient	315	36.8	5,591	40.5	20,965	45.9
	Advanced	193	22.5	2,459	17.8	8,669	19.0
	Total	857	100.0	13,816	100.0	45,701	100.0
Am. History	Below Basic	56	32.2	199	30.2	2,832	25.0
	Basic	59	33.9	141	21.4	2,847	25.2
	Proficient	43	24.7	191	28.9	3,406	30.1
	Advanced	16	9.2	129	19.6	2,224	19.7
	Total	174	100.0	660	100.0	11,309	100.0
Physical Science	Below Basic	--	--	--	--	344	5.5
	Basic	--	--	--	--	4,175	67.2
	Proficient	--	--	--	--	1,443	23.2
	Advanced	--	--	--	--	250	4.0
	Total	--	--	--	--	6,212	100.0

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Table 9.12. Percentage of Students in Each Achievement Level by Administration Year and Content Area

Content Area	Achievement Level	Administration Year									
		2008–2009		2009–2010		2010–2011		2011–2012		2012–2013	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
English II	Below Basic	2,429	4.1	1,927	3.0	2,769	4.2	3,753	5.7	3,088	4.8
	Basic	12,579	21.3	14,903	23.3	14,213	21.5	13,883	21.2	16,889	26.1
	Proficient	31,096	52.7	32,828	51.3	31,660	48.0	34,958	53.5	32,780	50.7
	Advanced	12,907	21.9	14,381	22.5	17,349	26.3	12,765	19.5	11,848	18.3
	Total	59,011	100.0	64,039	100.0	65,991	100.0	65,359	100.0	64,605	100.0
Algebra I	Below Basic	5,509	9.9	4,212	6.5	5,867	8.6	6,190	9.0	5,934	8.6
	Basic	20,176	36.2	22,185	34.5	20,469	30.2	23,825	34.5	23,741	34.2
	Proficient	21,916	39.3	26,644	41.4	27,651	40.7	24,527	35.5	28,264	40.8
	Advanced	8,173	14.7	11,275	17.5	13,877	20.4	14,532	21.0	11,389	16.4
	Total	55,774	100.0	64,316	100.0	67,864	100.0	69,074	100.0	69,328	100.0
Biology	Below Basic	4,232	7.3	3,989	6.4	4,313	6.7	5,361	8.2	2,588	4.0
	Basic	20,011	34.7	21,866	35.0	20,241	31.2	23,928	36.8	14,028	21.4
	Proficient	26,492	46.0	28,955	46.3	29,906	46.1	26,835	41.3	32,398	49.5
	Advanced	6,852	11.9	7,707	12.3	10,383	16.0	8,930	13.7	16,499	25.2
	Total	57,587	100.0	62,517	100.0	64,843	100.0	65,054	100.0	65,513	100.0
English I	Below Basic	--	--	5,325	12.5	4,641	10.9	4,317	9.6	7,173	11.2
	Basic	--	--	13,372	31.4	13,203	30.9	12,683	28.3	18,166	28.5
	Proficient	--	--	16,804	39.4	16,384	38.4	20,301	45.3	25,070	39.3
	Advanced	--	--	7,134	16.7	8,466	19.8	7,468	16.7	13,427	21.0
	Total	--	--	42,635	100.0	42,694	100.0	44,769	100.0	63,836	100.0
Algebra II	Below Basic	--	--	4,314	19.3	1,990	8.6	2,889	11.2	2,979	12.4
	Basic	--	--	8,644	38.7	8,823	38.1	8,396	32.6	8,031	33.4
	Proficient	--	--	7,110	31.8	9,627	41.6	10,314	40.0	9,224	38.4
	Advanced	--	--	2,281	10.2	2,690	11.6	4,189	16.2	3,781	15.7
	Total	--	--	22,349	100.0	23,130	100.0	25,788	100.0	24,015	100.0
Geometry	Below Basic	--	--	5,199	18.9	4,487	16.5	3,799	12.2	4,279	13.6
	Basic	--	--	8,034	29.3	9,105	33.5	7,876	25.3	8,137	25.9
	Proficient	--	--	9,480	34.5	10,646	39.1	15,295	49.1	12,207	38.8
	Advanced	--	--	4,736	17.3	2,957	10.9	4,202	13.5	6,853	21.8
	Total	--	--	27,449	100.0	27,195	100.0	31,172	100.0	31,476	100.0
Government	Below Basic	--	--	7,807	13.4	4,766	8.2	6,198	10.6	6,592	11.0
	Basic	--	--	21,211	36.5	19,466	33.3	21,975	37.7	20,899	34.9
	Proficient	--	--	20,614	35.5	25,283	43.3	21,466	36.9	22,207	37.1
	Advanced	--	--	8,466	14.6	8,862	15.2	8,609	14.8	10,164	17.0
	Total	--	--	58,098	100.0	58,377	100.0	58,248	100.0	59,862	100.0
Am. History	Below Basic	--	--	10,551	31.7	8,654	24.4	10,085	25.5	14,712	27.3
	Basic	--	--	9,223	27.7	9,015	25.4	10,403	26.3	13,926	25.8
	Proficient	--	--	9,510	28.5	13,423	37.8	14,757	37.3	16,661	30.9
	Advanced	--	--	4,050	12.1	2,384	6.7	4,342	11.0	8,612	16.0
	Total	--	--	33,334	100.0	35,476	100.0	39,587	100.0	53,911	100.0

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Table 9.12 (continued). Percentage of Students in Each Achievement Level by Administration Year and Content Area

Content Area	Achievement Level	Administration Year			
		2013-2014		2014–2015	
		Freq.	%	Freq.	%
English II	Below Basic	2,691	4.1	3,515	5.4
	Basic	13,837	21.3	13,663	21.0
	Proficient	29,990	46.1	36,183	55.6
	Advanced	18,565	28.5	11,737	18.0
	Total	65,083	100.0	65,098	100.0
Algebra I	Below Basic	7,255	10.4	12,716	18.5
	Basic	24,153	34.7	13,566	19.7
	Proficient	24,735	35.6	29,695	43.2
	Advanced	13,369	19.2	12,770	18.6
	Total	69,512	100.0	68,747	100.0
Biology	Below Basic	4,139	6.4	2,675	4.0
	Basic	17,090	26.5	14,423	21.8
	Proficient	29,951	46.4	32,495	49.2
	Advanced	13,366	20.7	16,475	24.9
	Total	64,546	100.0	66,068	100.0
English I	Below Basic	6,042	9.8	1,194	6.4
	Basic	18,680	30.3	4,976	26.6
	Proficient	23,392	37.9	10,452	55.9
	Advanced	13,557	22.0	2,080	11.1
	Total	61,671	100.0	18,702	100.0
Algebra II	Below Basic	2,044	7.8	3,191	14.7
	Basic	7,525	28.6	4,197	19.3
	Proficient	10,488	39.8	8,159	37.5
	Advanced	6,300	23.9	6,182	28.5
	Total	26,357	100.0	21,729	100.0
Geometry	Below Basic	4,007	10.9	2,282	18.8
	Basic	8,554	23.2	2,206	18.2
	Proficient	15,290	41.5	5,568	45.9
	Advanced	9,019	24.5	2,069	17.1
	Total	36,870	100.0	12,125	100.0
Government	Below Basic	6,264	10.3	4,371	7.2
	Basic	16,975	27.8	17,811	29.5
	Proficient	24,726	40.5	26,871	44.5
	Advanced	13,058	21.4	11,321	18.8
	Total	61,023	100.0	60,374	100.0
Am. History	Below Basic	13,050	25.1	3,087	25.4
	Basic	13,957	26.8	3,047	25.1
	Proficient	16,329	31.4	3,640	30.0
	Advanced	8,653	16.6	2,369	19.5
	Total	51,989	100.0	12,143	100.0
Physical Science	Below Basic	--	--	344	5.5
	Basic	--	--	4,175	67.2
	Proficient	--	--	1,443	23.2
	Advanced	--	--	250	4.0
	Total	--	--	6,212	100.0

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9.4.1. MO EOC Calendar of Major Events

Table 9.13 provides the major events that have occurred for the MO EOC Assessments from 2008–2009 to 2014–2015 to assist with the understanding and interpretation of test results.

Table 9.13. Calendar of Major Events from 2008–2009 to 2014–2015

Administration Year	Event(s)
2008–2009	1. English II, Algebra I, and Biology were administered operationally in both paper/pencil and online format (dual platform) starting in Fall 2008. These assessments consisted of both SR items and PE/WPs.
2009–2010	1. English I, Algebra II, Geometry, Government, and American History were administered operationally in both paper/pencil and online format (dual platform) starting in Fall 2009. These assessments consisted of SR items only.
2010–2011	1. PE/WPs were temporarily suspended from English II, Algebra I, and Biology starting in Summer 2010. 2. Assessments with SR items only (which include English I, Algebra II, Geometry, American History, and Government) were available in online format only.
2011–2012	1. All assessments were administered online.
2012–2013	1. PE/WPs were added back to English II, Algebra I, and Biology starting in Fall 2012.
2013–2014	1. iPad and Chromebook administration was available for SR items in Summer 2013. 2. iPad and Chromebook administration was available for PE/WPs starting in Fall 2013.
2014–2015	1. Physical Science was administered for the first time in Fall 2014. 2. Changes occurred for English I, English II, Algebra I, Algebra II, and Geometry, including revised blueprints, new test forms, and alignment of existing items to the Missouri Learning Standards. 3. Beginning in Fall 2014, English II, Algebra I, Algebra II, Biology, and Government are required and English I, Geometry, Physical Science, and American History are optional.

9.5. Descriptive Statistics by Demographic Group

Descriptive statistics of scale scores and percentage distributions of students' achievement levels by demographic groups are summarized in Tables 9.14 – 9.61. The results are only reported for groups with 10 or more students.

The demographic variables included are gender, ethnicity, migrant status, free and reduced lunch (FRL), limited English proficient (LEP), Title I, individualized education program (IEP), and accommodations.

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Table 9.14. Scale Score Distributions by Demographic Group—Gender, Summer 2014

Test Period	Content Area	Gender	N-Count	Min.	Max.	Mean	SD
Summer 2014	English II	Female	141	128	236	197.72	16.27
		Male	221	163	250	195.71	16.23
	Algebra I	Female	421	114	250	198.61	22.10
		Male	458	150	250	195.11	20.63
	Biology	Female	160	146	238	189.13	18.52
		Male	164	153	226	191.45	16.16
	English I	Female	77	155	243	199.03	20.55
		Male	87	135	250	196.03	24.65
	Algebra II	Female	38	157	207	181.11	12.76
		Male	39	164	250	186.38	17.36
	Geometry	Female	55	150	242	187.56	18.62
		Male	52	161	250	197.42	21.04
	Government	Female	444	114	250	201.69	22.50
		Male	413	114	250	205.56	23.19
	Am. History	Female	102	146	250	186.89	20.50
		Male	72	155	250	196.32	20.78

Table 9.15. Scale Score Distributions by Demographic Group—Gender, Fall 2014

Test Period	Content Area	Gender	N-Count	Min.	Max.	Mean	SD
Fall 2014	English II	Female	1,121	152	250	204.28	17.50
		Male	1,311	129	249	198.25	17.55
	Algebra I	Female	2,564	100	250	201.43	19.07
		Male	2,566	100	250	201.06	19.79
	Biology	Female	1,505	137	250	196.77	23.74
		Male	1,664	107	250	195.17	24.49
	English I	Female	311	142	250	207.61	17.76
		Male	313	150	250	203.94	18.58
	Algebra II	Female	402	151	250	206.08	23.66
		Male	365	151	250	211.83	25.01
	Geometry	Female	377	154	250	208.65	19.83
		Male	385	158	250	211.31	20.79
	Government	Female	6,844	143	250	202.44	18.16
		Male	6,972	143	250	204.98	19.79
	Am. History	Female	288	138	250	189.74	24.02
		Male	372	143	250	202.32	26.04

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Table 9.16. Scale Score Distributions by Demographic Group—Gender, Spring 2015

Test Period	Content Area	Gender	N-Count	Min.	Max.	Mean	SD
Spring 2015	English II	Female	30,945	135	250	209.84	15.35
		Male	31,359	105	250	206.49	16.75
	Algebra I	Female	31,153	100	250	206.41	19.35
		Male	31,585	100	250	205.12	20.58
	Biology	Female	30,948	100	250	211.48	17.42
		Male	31,627	100	250	210.23	18.30
	English I	Female	8,976	150	250	206.76	15.34
		Male	8,938	129	250	202.36	15.83
	Algebra II	Female	11,178	121	250	207.77	21.66
		Male	9,707	139	250	210.37	22.94
	Geometry	Female	5,897	141	250	202.73	18.67
		Male	5,359	148	250	206.10	19.02
	Government	Female	22,564	136	250	204.35	18.31
		Male	23,137	100	250	205.63	19.89
	Am. History	Female	5,573	100	250	195.04	24.15
		Male	5,736	117	250	202.20	25.66
	Physical Science	Female	3,012	140	250	188.56	15.96
		Male	3,200	134	250	191.75	17.47

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Table 9.17. Scale Score Distributions by Demographic Group—Ethnicity, Summer 2014

Test Period	Content Area	Ethnicity	N-Count	Min.	Max.	Mean	SD
Summer 2014	English II	American Indian/ Alaskan Native	--	--	--	--	--
		Asian	10	190	230	207.00	14.16
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	166	163	236	193.42	13.62
		Hispanic	25	128	236	195.48	21.37
		White (not Hispanic)	156	163	250	199.33	17.46
		Multi-racial	--	--	--	--	--
	Algebra I	American Indian/ Alaskan Native	--	--	--	--	--
		Asian	10	174	231	199.30	20.93
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	286	150	250	188.35	20.18
		Hispanic	43	114	225	188.00	19.36
		White (not Hispanic)	526	144	250	202.51	20.35
		Multi-racial	--	--	--	--	--
	Biology	American Indian/ Alaskan Native	--	--	--	--	--
		Asian	--	--	--	--	--
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	133	150	226	184.65	16.86
		Hispanic	50	164	228	195.82	13.58
		White (not Hispanic)	131	146	238	194.36	17.60
		Multi-racial	--	--	--	--	--

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Table 9.17 (continued). Scale Score Distributions by Demographic Group—Ethnicity, Summer 2014

Test Period	Content Area	Ethnicity	N-Count	Min.	Max.	Mean	SD
Summer 2014	English I	American Indian/ Alaskan Native	--	--	--	--	--
		Asian	--	--	--	--	--
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	31	155	232	192.58	18.05
		Hispanic	36	151	243	185.81	19.19
		White (not Hispanic)	90	135	250	204.06	23.64
		Multi-racial	--	--	--	--	--
	Algebra II	American Indian/ Alaskan Native	--	--	--	--	--
		Asian	--	--	--	--	--
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	19	160	200	176.26	10.59
		Hispanic	10	157	215	178.10	15.44
		White (not Hispanic)	47	167	250	188.00	15.89
		Multi-racial	--	--	--	--	--
	Geometry	American Indian/ Alaskan Native	--	--	--	--	--
		Asian	--	--	--	--	--
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	38	161	232	180.58	14.01
		Hispanic	11	161	208	184.55	14.60
		White (not Hispanic)	54	161	250	202.17	19.81
		Multi-racial	--	--	--	--	--
	Government	American Indian/ Alaskan Native	--	--	--	--	--
		Asian	44	173	250	223.91	17.82
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	155	143	250	190.97	18.65
		Hispanic	62	165	239	195.95	17.82
		White (not Hispanic)	573	114	250	206.03	22.91
		Multi-racial	13	156	250	206.00	27.80
	Am. History	American Indian/ Alaskan Native	--	--	--	--	--
		Asian	--	--	--	--	--
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	24	155	206	180.13	16.16
		Hispanic	38	155	221	180.76	15.48
		White (not Hispanic)	104	146	250	196.84	22.07
		Multi-racial	--	--	--	--	--

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Table 9.18. Scale Score Distribution by Demographic Group—Ethnicity, Fall 2014

Test Period	Content Area	Ethnicity	N-Count	Min.	Max.	Mean	SD
Fall 2014	English II	American Indian/ Alaskan Native	15	159	228	202.20	23.09
		Asian	55	156	236	198.47	20.15
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	774	129	236	194.78	16.00
		Hispanic	151	152	236	202.06	16.83
		White (not Hispanic)	1,373	147	250	204.53	17.75
		Multi-racial	56	167	232	201.59	16.06
	Algebra I	American Indian/ Alaskan Native	31	159	236	197.90	19.17
		Asian	116	172	250	211.49	24.22
		Pacific Islander	10	164	234	204.60	21.34
		Black (not Hispanic)	1,045	100	250	191.64	16.34
		Hispanic	252	159	250	197.12	17.49
		White (not Hispanic)	3,595	100	250	203.91	19.27
		Multi-racial	81	168	250	205.93	17.44
	Biology	American Indian/ Alaskan Native	23	146	234	187.61	23.47
		Asian	89	150	250	209.71	27.58
		Pacific Islander	11	169	214	192.55	15.61
		Black (not Hispanic)	787	107	250	179.42	17.84
		Hispanic	189	130	250	188.98	21.11
		White (not Hispanic)	2,000	142	250	202.44	23.20
		Multi-racial	70	156	247	200.03	19.92

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Table 9.18 (continued). Scale Score Distributions by Demographic Group—Ethnicity, Fall 2014

Test Period	Content Area	Ethnicity	N-Count	Min.	Max.	Mean	SD
Fall 2014	English I	American Indian/ Alaskan Native	--	--	--	--	--
		Asian	10	162	250	214.60	24.51
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	55	171	237	201.24	16.11
		Hispanic	32	157	232	205.75	17.46
		White (not Hispanic)	508	150	250	205.97	18.18
		Multi-racial	13	193	232	217.23	11.95
	Algebra II	American Indian/ Alaskan Native	--	--	--	--	--
		Asian	33	170	250	224.33	23.69
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	73	155	242	191.82	20.24
		Hispanic	42	155	250	209.60	24.32
		White (not Hispanic)	595	151	250	209.86	24.10
		Multi-racial	21	176	250	212.33	23.29
	Geometry	American Indian/ Alaskan Native	--	--	--	--	--
		Asian	29	181	250	222.31	22.31
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	93	162	243	196.88	17.05
		Hispanic	42	166	250	203.29	18.46
		White (not Hispanic)	568	154	250	212.00	20.00
		Multi-racial	24	189	239	211.58	14.55
	Government	American Indian/ Alaskan Native	60	163	250	198.60	18.20
		Asian	371	159	250	214.79	20.30
		Pacific Islander	33	173	250	206.82	19.50
		Black (not Hispanic)	2,414	143	250	194.02	16.60
		Hispanic	622	152	250	200.22	18.59
		White (not Hispanic)	10,072	143	250	205.88	18.74
		Multi-racial	244	148	250	203.39	18.19
	Am. History	American Indian/ Alaskan Native	--	--	--	--	--
		Asian	--	--	--	--	--
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	84	138	250	183.23	25.11
		Hispanic	34	138	250	193.15	30.21
		White (not Hispanic)	501	143	250	199.07	25.14
		Multi-racial	27	163	250	199.56	26.26

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Table 9.19. Scale Score Distribution by Demographic Group—Ethnicity, Spring 2015

Test Period	Content Area	Ethnicity	N-Count	Min.	Max.	Mean	SD
Spring 2015	English II	American Indian/ Alaskan Native	296	161	250	205.17	16.97
		Asian	1,217	150	250	213.36	18.70
		Pacific Islander	119	167	242	203.13	15.18
		Black (not Hispanic)	9,100	105	250	199.47	15.43
		Hispanic	2,860	135	250	204.53	15.38
		White (not Hispanic)	47,482	105	250	209.93	15.68
		Multi-racial	1,230	163	250	208.43	15.64
	Algebra I	American Indian/ Alaskan Native	280	158	250	203.29	19.67
		Asian	1,256	158	250	220.13	21.57
		Pacific Islander	123	162	250	203.58	18.82
		Black (not Hispanic)	9,202	100	250	195.86	17.47
		Hispanic	3,138	100	250	202.75	18.35
		White (not Hispanic)	47,460	100	250	207.55	19.80
		Multi-racial	1,279	100	250	204.66	19.92
	Biology	American Indian/ Alaskan Native	277	149	250	207.43	16.70
		Asian	1,219	153	250	217.02	19.37
		Pacific Islander	129	162	250	204.57	18.87
		Black (not Hispanic)	9,075	111	250	199.27	17.34
		Hispanic	2,919	100	250	206.71	17.75
		White (not Hispanic)	47,697	100	250	213.20	17.02
		Multi-racial	1,259	100	250	210.24	17.33
	English I	American Indian/ Alaskan Native	98	162	242	202.42	16.02
		Asian	221	164	250	208.72	16.63
		Pacific Islander	35	174	232	202.69	14.83
		Black (not Hispanic)	1,463	150	250	196.79	16.37
		Hispanic	677	159	242	201.22	14.88
		White (not Hispanic)	15,124	129	250	205.45	15.49
		Multi-racial	296	154	237	203.13	14.49

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Table 9.19 (continued). Scale Score Distributions by Demographic Group—Ethnicity, Spring 2015

Test Period	Content Area	Ethnicity	N-Count	Min.	Max.	Mean	SD
Spring 2015	Algebra II	American Indian/ Alaskan Native	111	156	250	205.18	21.62
		Asian	692	164	250	224.36	21.02
		Pacific Islander	30	174	250	209.80	19.23
		Black (not Hispanic)	1,428	139	250	195.84	20.87
		Hispanic	752	121	250	204.64	20.94
		White (not Hispanic)	17,453	131	250	209.62	21.95
		Multi-racial	419	156	250	210.22	23.09
	Geometry	American Indian/ Alaskan Native	56	154	249	200.77	16.90
		Asian	232	162	250	222.36	21.99
		Pacific Islander	13	184	239	206.46	14.98
		Black (not Hispanic)	706	154	250	196.91	18.63
		Hispanic	436	148	250	202.93	18.76
		White (not Hispanic)	9,676	141	250	204.60	18.55
		Multi-racial	137	158	250	199.28	19.06
	Government	American Indian/ Alaskan Native	219	155	250	204.04	16.97
		Asian	834	151	250	207.88	20.35
		Pacific Islander	99	168	250	200.48	19.84
		Black (not Hispanic)	6,711	136	250	193.78	17.56
		Hispanic	1,979	151	250	200.35	17.86
		White (not Hispanic)	34,999	100	250	207.36	18.68
		Multi-racial	860	151	250	204.99	18.39
	Am. History	American Indian/ Alaskan Native	61	152	250	199.25	26.43
		Asian	120	148	250	200.34	28.30
		Pacific Islander	11	156	250	203.82	28.06
		Black (not Hispanic)	645	125	250	181.49	22.71
		Hispanic	340	138	250	194.15	23.59
		White (not Hispanic)	9,956	100	250	199.94	24.91
		Multi-racial	176	138	250	197.32	25.19
	Physical Science	American Indian/ Alaskan Native	27	158	210	183.78	12.26
		Asian	45	150	239	194.02	20.56
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	278	145	249	182.72	15.28
		Hispanic	193	154	249	186.39	16.18
		White (not Hispanic)	5,581	134	250	190.75	16.79
		Multi-racial	82	145	239	188.00	16.94

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Table 9.20. Scale Score Distribution by Demographic Group—Migrant Status, Summer 2014

Test Period	Content Area	Migrant	N-Count	Min.	Max.	Mean	SD
Summer 2014	English II	No	353	128	250	196.89	16.19
		Yes	--	--	--	--	--
	Algebra I	No	870	114	250	196.94	21.42
		Yes	--	--	--	--	--
	Biology	No	313	146	238	190.68	17.35
		Yes	--	--	--	--	--
	English I	No	164	135	250	197.44	22.79
		Yes	--	--	--	--	--
	Algebra II	No	72	157	250	184.72	15.41
		Yes	--	--	--	--	--
	Geometry	No	107	150	250	192.36	20.35
		Yes	--	--	--	--	--
	Government	No	843	114	250	203.78	22.88
		Yes	--	--	--	--	--
	Am. History	No	173	146	250	190.74	21.13
		Yes	--	--	--	--	--

Table 9.21. Scale Score Distribution by Demographic Group—Migrant Status, Fall 2014

Test Period	Content Area	Migrant	N-Count	Min.	Max.	Mean	SD
Fall 2014	English II	No	2,420	129	250	201.09	17.73
		Yes	--	--	--	--	--
	Algebra I	No	4,990	100	250	201.58	19.50
		Yes	--	--	--	--	--
	Biology	No	3,160	130	250	196.00	24.10
		Yes	--	--	--	--	--
	English I	No	624	142	250	205.77	18.26
		Yes	--	--	--	--	--
	Algebra II	No	767	151	250	208.82	24.46
		Yes	--	--	--	--	--
	Geometry	No	761	154	250	210.04	20.33
		Yes	--	--	--	--	--
	Government	No	13,796	143	250	203.74	19.03
		Yes	--	--	--	--	--
	Am. History	No	660	138	250	196.83	25.92
		Yes	--	--	--	--	--

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Table 9.22. Scale Score Distribution by Demographic Group—Migrant Status, Spring 2015

Test Period	Content Area	Migrant	N-Count	Min.	Max.	Mean	SD
Spring 2015	English II	No	62,258	105	250	208.16	16.15
		Yes	13	165	212	185.46	13.62
	Algebra I	No	62,638	100	250	205.78	19.99
		Yes	21	162	219	196.57	16.21
	Biology	No	62,511	100	250	210.86	17.87
		Yes	19	159	212	189.68	14.91
	English I	No	17,888	129	250	204.58	15.74
		Yes	--	--	--	--	--
	Algebra II	No	20,878	121	250	208.98	22.30
		Yes	--	--	--	--	--
	Geometry	No	11,246	141	250	204.33	18.91
		Yes	--	--	--	--	--
	Government	No	45,666	100	250	205.01	19.14
		Yes	--	--	--	--	--
	Am. History	No	11,300	100	250	198.68	25.18
		Yes	--	--	--	--	--
	Physical Science	No	6,208	134	250	190.20	16.83
		Yes	--	--	--	--	--

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Table 9.23. Scale Distributions by Demographic Group—Free and Reduced Lunch, Summer 2014

Test Period	Content Area	FRL	N-Count	Min.	Max.	Mean	SD
Summer 2014	English II	No	128	128	250	199.13	17.44
		Yes	225	163	250	195.61	15.32
	Algebra I	No	396	150	250	201.15	21.53
		Yes	474	114	250	193.41	20.69
	Biology	No	97	146	238	193.07	19.37
		Yes	216	146	228	189.60	16.29
	English I	No	63	165	250	211.43	18.87
		Yes	101	135	243	188.71	20.64
	Algebra II	No	47	157	250	184.51	15.61
		Yes	25	164	225	185.12	15.34
	Geometry	No	54	161	250	199.00	23.36
		Yes	53	150	214	185.58	13.99
	Government	No	491	114	250	209.11	23.24
		Yes	353	143	250	196.37	20.15
	Am. History	No	70	146	250	199.49	21.46
		Yes	103	155	234	184.80	18.79

Table 9.24. Scale Distributions by Demographic Group—Free and Reduced Lunch, Fall 2014

Test Period	Content Area	FRL	N-Count	Min.	Max.	Mean	SD
Fall 2014	English II	No	1,095	147	250	207.24	17.28
		Yes	1,325	129	249	196.00	16.44
	Algebra I	No	2,802	100	250	207.25	19.54
		Yes	2,188	100	250	194.33	16.87
	Biology	No	1,608	142	250	206.53	23.28
		Yes	1,552	130	250	185.10	19.69
	English I	No	405	157	250	209.91	16.75
		Yes	219	142	250	198.11	18.49
	Algebra II	No	567	159	250	212.54	23.92
		Yes	200	151	250	198.26	22.92
	Geometry	No	560	154	250	212.41	19.47
		Yes	201	158	250	203.44	21.22
	Government	No	8,444	143	250	208.71	18.45
		Yes	5,355	143	250	195.90	17.19
	Am. History	No	407	138	250	203.34	24.25
		Yes	253	138	250	186.36	25.14

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Table 9.25. Scale Distributions by Demographic Group—Free and Reduced Lunch, Spring 2015

Test Period	Content Area	FRL	N-Count	Min.	Max.	Mean	SD
Spring 2015	English II	No	35,424	135	250	212.61	14.97
		Yes	26,847	105	250	202.29	15.78
	Algebra I	No	34,416	100	250	211.04	19.67
		Yes	28,243	100	250	199.36	18.43
	Biology	No	36,129	134	250	215.96	16.40
		Yes	26,401	100	250	203.88	17.44
	English I	No	9,264	147	250	208.53	14.81
		Yes	8,632	129	250	200.32	15.61
	Algebra II	No	15,321	121	250	212.12	21.96
		Yes	5,559	131	250	200.32	20.89
	Geometry	No	6,929	141	250	207.32	19.03
		Yes	4,318	148	250	199.54	17.71
	Government	No	26,300	142	250	210.20	18.05
		Yes	19,375	100	250	197.96	18.30
	Am. History	No	6,425	132	250	204.35	24.51
		Yes	4,876	100	250	191.22	24.09
	Physical Science	No	3,279	140	250	193.89	17.28
		Yes	2,929	134	250	186.08	15.29

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Table 9.26. Scale Score Distributions by Demographic Group—Limited English Proficient, Summer 2014

Test Period	Content Area	LEP	N-Count	Min.	Max.	Mean	SD
Summer 2014	English II	No	339	128	250	196.63	16.31
		Yes	14	174	219	203.21	11.41
	Algebra I	No	845	114	250	197.14	21.53
		Yes	25	162	227	190.16	15.86
	Biology	No	286	146	238	190.49	17.87
		Yes	27	172	214	192.67	10.33
	English I	No	143	135	250	200.17	22.52
		Yes	21	151	205	178.86	14.72
	Algebra II	No	72	157	250	184.72	15.41
		Yes	--	--	--	--	--
	Geometry	No	105	150	250	192.84	20.22
		Yes	--	--	--	--	--
	Government	No	816	114	250	204.13	23.00
		Yes	28	168	233	193.57	16.08
	Am. History	No	156	146	250	191.82	21.30
		Yes	17	159	213	180.82	16.96

Table 9.27. Scale Score Distributions by Demographic Group—Limited English Proficient, Fall 2014

Test Period	Content Area	LEP	N-Count	Min.	Max.	Mean	SD
Fall 2014	English II	No	2,321	129	250	201.48	17.73
		Yes	99	156	228	191.83	15.02
	Algebra I	No	4,862	100	250	201.77	19.51
		Yes	128	164	250	194.49	17.80
	Biology	No	3,047	130	250	196.59	24.06
		Yes	113	130	250	180.19	19.35
	English I	No	615	150	250	206.07	17.99
		Yes	--	--	--	--	--
	Algebra II	No	761	151	250	208.88	24.35
		Yes	--	--	--	--	--
	Geometry	No	740	154	250	210.32	20.23
		Yes	21	166	250	200.19	21.56
	Government	No	13,555	143	250	203.96	19.00
		Yes	244	159	243	191.71	16.63
	Am. History	No	643	138	250	197.23	25.93
		Yes	17	138	211	181.94	21.31

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Table 9.28. Scale Score Distributions by Demographic Group—Limited English Proficient, Spring 2015

Test Period	Content Area	LEP	N-Count	Min.	Max.	Mean	SD
Spring 2015	English II	No	61,044	105	250	208.44	16.06
		Yes	1,227	142	236	194.38	14.70
	Algebra I	No	61,153	100	250	205.94	19.98
		Yes	1,506	100	250	199.27	19.03
	Biology	No	61,265	100	250	211.16	17.75
		Yes	1,265	100	250	196.16	17.71
	English I	No	17,572	129	250	204.77	15.68
		Yes	324	150	242	193.77	15.32
	Algebra II	No	20,677	131	250	209.01	22.26
		Yes	203	121	250	205.97	25.76
	Geometry	No	11,077	141	250	204.37	18.91
		Yes	170	162	250	202.13	18.84
	Government	No	44,705	100	250	205.32	19.08
		Yes	970	147	250	190.51	15.95
	Am. History	No	11,210	100	250	198.77	25.17
		Yes	91	138	250	187.52	25.17
	Physical Science	No	6,159	134	250	190.26	16.82
		Yes	49	150	239	183.29	17.08

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Table 9.29. Scale Score Distributions by Demographic Group—Title I, Summer 2014

Test Period	Content Area	Title I	N-Count	Min.	Max.	Mean	SD
Summer 2014	English II	No	322	128	250	196.47	16.26
		Yes	31	163	230	201.26	14.95
	Algebra I	No	741	114	250	195.90	21.25
		Yes	129	162	250	202.87	21.49
	Biology	No	243	146	238	189.20	18.18
		Yes	70	170	226	195.80	12.92
	English I	No	112	135	250	201.74	24.11
		Yes	52	151	217	188.17	16.34
	Algebra II	No	52	157	250	182.35	14.75
		Yes	20	164	225	190.90	15.74
	Geometry	No	66	161	250	190.20	22.22
		Yes	41	150	228	195.83	16.60
	Government	No	786	114	250	204.18	23.13
		Yes	58	152	239	198.36	18.38
	Am. History	No	127	146	250	194.22	21.90
		Yes	46	155	221	181.13	15.32

Table 9.30. Scale Score Distributions by Demographic Group—Title I, Fall 2014

Test Period	Content Area	Title I	N-Count	Min.	Max.	Mean	SD
Fall 2014	English II	No	2,119	129	250	201.95	17.80
		Yes	301	162	242	195.01	15.94
	Algebra I	No	4,474	100	250	202.65	19.59
		Yes	516	153	250	192.34	15.89
	Biology	No	2,763	130	250	198.67	24.00
		Yes	397	130	234	177.48	14.87
	English I	No	600	142	250	205.49	18.43
		Yes	24	193	237	212.71	11.35
	Algebra II	No	766	151	250	208.84	24.47
		Yes	--	--	--	--	--
	Geometry	No	761	154	250	210.04	20.33
		Yes	--	--	--	--	--
	Government	No	13,125	143	250	204.10	19.01
		Yes	674	152	250	196.68	18.04
	Am. History	No	660	138	250	196.83	25.92
		Yes	--	--	--	--	--

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Table 9.31. Scale Score Distributions by Demographic Group—Title I, Spring 2015

Test Period	Content Area	Title I	N-Count	Min.	Max.	Mean	SD
Spring 2015	English II	No	57,501	105	250	208.92	15.95
		Yes	4,770	124	250	199.00	15.74
	Algebra I	No	56,708	100	250	206.55	19.94
		Yes	5,951	134	250	198.37	18.84
	Biology	No	58,136	100	250	211.80	17.53
		Yes	4,394	125	250	198.42	17.76
	English I	No	16,437	129	250	204.74	15.68
		Yes	1,459	150	250	202.63	16.29
	Algebra II	No	20,308	131	250	209.43	22.21
		Yes	572	121	249	192.75	19.05
	Geometry	No	10,700	141	250	204.41	18.93
		Yes	547	154	250	202.75	18.57
	Government	No	41,800	100	250	206.16	18.86
		Yes	3,875	151	250	192.55	17.70
	Am. History	No	10,912	100	250	199.14	25.17
		Yes	389	138	250	185.84	21.98
	Physical Science	No	5,818	134	250	190.53	16.94
		Yes	390	145	232	185.28	14.26

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Table 9.32. Scale Score Distributions by Demographic Group—Students with IEPs, Summer 2014

Test Period	Content Area	IEP	N-Count	Min.	Max.	Mean	SD
Summer 2014	English II	No	318	128	250	197.62	16.54
		Yes	35	172	219	190.26	10.56
	Algebra I	No	785	114	250	198.07	21.48
		Yes	85	144	242	186.47	17.75
	Biology	No	275	146	238	191.36	17.53
		Yes	38	159	214	185.74	15.26
	English I	No	154	135	250	198.89	22.64
		Yes	10	151	187	175.10	10.13
	Algebra II	No	69	157	250	184.94	15.65
		Yes	--	--	--	--	--
	Geometry	No	104	150	250	192.40	20.50
		Yes	--	--	--	--	--
	Government	No	789	114	250	204.85	22.84
		Yes	55	152	233	188.44	17.25
	Am. History	No	164	155	250	191.65	20.53
		Yes	--	--	--	--	--

Table 9.33. Scale Score Distributions by Demographic Group—Students with IEPs, Fall 2014

Test Period	Content Area	IEP	N-Count	Min.	Max.	Mean	SD
Fall 2014	English II	No	2,095	141	250	203.16	17.25
		Yes	325	129	228	187.69	14.65
	Algebra I	No	4,409	100	250	203.44	19.39
		Yes	581	136	244	187.52	13.75
	Biology	No	2,772	130	250	198.13	23.71
		Yes	388	130	250	180.82	21.26
	English I	No	567	157	250	208.03	16.60
		Yes	57	142	232	183.28	18.83
	Algebra II	No	757	151	250	208.89	24.40
		Yes	10	163	250	203.20	29.92
	Geometry	No	716	154	250	210.93	20.09
		Yes	45	162	243	195.82	18.91
	Government	No	12,489	143	250	205.29	18.58
		Yes	1,310	148	250	188.98	16.84
	Am. History	No	608	138	250	198.50	25.71
		Yes	52	138	243	177.40	20.04

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Table 9.34. Scale Score Distributions by Demographic Group—Students with IEPs, Spring 2015

Test Period	Content Area	IEP	N-Count	Min.	Max.	Mean	SD
Spring 2015	English II	No	56,086	105	250	209.95	15.21
		Yes	6,185	105	250	191.95	15.36
	Algebra I	No	56,363	100	250	207.70	19.36
		Yes	6,296	100	250	188.50	16.95
	Biology	No	56,448	100	250	212.79	16.84
		Yes	6,082	100	250	192.88	17.18
	English I	No	16,426	129	250	206.09	14.94
		Yes	1,470	137	232	187.61	14.47
	Algebra II	No	20,492	121	250	209.22	22.20
		Yes	388	146	250	196.08	23.94
	Geometry	No	10,820	141	250	204.92	18.70
		Yes	427	148	250	189.37	18.17
	Government	No	41,109	100	250	206.85	18.43
		Yes	4,566	136	250	188.39	17.30
	Am. History	No	10,321	100	250	200.63	24.48
		Yes	980	125	250	178.21	23.34
	Physical Science	No	5,635	145	250	191.57	16.57
		Yes	573	134	250	176.77	13.05

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Table 9.35. Scale Score Distributions by Demographic Group—Students with Accommodations, Summer 2014

Test Period	Content Area	Accom.	N-Count	Min.	Max.	Mean	SD
Summer 2014	English II	No	356	128	250	196.65	16.33
		Yes	--	--	--	--	--
	Algebra I	No	858	114	250	197.18	21.36
		Yes	21	144	220	180.48	16.72
	Biology	No	312	146	238	190.45	17.45
		Yes	12	161	214	186.50	15.59
	English I	No	164	135	250	197.44	22.79
		Yes	--	--	--	--	--
	Algebra II	No	77	157	250	183.78	15.39
		Yes	--	--	--	--	--
	Geometry	No	107	150	250	192.36	20.35
		Yes	--	--	--	--	--
	Government	No	846	114	250	203.82	22.88
		Yes	11	152	201	183.09	14.33
	Am. History	No	172	146	250	191.13	20.96
		Yes	--	--	--	--	--

Table 9.36. Scale Score Distributions by Demographic Group—Students with Accommodations, Fall 2014

Test Period	Content Area	Accom.	N-Count	Min.	Max.	Mean	SD
Fall 2014	English II	No	2,319	129	250	201.69	17.67
		Yes	113	147	225	187.54	14.32
	Algebra I	No	4,887	100	250	201.88	19.44
		Yes	243	164	250	188.39	14.24
	Biology	No	2,989	107	250	197.13	23.99
		Yes	180	142	231	176.01	17.14
	English I	No	597	150	250	206.74	17.63
		Yes	27	142	225	184.37	19.05
	Algebra II	No	764	151	250	208.93	24.44
		Yes	--	--	--	--	--
	Geometry	No	729	154	250	211.01	19.95
		Yes	33	162	225	187.67	16.11
	Government	No	13,267	143	250	204.34	18.90
		Yes	549	148	250	188.69	16.07
	Am. History	No	624	138	250	198.20	25.70
		Yes	36	138	211	173.11	16.86

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Table 9.37. Scale Score Distributions by Demographic Group—Students with Accommodations, Spring 2015

Test Period	Content Area	Accom.	N-Count	Min.	Max.	Mean	SD
Spring 2015	English II	No	58,308	105	250	209.29	15.63
		Yes	3,996	135	250	191.52	14.49
	Algebra I	No	58,601	100	250	207.03	19.64
		Yes	4,137	100	250	187.78	15.76
	Biology	No	58,488	100	250	212.16	17.26
		Yes	4,087	134	250	192.04	15.85
	English I	No	16,812	129	250	205.69	15.16
		Yes	1,102	142	242	187.37	14.28
	Algebra II	No	20,704	121	250	209.14	22.24
		Yes	181	151	249	190.55	21.84
	Geometry	No	11,002	141	250	204.76	18.76
		Yes	254	154	235	185.97	16.41
	Government	No	42,616	100	250	206.24	18.73
		Yes	3,085	142	250	187.91	16.44
	Am. History	No	10,625	100	250	200.09	24.74
		Yes	684	125	250	176.67	21.46
	Physical Science	No	5,824	145	250	191.11	16.70
		Yes	388	134	213	176.60	12.14

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Table 9.38. Achievement-Level Distributions—Gender, Summer 2014

Test Period	Content Area	Gender	Achievement Level	Freq.	%
Summer 2014	English II	Female	Below Basic	16	11.35
			Basic	56	39.72
			Proficient	58	41.13
			Advanced	11	7.80
			Total	141	100.00
		Male	Below Basic	30	13.57
			Basic	105	47.51
			Proficient	73	33.03
			Advanced	13	5.88
			Total	221	100.00
	Algebra I	Female	Below Basic	59	14.01
			Basic	163	38.72
			Proficient	130	30.88
			Advanced	69	16.39
			Total	421	100.00
		Male	Below Basic	75	16.38
			Basic	198	43.23
			Proficient	137	29.91
			Advanced	48	10.48
			Total	458	100.00
	Biology	Female	Below Basic	35	21.88
			Basic	83	51.88
			Proficient	36	22.50
			Advanced	--	--
			Total	160	100.00
		Male	Below Basic	34	20.73
			Basic	71	43.29
			Proficient	56	34.15
			Advanced	--	--
			Total	164	100.00

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Table 9.38 (continued). Achievement-Level Distributions—Gender, Summer 2014

Test Period	Content Area	Gender	Achievement Level	Freq.	%
Summer 2014	English I	Female	Below Basic	10	12.99
			Basic	27	35.06
			Proficient	30	38.96
			Advanced	10	12.99
			Total	77	100.00
		Male	Below Basic	18	20.69
			Basic	30	34.48
			Proficient	27	31.03
			Advanced	12	13.79
			Total	87	100.00
	Algebra II	Female	Below Basic	18	47.37
			Basic	16	42.11
			Proficient	--	--
			Advanced	--	--
			Total	38	100.00
		Male	Below Basic	15	38.46
			Basic	17	43.59
			Proficient	--	--
			Advanced	--	--
			Total	39	100.00
	Geometry	Female	Below Basic	21	38.18
			Basic	17	30.91
			Proficient	15	27.27
			Advanced	--	--
			Total	55	100.00
		Male	Below Basic	10	19.23
			Basic	18	34.62
			Proficient	17	32.69
			Advanced	--	--
			Total	52	100.00
	Government	Female	Below Basic	69	15.54
			Basic	132	29.73
			Proficient	156	35.14
			Advanced	87	19.59
			Total	444	100.00
		Male	Below Basic	48	11.62
			Basic	100	24.21
			Proficient	159	38.50
			Advanced	106	25.67
			Total	413	100.00
	Am. History	Female	Below Basic	40	39.22
			Basic	36	35.29
			Proficient	20	19.61
			Advanced	--	--
			Total	102	100.00
		Male	Below Basic	16	22.22
			Basic	23	31.94
			Proficient	23	31.94
			Advanced	10	13.89
			Total	72	100.00

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Table 9.39. Achievement-Level Distributions—Gender, Fall 2014

Test Period	Content Area	Gender	Achievement Level	Freq.	%
Fall 2014	English II	Female	Below Basic	112	9.99
			Basic	304	27.12
			Proficient	537	47.90
			Advanced	168	14.99
			Total	1,121	100.00
		Male	Below Basic	231	17.62
			Basic	429	32.72
			Proficient	545	41.57
			Advanced	106	8.09
			Total	1,311	100.00
	Algebra I	Female	Below Basic	583	22.74
			Basic	607	23.67
			Proficient	1,067	41.61
			Advanced	307	11.97
			Total	2,564	100.00
		Male	Below Basic	626	24.40
			Basic	651	25.37
			Proficient	935	36.44
			Advanced	354	13.80
			Total	2,566	100.00
	Biology	Female	Below Basic	315	20.93
			Basic	518	34.42
			Proficient	447	29.70
			Advanced	225	14.95
			Total	1,505	100.00
		Male	Below Basic	413	24.82
			Basic	534	32.09
			Proficient	491	29.51
			Advanced	226	13.58
			Total	1,664	100.00

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Table 9.39 (continued). Achievement-Level Distributions—Gender, Fall 2014

Test Period	Content Area	Gender	Achievement Level	Freq.	%
Fall 2014	English I	Female	Below Basic	23	7.40
			Basic	62	19.94
			Proficient	164	52.73
			Advanced	62	19.94
			Total	311	100.00
		Male	Below Basic	30	9.58
			Basic	83	26.52
			Proficient	156	49.84
			Advanced	44	14.06
			Total	313	100.00
	Algebra II	Female	Below Basic	79	19.65
			Basic	79	19.65
			Proficient	134	33.33
			Advanced	110	27.36
			Total	402	100.00
		Male	Below Basic	57	15.62
			Basic	54	14.79
			Proficient	120	32.88
			Advanced	134	36.71
			Total	365	100.00
	Geometry	Female	Below Basic	49	13.00
			Basic	67	17.77
			Proficient	176	46.68
			Advanced	85	22.55
			Total	377	100.00
		Male	Below Basic	55	14.29
			Basic	45	11.69
			Proficient	171	44.42
			Advanced	114	29.61
			Total	385	100.00
	Government	Female	Below Basic	526	7.69
			Basic	2,489	36.37
			Proficient	2,779	40.60
			Advanced	1,050	15.34
			Total	6,844	100.00
		Male	Below Basic	545	7.82
			Basic	2,206	31.64
			Proficient	2,812	40.33
			Advanced	1,409	20.21
			Total	6,972	100.00
	Am. History	Female	Below Basic	107	37.15
			Basic	81	28.13
			Proficient	67	23.26
			Advanced	33	11.46
			Total	288	100.00
		Male	Below Basic	92	24.73
			Basic	60	16.13
			Proficient	124	33.33
			Advanced	96	25.81
			Total	372	100.00

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Table 9.40. Achievement-Level Distributions—Gender, Spring 2015

Test Period	Content Area	Gender	Achievement Level	Freq.	%
Spring 2015	English II	Female	Below Basic	994	3.21
			Basic	5,590	18.06
			Proficient	18,187	58.77
			Advanced	6,174	19.95
			Total	30,945	100.00
		Male	Below Basic	2,132	6.80
			Basic	7,179	22.89
			Proficient	16,783	53.52
			Advanced	5,265	16.79
			Total	31,359	100.00
	Algebra I	Female	Below Basic	5,043	16.19
			Basic	5,942	19.07
			Proficient	14,243	45.72
			Advanced	5,925	19.02
			Total	31,153	100.00
		Male	Below Basic	6,330	20.04
			Basic	6,005	19.01
			Proficient	13,183	41.74
			Advanced	6,067	19.21
			Total	31,585	100.00
	Biology	Female	Below Basic	760	2.46
			Basic	6,256	20.21
			Proficient	15,845	51.20
			Advanced	8,087	26.13
			Total	30,948	100.00
		Male	Below Basic	1,118	3.53
			Basic	6,961	22.01
			Proficient	15,620	49.39
			Advanced	7,928	25.07
			Total	31,627	100.00
	English I	Female	Below Basic	398	4.43
			Basic	2,082	23.20
			Proficient	5,291	58.95
			Advanced	1,205	13.42
			Total	8,976	100.00
		Male	Below Basic	715	8.00
			Basic	2,692	30.12
			Proficient	4,784	53.52
			Advanced	747	8.36
			Total	8,938	100.00

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Table 9.40 (continued). Achievement-Level Distributions—Gender, Spring 2015

Test Period	Content Area	Gender	Achievement Level	Freq.	%
Spring 2015	Algebra II	Female	Below Basic	1,640	14.67
			Basic	2,265	20.26
			Proficient	4,399	39.35
			Advanced	2,874	25.71
			Total	11,178	100.00
		Male	Below Basic	1,382	14.24
			Basic	1,766	18.19
			Proficient	3,497	36.03
			Advanced	3,062	31.54
			Total	9,707	100.00
	Geometry	Female	Below Basic	1,264	21.43
			Basic	1,153	19.55
			Proficient	2,638	44.73
			Advanced	842	14.28
			Total	5,897	100.00
		Male	Below Basic	883	16.48
			Basic	906	16.91
			Proficient	2,551	47.60
			Advanced	1,019	19.01
			Total	5,359	100.00
	Government	Female	Below Basic	1,414	6.27
			Basic	6,684	29.62
			Proficient	10,658	47.23
			Advanced	3,808	16.88
			Total	22,564	100.00
		Male	Below Basic	1,769	7.65
			Basic	6,200	26.80
			Proficient	10,307	44.55
			Advanced	4,861	21.01
			Total	23,137	100.00
	Am. History	Female	Below Basic	1,643	29.48
			Basic	1,512	27.13
			Proficient	1,575	28.26
			Advanced	843	15.13
			Total	5,573	100.00
		Male	Below Basic	1,189	20.73
			Basic	1,335	23.27
			Proficient	1,831	31.92
			Advanced	1,381	24.08
			Total	5,736	100.00
	Physical Science	Female	Below Basic	194	6.44
			Basic	2,106	69.92
			Proficient	624	20.72
			Advanced	88	2.92
			Total	3,012	100.00
		Male	Below Basic	150	4.69
			Basic	2,069	64.66
			Proficient	819	25.59
			Advanced	162	5.06
			Total	3,200	100.00

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Table 9.41. Achievement-Level Distribution—Ethnicity, Summer 2014

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Summer 2014	English II	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	10	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Black (not Hispanic)	Below Basic	20	12.05
			Basic	94	56.63
			Proficient	47	28.31
			Advanced	--	--
			Total	166	100.00
		Hispanic	Below Basic	--	--
			Basic	11	44.00
			Proficient	--	--
			Advanced	--	--
			Total	25	100.00
		White (not Hispanic)	Below Basic	21	13.46
			Basic	51	32.69
			Proficient	69	44.23
			Advanced	15	9.62
			Total	156	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--

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Table 9.41 (continued). Achievement-Level Distributions—Ethnicity, Summer 2014

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Summer 2014	Algebra I	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	10	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Black (not Hispanic)	Below Basic	70	24.48
			Basic	146	51.05
			Proficient	49	17.13
			Advanced	21	7.34
			Total	286	100.00
		Hispanic	Below Basic	--	--
			Basic	20	46.51
			Proficient	13	30.23
			Advanced	--	--
			Total	43	100.00
		White (not Hispanic)	Below Basic	47	8.94
			Basic	187	35.55
			Proficient	199	37.83
			Advanced	93	17.68
			Total	526	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--

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Table 9.41 (continued). Achievement-Level Distributions—Ethnicity, Summer 2014

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Summer 2014	Biology	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Black (not Hispanic)	Below Basic	42	31.58
			Basic	64	48.12
			Proficient	25	18.80
			Advanced	--	--
			Total	133	100.00
		Hispanic	Below Basic	--	--
			Basic	28	56.00
			Proficient	17	34.00
			Advanced	--	--
			Total	50	100.00
		White (not Hispanic)	Below Basic	20	15.27
			Basic	57	43.51
			Proficient	48	36.64
			Advanced	--	--
			Total	131	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--

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Table 9.41 (continued). Achievement-Level Distributions—Ethnicity, Summer 2014

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Summer 2014	English I	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Black (not Hispanic)	Below Basic	--	--
			Basic	11	35.48
			Proficient	13	41.94
			Advanced	--	--
			Total	31	100.00
		Hispanic	Below Basic	10	27.78
			Basic	19	52.78
			Proficient	--	--
			Advanced	--	--
			Total	36	100.00
		White (not Hispanic)	Below Basic	11	12.22
			Basic	23	25.56
			Proficient	37	41.11
			Advanced	19	21.11
			Total	90	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--

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Table 9.41 (continued). Achievement-Level Distributions—Ethnicity, Summer 2014

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Summer 2014	Algebra II	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Black (not Hispanic)	Below Basic	12	63.16
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	19	100.00
		Hispanic	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	10	100.00
		White (not Hispanic)	Below Basic	15	31.91
			Basic	23	48.94
			Proficient	--	--
			Advanced	--	--
			Total	47	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--

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Table 9.41 (continued). Achievement-Level Distributions—Ethnicity, Summer 2014

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Summer 2014	Geometry	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Black (not Hispanic)	Below Basic	20	52.63
			Basic	15	39.47
			Proficient	--	--
			Advanced	--	--
			Total	38	100.00
		Hispanic	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	11	100.00
		White (not Hispanic)	Below Basic	--	--
			Basic	16	29.63
			Proficient	24	44.44
			Advanced	--	--
			Total	54	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--

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Table 9.41 (continued). Achievement-Level Distributions—Ethnicity, Summer 2014

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Summer 2014	Government	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	17	38.64
			Advanced	25	56.82
			Total	44	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Black (not Hispanic)	Below Basic	44	28.39
			Basic	56	36.13
			Proficient	47	30.32
			Advanced	--	--
			Total	155	100.00
		Hispanic	Below Basic	10	16.13
			Basic	24	38.71
			Proficient	22	35.48
			Advanced	--	--
			Total	62	100.00
		White (not Hispanic)	Below Basic	60	10.47
			Basic	147	25.65
			Proficient	217	37.87
			Advanced	149	26.00
			Total	573	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	13	100.00

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Table 9.41 (continued). Achievement-Level Distributions—Ethnicity, Summer 2014

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Summer 2014	Am. History	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Black (not Hispanic)	Below Basic	12	50.00
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	24	100.00
		Hispanic	Below Basic	18	47.37
			Basic	15	39.47
			Proficient	--	--
			Advanced	--	--
			Total	38	100.00
		White (not Hispanic)	Below Basic	24	23.08
			Basic	34	32.69
			Proficient	30	28.85
			Advanced	16	15.38
			Total	104	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--

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Table 9.42. Achievement-Level Distributions—Ethnicity, Fall 2014

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Fall 2014	English II	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	15	100.00
		Asian	Below Basic	10	18.18
			Basic	17	30.91
			Proficient	21	38.18
			Advanced	--	--
			Total	55	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Black (not Hispanic)	Below Basic	162	20.93
			Basic	299	38.63
			Proficient	284	36.69
			Advanced	29	3.75
			Total	774	100.00
		Hispanic	Below Basic	14	9.27
			Basic	47	31.13
			Proficient	74	49.01
			Advanced	16	10.60
			Total	151	100.00
		White (not Hispanic)	Below Basic	144	10.49
			Basic	353	25.71
			Proficient	660	48.07
			Advanced	216	15.73
			Total	1,373	100.00
		Multi-racial	Below Basic	--	--
			Basic	13	23.21
			Proficient	32	57.14
			Advanced	--	--
			Total	56	100.00

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Table 9.42 (continued). Achievement-Level Distributions—Ethnicity, Fall 2012

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Fall 2012	Algebra I	American Indian/ Alaskan Native	Below Basic	10	32.26
			Basic	--	--
			Proficient	10	32.26
			Advanced	--	--
			Total	31	100.00
		Asian	Below Basic	23	19.83
			Basic	13	11.21
			Proficient	46	39.66
			Advanced	34	29.31
			Total	116	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	10	100.00
		Black (not Hispanic)	Below Basic	416	39.81
			Basic	320	30.62
			Proficient	276	26.41
			Advanced	33	3.16
			Total	1,045	100.00
		Hispanic	Below Basic	82	32.54
			Basic	62	24.60
			Proficient	88	34.92
			Advanced	20	7.94
			Total	252	100.00
		White (not Hispanic)	Below Basic	668	18.58
			Basic	831	23.12
			Proficient	1,539	42.81
			Advanced	557	15.49
			Total	3,595	100.00
		Multi-racial	Below Basic	--	--
			Basic	22	27.16
			Proficient	39	48.15
			Advanced	12	14.81
			Total	81	100.00

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Table 9.42 (continued). Achievement-Level Distributions—Ethnicity, Fall 2014

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Fall 2014	Biology	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	23	100.00
		Asian	Below Basic	14	15.73
			Basic	17	19.10
			Proficient	27	30.34
			Advanced	31	34.83
			Total	89	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	11	100.00
		Black (not Hispanic)	Below Basic	355	45.11
			Basic	328	41.68
			Proficient	92	11.69
			Advanced	12	1.52
			Total	787	100.00
		Hispanic	Below Basic	53	28.04
			Basic	80	42.33
			Proficient	47	24.87
			Advanced	--	--
			Total	189	100.00
		White (not Hispanic)	Below Basic	286	14.30
			Basic	593	29.65
			Proficient	733	36.65
			Advanced	388	19.40
			Total	2,000	100.00
		Multi-racial	Below Basic	11	15.71
			Basic	21	30.00
			Proficient	29	41.43
			Advanced	--	--
			Total	70	100.00

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Table 9.42 (continued). Achievement-Level Distributions—Ethnicity, Fall 2014

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Fall 2014	English I	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	10	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Black (not Hispanic)	Below Basic	--	--
			Basic	19	34.55
			Proficient	26	47.27
			Advanced	--	--
			Total	55	100.00
		Hispanic	Below Basic	--	--
			Basic	--	--
			Proficient	15	46.88
			Advanced	--	--
			Total	32	100.00
		White (not Hispanic)	Below Basic	43	8.46
			Basic	114	22.44
			Proficient	264	51.97
			Advanced	87	17.13
			Total	508	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	13	100.00

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Table 9.42 (continued). Achievement-Level Distributions—Ethnicity, Fall 2014

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Fall 2014	Algebra II	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	20	60.61
			Total	33	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Black (not Hispanic)	Below Basic	29	39.73
			Basic	15	20.55
			Proficient	22	30.14
			Advanced	--	--
			Total	73	100.00
		Hispanic	Below Basic	--	--
			Basic	--	--
			Proficient	14	33.33
			Advanced	16	38.10
			Total	42	100.00
		White (not Hispanic)	Below Basic	95	15.97
			Basic	105	17.65
			Proficient	203	34.12
			Advanced	192	32.27
			Total	595	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	21	100.00

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Table 9.42 (continued). Achievement-Level Distributions—Ethnicity, Fall 2014

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Fall 2014	Geometry	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	11	37.93
			Advanced	14	48.28
			Total	29	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Black (not Hispanic)	Below Basic	27	29.03
			Basic	23	24.73
			Proficient	36	38.71
			Advanced	--	--
			Total	93	100.00
		Hispanic	Below Basic	--	--
			Basic	--	--
			Proficient	23	54.76
			Advanced	--	--
			Total	42	100.00
		White (not Hispanic)	Below Basic	68	11.97
			Basic	71	12.50
			Proficient	264	46.48
			Advanced	165	29.05
			Total	568	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	12	50.00
			Advanced	--	--
			Total	24	100.00

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Table 9.42 (continued). Achievement-Level Distributions—Ethnicity, Fall 2014

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Fall 2014	Government	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	24	40.00
			Proficient	23	38.33
			Advanced	--	--
			Total	60	100.00
		Asian	Below Basic	--	--
			Basic	80	21.56
			Proficient	143	38.54
			Advanced	143	38.54
			Total	371	100.00
		Pacific Islander	Below Basic	--	--
			Basic	11	33.33
			Proficient	15	45.45
			Advanced	--	--
			Total	33	100.00
		Black (not Hispanic)	Below Basic	369	15.29
			Basic	1,158	47.97
			Proficient	755	31.28
			Advanced	132	5.47
			Total	2,414	100.00
		Hispanic	Below Basic	63	10.13
			Basic	234	37.62
			Proficient	245	39.39
			Advanced	80	12.86
			Total	622	100.00
		White (not Hispanic)	Below Basic	607	6.03
			Basic	3,107	30.85
			Proficient	4,301	42.70
			Advanced	2,057	20.42
			Total	10,072	100.00
		Multi-racial	Below Basic	19	7.79
			Basic	81	33.20
			Proficient	109	44.67
			Advanced	35	14.34
			Total	244	100.00

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Table 9.42 (continued). Achievement-Level Distributions—Ethnicity, Fall 2014

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Fall 2014	Am. History	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Black (not Hispanic)	Below Basic	45	53.57
			Basic	16	19.05
			Proficient	15	17.86
			Advanced	--	--
			Total	84	100.00
		Hispanic	Below Basic	15	44.12
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	34	100.00
		White (not Hispanic)	Below Basic	128	25.55
			Basic	112	22.36
			Proficient	156	31.14
			Advanced	105	20.96
			Total	501	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	27	100.00

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Table 9.43. Achievement-Level Distributions—Ethnicity, Spring 2015

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Spring 2015	English II	American Indian/ Alaskan Native	Below Basic	26	8.78
			Basic	65	21.96
			Proficient	163	55.07
			Advanced	42	14.19
			Total	296	100.00
		Asian	Below Basic	75	6.16
			Basic	160	13.15
			Proficient	589	48.40
			Advanced	393	32.29
			Total	1,217	100.00
		Pacific Islander	Below Basic	--	--
			Basic	41	34.45
			Proficient	56	47.06
			Advanced	17	14.29
			Total	119	100.00
		Black (not Hispanic)	Below Basic	1,024	11.25
			Basic	3,096	34.02
			Proficient	4,415	48.52
			Advanced	565	6.21
			Total	9,100	100.00
		Hispanic	Below Basic	175	6.12
			Basic	736	25.73
			Proficient	1,613	56.40
			Advanced	336	11.75
			Total	2,860	100.00
		White (not Hispanic)	Below Basic	1,777	3.74
			Basic	8,407	17.71
			Proficient	27,436	57.78
			Advanced	9,862	20.77
			Total	47,482	100.00
		Multi-racial	Below Basic	44	3.58
			Basic	264	21.46
			Proficient	698	56.75
			Advanced	224	18.21
			Total	1,230	100.00

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Table 9.43 (continued). Achievement-Level Distributions—Ethnicity, Spring 2015

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Spring 2015	Algebra I	American Indian/ Alaskan Native	Below Basic	68	24.29
			Basic	53	18.93
			Proficient	108	38.57
			Advanced	51	18.21
			Total	280	100.00
		Asian	Below Basic	112	8.92
			Basic	115	9.16
			Proficient	444	35.35
			Advanced	585	46.58
			Total	1,256	100.00
		Pacific Islander	Below Basic	24	19.51
			Basic	30	24.39
			Proficient	48	39.02
			Advanced	21	17.07
			Total	123	100.00
		Black (not Hispanic)	Below Basic	2,940	31.95
			Basic	2,323	25.24
			Proficient	3,387	36.81
			Advanced	552	6.00
			Total	9,202	100.00
		Hispanic	Below Basic	623	19.85
			Basic	663	21.13
			Proficient	1,452	46.27
			Advanced	400	12.75
			Total	3,138	100.00
		White (not Hispanic)	Below Basic	7,342	15.47
			Basic	8,529	17.97
			Proficient	21,434	45.16
			Advanced	10,155	21.40
			Total	47,460	100.00
		Multi-racial	Below Basic	264	20.64
			Basic	234	18.30
			Proficient	553	43.24
			Advanced	228	17.83
			Total	1,279	100.00

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Table 9.43 (continued). Achievement-Level Distributions—Ethnicity, Spring 2015

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Spring 2015	Biology	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	75	27.08
			Proficient	147	53.07
			Advanced	48	17.33
			Total	277	100.00
		Asian	Below Basic	36	2.95
			Basic	177	14.52
			Proficient	496	40.69
			Advanced	510	41.84
			Total	1,219	100.00
		Pacific Islander	Below Basic	--	--
			Basic	43	33.33
			Proficient	56	43.41
			Advanced	23	17.83
			Total	129	100.00
		Black (not Hispanic)	Below Basic	766	8.44
			Basic	3,657	40.30
			Proficient	3,872	42.67
			Advanced	780	8.60
			Total	9,075	100.00
		Hispanic	Below Basic	127	4.35
			Basic	784	26.86
			Proficient	1,484	50.84
			Advanced	524	17.95
			Total	2,919	100.00
		White (not Hispanic)	Below Basic	902	1.89
			Basic	8,211	17.21
			Proficient	24,754	51.90
			Advanced	13,830	29.00
			Total	47,697	100.00
		Multi-racial	Below Basic	33	2.62
			Basic	270	21.45
			Proficient	656	52.10
			Advanced	300	23.83
			Total	1,259	100.00

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Table 9.43 (continued). Achievement-Level Distributions—Ethnicity, Spring 2015

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Spring 2015	English I	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	34	34.69
			Proficient	50	51.02
			Advanced	--	--
			Total	98	100.00
		Asian	Below Basic	13	5.88
			Basic	47	21.27
			Proficient	122	55.20
			Advanced	39	17.65
			Total	221	100.00
		Pacific Islander	Below Basic	--	--
			Basic	12	34.29
			Proficient	18	51.43
			Advanced	--	--
			Total	35	100.00
		Black (not Hispanic)	Below Basic	214	14.63
			Basic	575	39.30
			Proficient	600	41.01
			Advanced	74	5.06
			Total	1,463	100.00
		Hispanic	Below Basic	52	7.68
			Basic	232	34.27
			Proficient	350	51.70
			Advanced	43	6.35
			Total	677	100.00
		White (not Hispanic)	Below Basic	812	5.37
			Basic	3,776	24.97
			Proficient	8,767	57.97
			Advanced	1,769	11.70
			Total	15,124	100.00
		Multi-racial	Below Basic	13	4.39
			Basic	98	33.11
			Proficient	168	56.76
			Advanced	17	5.74
			Total	296	100.00

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Table 9.43 (continued). Achievement-Level Distributions—Ethnicity, Spring 2015

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Spring 2015	Algebra II	American Indian/ Alaskan Native	Below Basic	22	19.82
			Basic	25	22.52
			Proficient	36	32.43
			Advanced	28	25.23
			Total	111	100.00
		Asian	Below Basic	26	3.76
			Basic	72	10.40
			Proficient	201	29.05
			Advanced	393	56.79
			Total	692	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	12	40.00
			Advanced	--	--
			Total	30	100.00
		Black (not Hispanic)	Below Basic	476	33.33
			Basic	332	23.25
			Proficient	463	32.42
			Advanced	157	10.99
			Total	1,428	100.00
		Hispanic	Below Basic	125	16.62
			Basic	174	23.14
			Proficient	308	40.96
			Advanced	145	19.28
			Total	752	100.00
		White (not Hispanic)	Below Basic	2,306	13.21
			Basic	3,351	19.20
			Proficient	6,718	38.49
			Advanced	5,078	29.10
			Total	17,453	100.00
		Multi-racial	Below Basic	64	15.27
			Basic	71	16.95
			Proficient	158	37.71
			Advanced	126	30.07
			Total	419	100.00

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Table 9.43 (continued). Achievement-Level Distributions—Ethnicity, Spring 2015

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Spring 2015	Geometry	American Indian/ Alaskan Native	Below Basic	12	21.43
			Basic	13	23.21
			Proficient	25	44.64
			Advanced	--	--
			Total	56	100.00
		Asian	Below Basic	15	6.47
			Basic	20	8.62
			Proficient	74	31.90
			Advanced	123	53.02
			Total	232	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	13	100.00
		Black (not Hispanic)	Below Basic	247	34.99
			Basic	138	19.55
			Proficient	258	36.54
			Advanced	63	8.92
			Total	706	100.00
		Hispanic	Below Basic	91	20.87
			Basic	79	18.12
			Proficient	204	46.79
			Advanced	62	14.22
			Total	436	100.00
		White (not Hispanic)	Below Basic	1,744	18.02
			Basic	1,772	18.31
			Proficient	4,571	47.24
			Advanced	1,589	16.42
			Total	9,676	100.00
		Multi-racial	Below Basic	36	26.28
			Basic	36	26.28
			Proficient	48	35.04
			Advanced	17	12.41
			Total	137	100.00

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Table 9.43 (continued). Achievement-Level Distributions—Ethnicity, Spring 2015

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Spring 2015	Government	American Indian/ Alaskan Native	Below Basic	15	6.85
			Basic	57	26.03
			Proficient	115	52.51
			Advanced	32	14.61
			Total	219	100.00
		Asian	Below Basic	60	7.19
			Basic	192	23.02
			Proficient	376	45.08
			Advanced	206	24.70
			Total	834	100.00
		Pacific Islander	Below Basic	14	14.14
			Basic	29	29.29
			Proficient	44	44.44
			Advanced	12	12.12
			Total	99	100.00
		Black (not Hispanic)	Below Basic	1,148	17.11
			Basic	2,853	42.51
			Proficient	2,263	33.72
			Advanced	447	6.66
			Total	6,711	100.00
		Hispanic	Below Basic	203	10.26
			Basic	650	32.84
			Proficient	904	45.68
			Advanced	222	11.22
			Total	1,979	100.00
		White (not Hispanic)	Below Basic	1,697	4.85
			Basic	8,840	25.26
			Proficient	16,873	48.21
			Advanced	7,589	21.68
			Total	34,999	100.00
		Multi-racial	Below Basic	46	5.35
			Basic	263	30.58
			Proficient	390	45.35
			Advanced	161	18.72
			Total	860	100.00

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Table 9.43 (continued). Achievement-Level Distributions—Ethnicity, Spring 2015

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Spring 2015	Am. History	American Indian/ Alaskan Native	Below Basic	14	22.95
			Basic	16	26.23
			Proficient	20	32.79
			Advanced	11	18.03
			Total	61	100.00
		Asian	Below Basic	32	26.67
			Basic	28	23.33
			Proficient	31	25.83
			Advanced	29	24.17
			Total	120	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	11	100.00
		Black (not Hispanic)	Below Basic	333	51.63
			Basic	172	26.67
			Proficient	102	15.81
			Advanced	38	5.89
			Total	645	100.00
		Hispanic	Below Basic	102	30.00
			Basic	107	31.47
			Proficient	78	22.94
			Advanced	53	15.59
			Total	340	100.00
		White (not Hispanic)	Below Basic	2,302	23.12
			Basic	2,474	24.85
			Proficient	3,122	31.36
			Advanced	2,058	20.67
			Total	9,956	100.00
		Multi-racial	Below Basic	48	27.27
			Basic	45	25.57
			Proficient	52	29.55
			Advanced	31	17.61
			Total	176	100.00

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Table 9.43 (continued). Achievement-Level Distributions—Ethnicity, Spring 2015

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Spring 2015	Physical Science	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	23	85.19
			Proficient	--	--
			Advanced	--	--
			Total	27	100.00
		Asian	Below Basic	--	--
			Basic	25	55.56
			Proficient	11	24.44
			Advanced	--	--
			Total	45	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
		Black (not Hispanic)	Below Basic	35	12.59
			Basic	203	73.02
			Proficient	36	12.95
			Advanced	--	--
			Total	278	100.00
		Hispanic	Below Basic	12	6.22
			Basic	147	76.17
			Proficient	25	12.95
			Advanced	--	--
			Total	193	100.00
		White (not Hispanic)	Below Basic	285	5.11
			Basic	3,718	66.62
			Proficient	1,349	24.17
			Advanced	229	4.10
			Total	5,581	100.00
		Multi-racial	Below Basic	--	--
			Basic	54	65.85
			Proficient	19	23.17
			Advanced	--	--
			Total	82	100.00

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Table 9.44. Achievement-Level Distributions—Migrant, Summer 2014

Test Period	Content Area	Migrant	Achievement Level	Freq.	%
Summer 2014	English II	No	Below Basic	41	11.61
			Basic	158	44.76
			Proficient	130	36.83
			Advanced	24	6.80
			Total	353	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Algebra I	No	Below Basic	132	15.17
			Basic	355	40.80
			Proficient	266	30.57
			Advanced	117	13.45
			Total	870	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Biology	No	Below Basic	64	20.45
			Basic	149	47.60
			Proficient	91	29.07
			Advanced	--	--
			Total	313	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--

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Table 9.44 (continued). Achievement-Level Distributions—Migrant, Summer 2014

Test Period	Content Area	Migrant	Achievement Level	Freq.	%
Summer 2014	English I	No	Below Basic	28	17.07
			Basic	57	34.76
			Proficient	57	34.76
			Advanced	22	13.41
			Total	164	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Algebra II	No	Below Basic	28	38.89
			Basic	33	45.83
			Proficient	--	--
			Advanced	--	--
			Total	72	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Geometry	No	Below Basic	31	28.97
			Basic	35	32.71
			Proficient	32	29.91
			Advanced	--	--
			Total	107	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Government	No	Below Basic	112	13.29
			Basic	228	27.05
			Proficient	311	36.89
			Advanced	192	22.78
			Total	843	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Am. History	No	Below Basic	56	32.37
			Basic	59	34.10
			Proficient	42	24.28
			Advanced	16	9.25
			Total	173	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--

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Table 9.45. Achievement-Level Distributions—Migrant, Fall 2014

Test Period	Content Area	Migrant	Achievement Level	Freq.	%
Fall 2014	English II	No	Below Basic	339	14.01
			Basic	730	30.17
			Proficient	1,078	44.55
			Advanced	273	11.28
			Total	2,420	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Algebra I	No	Below Basic	1,152	23.09
			Basic	1,201	24.07
			Proficient	1,978	39.64
			Advanced	659	13.21
			Total	4,990	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Biology	No	Below Basic	724	22.91
			Basic	1,047	33.13
			Proficient	938	29.68
			Advanced	451	14.27
			Total	3,160	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--

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Table 9.45 (continued). Achievement-Level Distributions—Migrant, Fall 2014

Test Period	Content Area	Migrant	Achievement Level	Freq.	%
Fall 2014	English I	No	Below Basic	53	8.49
			Basic	145	23.24
			Proficient	320	51.28
			Advanced	106	16.99
			Total	624	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Algebra II	No	Below Basic	136	17.73
			Basic	133	17.34
			Proficient	254	33.12
			Advanced	244	31.81
			Total	767	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Geometry	No	Below Basic	103	13.53
			Basic	112	14.72
			Proficient	347	45.60
			Advanced	199	26.15
			Total	761	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Government	No	Below Basic	1,064	7.71
			Basic	4,687	33.97
			Proficient	5,588	40.50
			Advanced	2,457	17.81
			Total	13,796	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Am. History	No	Below Basic	199	30.15
			Basic	141	21.36
			Proficient	191	28.94
			Advanced	129	19.55
			Total	660	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--

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Table 9.46. Achievement-Level Distributions—Migrant, Spring 2015

Test Period	Content Area	Migrant	Achievement Level	Freq.	%
Spring 2015	English II	No	Below Basic	3,114	5.00
			Basic	12,752	20.48
			Proficient	34,956	56.15
			Advanced	11,436	18.37
			Total	62,258	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	13	100.00
	Algebra I	No	Below Basic	11,341	18.11
			Basic	11,919	19.03
			Proficient	27,389	43.73
			Advanced	11,989	19.14
			Total	62,638	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	10	47.62
			Advanced	--	--
			Total	21	100.00
	Biology	No	Below Basic	1,869	2.99
			Basic	13,189	21.10
			Proficient	31,444	50.30
			Advanced	16,009	25.61
			Total	62,511	100.00
		Yes	Below Basic	--	--
			Basic	12	63.16
			Proficient	--	--
			Advanced	--	--
			Total	19	100.00
	English I	No	Below Basic	1,109	6.20
			Basic	4,767	26.65
			Proficient	10,061	56.24
			Advanced	1,951	10.91
			Total	17,888	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--

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Table 9.46 (continued). Achievement-Level Distributions—Migrant, Spring 2015

Test Period	Content Area	Migrant	Achievement Level	Freq.	%
Spring 2015	Algebra II	No	Below Basic	3,021	14.47
			Basic	4,029	19.30
			Proficient	7,893	37.81
			Advanced	5,935	28.43
			Total	20,878	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Geometry	No	Below Basic	2,144	19.06
			Basic	2,058	18.30
			Proficient	5,185	46.11
			Advanced	1,859	16.53
			Total	11,246	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Government	No	Below Basic	3,178	6.96
			Basic	12,865	28.17
			Proficient	20,957	45.89
			Advanced	8,666	18.98
			Total	45,666	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Am. History	No	Below Basic	2,829	25.04
			Basic	2,842	25.15
			Proficient	3,406	30.14
			Advanced	2,223	19.67
			Total	11,300	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Physical Science	No	Below Basic	344	5.54
			Basic	4,172	67.20
			Proficient	1,442	23.23
			Advanced	250	4.03
			Total	6,208	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--

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Table 9.47. Achievement-Level Distributions—Free and Reduced Lunch, Summer 2014

Test Period	Content Area	FRL	Achievement Level	Freq.	%
Summer 2014	English II	No	Below Basic	11	8.59
			Basic	52	40.63
			Proficient	51	39.84
			Advanced	14	10.94
			Total	128	100.00
		Yes	Below Basic	30	13.33
			Basic	106	47.11
			Proficient	79	35.11
			Advanced	10	4.44
			Total	225	100.00
	Algebra I	No	Below Basic	46	11.62
			Basic	144	36.36
			Proficient	136	34.34
			Advanced	70	17.68
			Total	396	100.00
		Yes	Below Basic	86	18.14
			Basic	211	44.51
			Proficient	130	27.43
			Advanced	47	9.92
			Total	474	100.00
	Biology	No	Below Basic	19	19.59
			Basic	38	39.18
			Proficient	34	35.05
			Advanced	--	--
			Total	97	100.00
		Yes	Below Basic	45	20.83
			Basic	111	51.39
			Proficient	57	26.39
			Advanced	--	--
			Total	216	100.00

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Table 9.47 (continued). Achievement-Level Distributions—Free and Reduced Lunch, Summer 2014

Test Period	Content Area	FRL	Achievement Level	Freq.	%
Summer 2014	English I	No	Below Basic	--	--
			Basic	--	--
			Proficient	33	52.38
			Advanced	17	26.98
			Total	63	100.00
		Yes	Below Basic	24	23.76
			Basic	48	47.52
			Proficient	24	23.76
			Advanced	--	--
			Total	101	100.00
	Algebra II	No	Below Basic	17	36.17
			Basic	23	48.94
			Proficient	--	--
			Advanced	--	--
			Total	47	100.00
		Yes	Below Basic	11	44.00
			Basic	10	40.00
			Proficient	--	--
			Advanced	--	--
			Total	25	100.00
	Geometry	No	Below Basic	12	22.22
			Basic	13	24.07
			Proficient	20	37.04
			Advanced	--	--
			Total	54	100.00
		Yes	Below Basic	19	35.85
			Basic	22	41.51
			Proficient	12	22.64
			Advanced	--	--
			Total	53	100.00
	Government	No	Below Basic	43	8.76
			Basic	106	21.59
			Proficient	191	38.90
			Advanced	151	30.75
			Total	491	100.00
		Yes	Below Basic	69	19.55
			Basic	122	34.56
			Proficient	121	34.28
			Advanced	41	11.61
			Total	353	100.00
	Am. History	No	Below Basic	10	14.29
			Basic	26	37.14
			Proficient	22	31.43
			Advanced	12	17.14
			Total	70	100.00
		Yes	Below Basic	46	44.66
			Basic	33	32.04
			Proficient	20	19.42
			Advanced	--	--
			Total	103	100.00

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Table 9.48. Achievement-Level Distributions—Free and Reduced Lunch, Fall 2014

Test Period	Content Area	FRL	Achievement Level	Freq.	%
Fall 2014	English II	No	Below Basic	89	8.13
			Basic	244	22.28
			Proficient	555	50.68
			Advanced	207	18.90
			Total	1,095	100.00
		Yes	Below Basic	250	18.87
			Basic	486	36.68
			Proficient	523	39.47
			Advanced	66	4.98
			Total	1,325	100.00
	Algebra I	No	Below Basic	402	14.35
			Basic	559	19.95
			Proficient	1,297	46.29
			Advanced	544	19.41
			Total	2,802	100.00
		Yes	Below Basic	750	34.28
			Basic	642	29.34
			Proficient	681	31.12
			Advanced	115	5.26
			Total	2,188	100.00
	Biology	No	Below Basic	184	11.44
			Basic	398	24.75
			Proficient	635	39.49
			Advanced	391	24.32
			Total	1,608	100.00
		Yes	Below Basic	540	34.79
			Basic	649	41.82
			Proficient	303	19.52
			Advanced	60	3.87
			Total	1,552	100.00

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Table 9.48 (continued). Achievement-Level Distributions—Free and Reduced Lunch, Fall 2014

Test Period	Content Area	FRL	Achievement Level	Freq.	%
Fall 2014	English I	No	Below Basic	21	5.19
			Basic	74	18.27
			Proficient	216	53.33
			Advanced	94	23.21
			Total	405	100.00
		Yes	Below Basic	32	14.61
			Basic	71	32.42
			Proficient	104	47.49
			Advanced	12	5.48
			Total	219	100.00
	Algebra II	No	Below Basic	73	12.87
			Basic	95	16.75
			Proficient	188	33.16
			Advanced	211	37.21
			Total	567	100.00
		Yes	Below Basic	63	31.50
			Basic	38	19.00
			Proficient	66	33.00
			Advanced	33	16.50
			Total	200	100.00
	Geometry	No	Below Basic	57	10.18
			Basic	72	12.86
			Proficient	271	48.39
			Advanced	160	28.57
			Total	560	100.00
		Yes	Below Basic	46	22.89
			Basic	40	19.90
			Proficient	76	37.81
			Advanced	39	19.40
			Total	201	100.00
	Government	No	Below Basic	352	4.17
			Basic	2,219	26.28
			Proficient	3,824	45.29
			Advanced	2,049	24.27
			Total	8,444	100.00
		Yes	Below Basic	713	13.31
			Basic	2,469	46.11
			Proficient	1,765	32.96
			Advanced	408	7.62
			Total	5,355	100.00
	Am. History	No	Below Basic	78	19.16
			Basic	89	21.87
			Proficient	139	34.15
			Advanced	101	24.82
			Total	407	100.00
		Yes	Below Basic	121	47.83
			Basic	52	20.55
			Proficient	52	20.55
			Advanced	28	11.07
			Total	253	100.00

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Table 9.49. Achievement-Level Distributions—Free and Reduced Lunch, Spring 2015

Test Period	Content Area	FRL	Achievement Level	Freq.	%
Spring 2015	English II	No	Below Basic	759	2.14
			Basic	4,848	13.69
			Proficient	20,949	59.14
			Advanced	8,868	25.03
			Total	35,424	100.00
		Yes	Below Basic	2,361	8.79
			Basic	7,909	29.46
			Proficient	14,009	52.18
			Advanced	2,568	9.57
			Total	26,847	100.00
	Algebra I	No	Below Basic	3,924	11.40
			Basic	5,338	15.51
			Proficient	15,973	46.41
			Advanced	9,181	26.68
			Total	34,416	100.00
		Yes	Below Basic	7,422	26.28
			Basic	6,587	23.32
			Proficient	11,426	40.46
			Advanced	2,808	9.94
			Total	28,243	100.00
	Biology	No	Below Basic	414	1.15
			Basic	4,765	13.19
			Proficient	18,536	51.31
			Advanced	12,414	34.36
			Total	36,129	100.00
		Yes	Below Basic	1,457	5.52
			Basic	8,436	31.95
			Proficient	12,913	48.91
			Advanced	3,595	13.62
			Total	26,401	100.00
	English I	No	Below Basic	314	3.39
			Basic	1,808	19.52
			Proficient	5,753	62.10
			Advanced	1,389	14.99
			Total	9,264	100.00
		Yes	Below Basic	798	9.24
			Basic	2,961	34.30
			Proficient	4,310	49.93
			Advanced	563	6.52
			Total	8,632	100.00

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Table 9.49 (continued). Achievement-Level Distributions—Free and Reduced Lunch, Spring 2015

Test Period	Content Area	FRL	Achievement Level	Freq.	%
Spring 2015	Algebra II	No	Below Basic	1,700	11.10
			Basic	2,642	17.24
			Proficient	5,884	38.40
			Advanced	5,095	33.26
			Total	15,321	100.00
		Yes	Below Basic	1,321	23.76
			Basic	1,388	24.97
			Proficient	2,010	36.16
			Advanced	840	15.11
			Total	5,559	100.00
	Geometry	No	Below Basic	1,001	14.45
			Basic	1,164	16.80
			Proficient	3,332	48.09
			Advanced	1,432	20.67
			Total	6,929	100.00
		Yes	Below Basic	1,144	26.49
			Basic	894	20.70
			Proficient	1,853	42.91
			Advanced	427	9.89
			Total	4,318	100.00
	Government	No	Below Basic	797	3.03
			Basic	5,505	20.93
			Proficient	13,282	50.50
			Advanced	6,716	25.54
			Total	26,300	100.00
		Yes	Below Basic	2,383	12.30
			Basic	7,367	38.02
			Proficient	7,675	39.61
			Advanced	1,950	10.06
			Total	19,375	100.00
	Am. History	No	Below Basic	1,118	17.40
			Basic	1,504	23.41
			Proficient	2,171	33.79
			Advanced	1,632	25.40
			Total	6,425	100.00
		Yes	Below Basic	1,711	35.09
			Basic	1,338	27.44
			Proficient	1,235	25.33
			Advanced	592	12.14
			Total	4,876	100.00
	Physical Science	No	Below Basic	124	3.78
			Basic	2,024	61.73
			Proficient	935	28.51
			Advanced	196	5.98
			Total	3,279	100.00
		Yes	Below Basic	220	7.51
			Basic	2,148	73.34
			Proficient	507	17.31
			Advanced	54	1.84
			Total	2,929	100.00

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Table 9.50. Achievement-Level Distributions—Limited English Proficient, Summer 2014

Test Period	Content Area	LEP	Achievement Level	Freq.	%
Summer 2014	English II	No	Below Basic	40	11.80
			Basic	155	45.72
			Proficient	120	35.40
			Advanced	24	7.08
			Total	339	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	10	71.43
			Advanced	--	--
			Total	14	100.00
	Algebra I	No	Below Basic	128	15.15
			Basic	341	40.36
			Proficient	260	30.77
			Advanced	116	13.73
			Total	845	100.00
		Yes	Below Basic	--	--
			Basic	14	56.00
			Proficient	--	--
			Advanced	--	--
			Total	25	100.00
	Biology	No	Below Basic	63	22.03
			Basic	130	45.45
			Proficient	84	29.37
			Advanced	--	--
			Total	286	100.00
		Yes	Below Basic	--	--
			Basic	19	70.37
			Proficient	--	--
			Advanced	--	--
			Total	27	100.00

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Table 9.50 (continued). Achievement-Level Distributions—Limited English Proficient, Summer 2014

Test Period	Content Area	LEP	Achievement Level	Freq.	%
Summer 2014	English I	No	Below Basic	20	13.99
			Basic	46	32.17
			Proficient	55	38.46
			Advanced	22	15.38
			Total	143	100.00
		Yes	Below Basic	--	--
			Basic	11	52.38
			Proficient	--	--
			Advanced	--	--
			Total	21	100.00
	Algebra II	No	Below Basic	28	38.89
			Basic	33	45.83
			Proficient	--	--
			Advanced	--	--
			Total	72	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Geometry	No	Below Basic	29	27.62
			Basic	35	33.33
			Proficient	32	30.48
			Advanced	--	--
			Total	105	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Government	No	Below Basic	107	13.11
			Basic	217	26.59
			Proficient	301	36.89
			Advanced	191	23.41
			Total	816	100.00
		Yes	Below Basic	--	--
			Basic	11	39.29
			Proficient	11	39.29
			Advanced	--	--
			Total	28	100.00
	Am. History	No	Below Basic	47	30.13
			Basic	54	34.62
			Proficient	39	25.00
			Advanced	16	10.26
			Total	156	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	17	100.00

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Table 9.51. Achievement-Level Distributions—Limited English Proficient, Fall 2014

Test Period	Content Area	LEP	Achievement Level	Freq.	%
Fall 2014	English II	No	Below Basic	316	13.61
			Basic	691	29.77
			Proficient	1,042	44.89
			Advanced	272	11.72
			Total	2,321	100.00
		Yes	Below Basic	23	23.23
			Basic	39	39.39
			Proficient	36	36.36
			Advanced	--	--
			Total	99	100.00
	Algebra I	No	Below Basic	1,106	22.75
			Basic	1,162	23.90
			Proficient	1,945	40.00
			Advanced	649	13.35
			Total	4,862	100.00
		Yes	Below Basic	46	35.94
			Basic	39	30.47
			Proficient	33	25.78
			Advanced	10	7.81
			Total	128	100.00
	Biology	No	Below Basic	670	21.99
			Basic	1,007	33.05
			Proficient	921	30.23
			Advanced	449	14.74
			Total	3,047	100.00
		Yes	Below Basic	54	47.79
			Basic	40	35.40
			Proficient	17	15.04
			Advanced	--	--
			Total	113	100.00

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Table 9.51 (continued). Achievement-Level Distributions—Limited English Proficient, Fall 2014

Test Period	Content Area	LEP	Achievement Level	Freq.	%
Fall 2014	English I	No	Below Basic	49	7.97
			Basic	143	23.25
			Proficient	317	51.54
			Advanced	106	17.24
			Total	615	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Algebra II	No	Below Basic	133	17.48
			Basic	132	17.35
			Proficient	254	33.38
			Advanced	242	31.80
			Total	761	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Geometry	No	Below Basic	98	13.24
			Basic	107	14.46
			Proficient	338	45.68
			Advanced	197	26.62
			Total	740	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	21	100.00
	Government	No	Below Basic	1,019	7.52
			Basic	4,567	33.69
			Proficient	5,529	40.79
			Advanced	2,440	18.00
			Total	13,555	100.00
		Yes	Below Basic	46	18.85
			Basic	121	49.59
			Proficient	60	24.59
			Advanced	17	6.97
			Total	244	100.00
	Am. History	No	Below Basic	191	29.70
			Basic	137	21.31
			Proficient	186	28.93
			Advanced	129	20.06
			Total	643	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	17	100.00

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Table 9.52. Achievement-Level Distributions—Limited English Proficient, Spring 2015

Test Period	Content Area	LEP	Achievement Level	Freq.	%
Spring 2015	English II	No	Below Basic	2,896	4.74
			Basic	12,253	20.07
			Proficient	34,492	56.50
			Advanced	11,403	18.68
			Total	61,044	100.00
		Yes	Below Basic	224	18.26
			Basic	504	41.08
			Proficient	466	37.98
			Advanced	33	2.69
			Total	1,227	100.00
	Algebra I	No	Below Basic	10,933	17.88
			Basic	11,562	18.91
			Proficient	26,822	43.86
			Advanced	11,836	19.35
			Total	61,153	100.00
		Yes	Below Basic	413	27.42
			Basic	363	24.10
			Proficient	577	38.31
			Advanced	153	10.16
			Total	1,506	100.00
	Biology	No	Below Basic	1,722	2.81
			Basic	12,644	20.64
			Proficient	30,978	50.56
			Advanced	15,921	25.99
			Total	61,265	100.00
		Yes	Below Basic	149	11.78
			Basic	557	44.03
			Proficient	471	37.23
			Advanced	88	6.96
			Total	1,265	100.00
	English I	No	Below Basic	1,053	5.99
			Basic	4,624	26.31
			Proficient	9,955	56.65
			Advanced	1,940	11.04
			Total	17,572	100.00
		Yes	Below Basic	59	18.21
			Basic	145	44.75
			Proficient	108	33.33
			Advanced	12	3.70
			Total	324	100.00

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Table 9.52 (continued). Achievement-Level Distributions—Limited English Proficient, Spring 2015

Test Period	Content Area	LEP	Achievement Level	Freq.	%
Spring 2015	Algebra II	No	Below Basic	2,975	14.39
			Basic	3,988	19.29
			Proficient	7,836	37.90
			Advanced	5,878	28.43
			Total	20,677	100.00
		Yes	Below Basic	46	22.66
			Basic	42	20.69
			Proficient	58	28.57
			Advanced	57	28.08
			Total	203	100.00
	Geometry	No	Below Basic	2,107	19.02
			Basic	2,022	18.25
			Proficient	5,113	46.16
			Advanced	1,835	16.57
			Total	11,077	100.00
		Yes	Below Basic	38	22.35
			Basic	36	21.18
			Proficient	72	42.35
			Advanced	24	14.12
			Total	170	100.00
	Government	No	Below Basic	2,974	6.65
			Basic	12,423	27.79
			Proficient	20,670	46.24
			Advanced	8,638	19.32
			Total	44,705	100.00
		Yes	Below Basic	206	21.24
			Basic	449	46.29
			Proficient	287	29.59
			Advanced	28	2.89
			Total	970	100.00
	Am. History	No	Below Basic	2,794	24.92
			Basic	2,813	25.09
			Proficient	3,388	30.22
			Advanced	2,215	19.76
			Total	11,210	100.00
		Yes	Below Basic	35	38.46
			Basic	29	31.87
			Proficient	18	19.78
			Advanced	--	--
			Total	91	100.00
	Physical Science	No	Below Basic	338	5.49
			Basic	4,139	67.20
			Proficient	1,434	23.28
			Advanced	248	4.03
			Total	6,159	100.00
		Yes	Below Basic	--	--
			Basic	33	67.35
			Proficient	--	--
			Advanced	--	--
			Total	49	100.00

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Table 9.53. Achievement-Level Distributions—Title I, Summer 2014

Test Period	Content Area	Title I	Achievement Level	Freq.	%
Summer 2014	English II	No	Below Basic	40	12.42
			Basic	144	44.72
			Proficient	117	36.34
			Advanced	21	6.52
			Total	322	100.00
		Yes	Below Basic	--	--
			Basic	14	45.16
			Proficient	13	41.94
			Advanced	--	--
			Total	31	100.00
	Algebra I	No	Below Basic	120	16.19
			Basic	311	41.97
			Proficient	216	29.15
			Advanced	94	12.69
			Total	741	100.00
		Yes	Below Basic	12	9.30
			Basic	44	34.11
			Proficient	50	38.76
			Advanced	23	17.83
			Total	129	100.00
	Biology	No	Below Basic	59	24.28
			Basic	110	45.27
			Proficient	67	27.57
			Advanced	--	--
			Total	243	100.00
		Yes	Below Basic	--	--
			Basic	39	55.71
			Proficient	24	34.29
			Advanced	--	--
			Total	70	100.00

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Table 9.53 (continued). Achievement-Level Distributions—Title I, Summer 2014

Test Period	Content Area	Title I	Achievement Level	Freq.	%
Summer 2014	English I	No	Below Basic	16	14.29
			Basic	32	28.57
			Proficient	42	37.50
			Advanced	22	19.64
			Total	112	100.00
		Yes	Below Basic	12	23.08
			Basic	25	48.08
			Proficient	15	28.85
			Advanced	--	--
			Total	52	100.00
	Algebra II	No	Below Basic	22	42.31
			Basic	25	48.08
			Proficient	--	--
			Advanced	--	--
			Total	52	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	20	100.00
	Geometry	No	Below Basic	24	36.36
			Basic	25	37.88
			Proficient	--	--
			Advanced	--	--
			Total	66	100.00
		Yes	Below Basic	--	--
			Basic	10	24.39
			Proficient	23	56.10
			Advanced	--	--
			Total	41	100.00
	Government	No	Below Basic	105	13.36
			Basic	207	26.34
			Proficient	288	36.64
			Advanced	186	23.66
			Total	786	100.00
		Yes	Below Basic	--	--
			Basic	21	36.21
			Proficient	24	41.38
			Advanced	--	--
			Total	58	100.00
	Am. History	No	Below Basic	33	25.98
			Basic	43	33.86
			Proficient	35	27.56
			Advanced	16	12.60
			Total	127	100.00
		Yes	Below Basic	23	50.00
			Basic	16	34.78
			Proficient	--	--
			Advanced	--	--
			Total	46	100.00

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Table 9.54. Achievement-Level Distributions—Title I, Fall 2014

Test Period	Content Area	Title I	Achievement Level	Freq.	%
Fall 2014	English II	No	Below Basic	277	13.07
			Basic	611	28.83
			Proficient	975	46.01
			Advanced	256	12.08
			Total	2,119	100.00
		Yes	Below Basic	62	20.60
			Basic	119	39.53
			Proficient	103	34.22
			Advanced	17	5.65
			Total	301	100.00
	Algebra I	No	Below Basic	943	21.08
			Basic	1,058	23.65
			Proficient	1,832	40.95
			Advanced	641	14.33
			Total	4,474	100.00
		Yes	Below Basic	209	40.50
			Basic	143	27.71
			Proficient	146	28.29
			Advanced	18	3.49
			Total	516	100.00
	Biology	No	Below Basic	536	19.40
			Basic	869	31.45
			Proficient	908	32.86
			Advanced	450	16.29
			Total	2,763	100.00
		Yes	Below Basic	188	47.36
			Basic	178	44.84
			Proficient	30	7.56
			Advanced	--	--
			Total	397	100.00

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Table 9.54 (continued). Achievement-Level Distributions—Title I, Fall 2014

Test Period	Content Area	Title I	Achievement Level	Freq.	%
Fall 2014	English I	No	Below Basic	53	8.83
			Basic	143	23.83
			Proficient	302	50.33
			Advanced	102	17.00
			Total	600	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	18	75.00
			Advanced	--	--
			Total	24	100.00
	Algebra II	No	Below Basic	136	17.75
			Basic	132	17.23
			Proficient	254	33.16
			Advanced	244	31.85
			Total	766	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Geometry	No	Below Basic	103	13.53
			Basic	112	14.72
			Proficient	347	45.60
			Advanced	199	26.15
			Total	761	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Government	No	Below Basic	968	7.38
			Basic	4,402	33.54
			Proficient	5,366	40.88
			Advanced	2,389	18.20
			Total	13,125	100.00
		Yes	Below Basic	97	14.39
			Basic	286	42.43
			Proficient	223	33.09
			Advanced	68	10.09
			Total	674	100.00
	Am. History	No	Below Basic	199	30.15
			Basic	141	21.36
			Proficient	191	28.94
			Advanced	129	19.55
			Total	660	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--

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Table 9.55. Achievement-Level Distributions—Title I, Spring 2015

Test Period	Content Area	Title I	Achievement Level	Freq.	%
Spring 2015	English II	No	Below Basic	2,525	4.39
			Basic	11,071	19.25
			Proficient	32,769	56.99
			Advanced	11,136	19.37
			Total	57,501	100.00
		Yes	Below Basic	595	12.47
			Basic	1,686	35.35
			Proficient	2,189	45.89
			Advanced	300	6.29
			Total	4,770	100.00
	Algebra I	No	Below Basic	9,587	16.91
			Basic	10,586	18.67
			Proficient	25,120	44.30
			Advanced	11,415	20.13
			Total	56,708	100.00
		Yes	Below Basic	1,759	29.56
			Basic	1,339	22.50
			Proficient	2,279	38.30
			Advanced	574	9.65
			Total	5,951	100.00
	Biology	No	Below Basic	1,437	2.47
			Basic	11,409	19.62
			Proficient	29,642	50.99
			Advanced	15,648	26.92
			Total	58,136	100.00
		Yes	Below Basic	434	9.88
			Basic	1,792	40.78
			Proficient	1,807	41.12
			Advanced	361	8.22
			Total	4,394	100.00
	English I	No	Below Basic	990	6.02
			Basic	4,342	26.42
			Proficient	9,289	56.51
			Advanced	1,816	11.05
			Total	16,437	100.00
		Yes	Below Basic	122	8.36
			Basic	427	29.27
			Proficient	774	53.05
			Advanced	136	9.32
			Total	1,459	100.00

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Table 9.55 (continued). Achievement-Level Distributions—Title I, Spring 2015

Test Period	Content Area	Title I	Achievement Level	Freq.	%
Spring 2015	Algebra II	No	Below Basic	2,812	13.85
			Basic	3,886	19.14
			Proficient	7,712	37.98
			Advanced	5,898	29.04
			Total	20,308	100.00
		Yes	Below Basic	209	36.54
			Basic	144	25.17
			Proficient	182	31.82
			Advanced	37	6.47
			Total	572	100.00
	Geometry	No	Below Basic	2,018	18.86
			Basic	1,961	18.33
			Proficient	4,939	46.16
			Advanced	1,782	16.65
			Total	10,700	100.00
		Yes	Below Basic	127	23.22
			Basic	97	17.73
			Proficient	246	44.97
			Advanced	77	14.08
			Total	547	100.00
	Government	No	Below Basic	2,437	5.83
			Basic	11,181	26.75
			Proficient	19,759	47.27
			Advanced	8,423	20.15
			Total	41,800	100.00
		Yes	Below Basic	743	19.17
			Basic	1,691	43.64
			Proficient	1,198	30.92
			Advanced	243	6.27
			Total	3,875	100.00
	Am. History	No	Below Basic	2,665	24.42
			Basic	2,728	25.00
			Proficient	3,320	30.43
			Advanced	2,199	20.15
			Total	10,912	100.00
		Yes	Below Basic	164	42.16
			Basic	114	29.31
			Proficient	86	22.11
			Advanced	25	6.43
			Total	389	100.00
	Physical Science	No	Below Basic	312	5.36
			Basic	3,879	66.67
			Proficient	1,382	23.75
			Advanced	245	4.21
			Total	5,818	100.00
		Yes	Below Basic	32	8.21
			Basic	293	75.13
			Proficient	60	15.38
			Advanced	--	--
			Total	390	100.00

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Table 9.56. Achievement-Level Distributions—Individualized Education Program, Summer 2014

Test Period	Content Area	IEP	Achievement Level	Freq.	%
Summer 2014	English II	No	Below Basic	39	12.26
			Basic	132	41.51
			Proficient	123	38.68
			Advanced	24	7.55
			Total	318	100.00
		Yes	Below Basic	--	--
			Basic	26	74.29
			Proficient	--	--
			Advanced	--	--
			Total	35	100.00
	Algebra I	No	Below Basic	112	14.27
			Basic	306	38.98
			Proficient	254	32.36
			Advanced	113	14.39
			Total	785	100.00
		Yes	Below Basic	20	23.53
			Basic	49	57.65
			Proficient	12	14.12
			Advanced	--	--
			Total	85	100.00
	Biology	No	Below Basic	51	18.55
			Basic	133	48.36
			Proficient	82	29.82
			Advanced	--	--
			Total	275	100.00
		Yes	Below Basic	13	34.21
			Basic	16	42.11
			Proficient	--	--
			Advanced	--	--
			Total	38	100.00

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Table 9.56 (continued). Achievement-Level Distributions—Individualized Education Program, Summer 2014

Test Period	Content Area	IEP	Achievement Level	Freq.	%
Summer 2014	English I	No	Below Basic	23	14.94
			Basic	52	33.77
			Proficient	57	37.01
			Advanced	22	14.29
			Total	154	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	10	100.00
	Algebra II	No	Below Basic	26	37.68
			Basic	32	46.38
			Proficient	--	--
			Advanced	--	--
			Total	69	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Geometry	No	Below Basic	30	28.85
			Basic	34	32.69
			Proficient	31	29.81
			Advanced	--	--
			Total	104	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Government	No	Below Basic	96	12.17
			Basic	205	25.98
			Proficient	298	37.77
			Advanced	190	24.08
			Total	789	100.00
		Yes	Below Basic	16	29.09
			Basic	23	41.82
			Proficient	14	25.45
			Advanced	--	--
			Total	55	100.00
	Am. History	No	Below Basic	50	30.49
			Basic	57	34.76
			Proficient	42	25.61
			Advanced	15	9.15
			Total	164	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--

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Table 9.57. Achievement-Level Distributions—Individualized Education Program, Fall 2014

Test Period	Content Area	IEP	Achievement Level	Freq.	%
Fall 2014	English II	No	Below Basic	230	10.98
			Basic	591	28.21
			Proficient	1,005	47.97
			Advanced	269	12.84
			Total	2,095	100.00
		Yes	Below Basic	109	33.54
			Basic	139	42.77
			Proficient	73	22.46
			Advanced	--	--
			Total	325	100.00
	Algebra I	No	Below Basic	863	19.57
			Basic	1,006	22.82
			Proficient	1,893	42.93
			Advanced	647	14.67
			Total	4,409	100.00
		Yes	Below Basic	289	49.74
			Basic	195	33.56
			Proficient	85	14.63
			Advanced	12	2.07
			Total	581	100.00
	Biology	No	Below Basic	540	19.48
			Basic	922	33.26
			Proficient	877	31.64
			Advanced	433	15.62
			Total	2,772	100.00
		Yes	Below Basic	184	47.42
			Basic	125	32.22
			Proficient	61	15.72
			Advanced	18	4.64
			Total	388	100.00

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Table 9.57 (continued). Achievement-Level Distributions—Individualized Education Program, Fall 2014

Test Period	Content Area	IEP	Achievement Level	Freq.	%
Fall 2014	English I	No	Below Basic	30	5.29
			Basic	124	21.87
			Proficient	308	54.32
			Advanced	105	18.52
			Total	567	100.00
		Yes	Below Basic	23	40.35
			Basic	21	36.84
			Proficient	12	21.05
			Advanced	--	--
			Total	57	100.00
	Algebra II	No	Below Basic	132	17.44
			Basic	132	17.44
			Proficient	252	33.29
			Advanced	241	31.84
			Total	757	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	10	100.00
	Geometry	No	Below Basic	88	12.29
			Basic	100	13.97
			Proficient	333	46.51
			Advanced	195	27.23
			Total	716	100.00
		Yes	Below Basic	15	33.33
			Basic	12	26.67
			Proficient	14	31.11
			Advanced	--	--
			Total	45	100.00
	Government	No	Below Basic	725	5.81
			Basic	4,056	32.48
			Proficient	5,305	42.48
			Advanced	2,403	19.24
			Total	12,489	100.00
		Yes	Below Basic	340	25.95
			Basic	632	48.24
			Proficient	284	21.68
			Advanced	54	4.12
			Total	1,310	100.00
	Am. History	No	Below Basic	166	27.30
			Basic	133	21.88
			Proficient	181	29.77
			Advanced	128	21.05
			Total	608	100.00
		Yes	Below Basic	33	63.46
			Basic	--	--
			Proficient	10	19.23
			Advanced	--	--
			Total	52	100.00

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Table 9.58. Achievement-Level Distributions—Individualized Education Program, Spring 2015

Test Period	Content Area	IEP	Achievement Level	Freq.	%
Spring 2015	English II	No	Below Basic	1,629	2.90
			Basic	10,108	18.02
			Proficient	33,099	59.01
			Advanced	11,250	20.06
			Total	56,086	100.00
		Yes	Below Basic	1,491	24.11
			Basic	2,649	42.83
			Proficient	1,859	30.06
			Advanced	186	3.01
			Total	6,185	100.00
	Algebra I	No	Below Basic	8,081	14.34
			Basic	10,442	18.53
			Proficient	26,072	46.26
			Advanced	11,768	20.88
			Total	56,363	100.00
		Yes	Below Basic	3,265	51.86
			Basic	1,483	23.55
			Proficient	1,327	21.08
			Advanced	221	3.51
			Total	6,296	100.00
	Biology	No	Below Basic	967	1.71
			Basic	10,178	18.03
			Proficient	29,573	52.39
			Advanced	15,730	27.87
			Total	56,448	100.00
		Yes	Below Basic	904	14.86
			Basic	3,023	49.70
			Proficient	1,876	30.85
			Advanced	279	4.59
			Total	6,082	100.00
	English I	No	Below Basic	671	4.08
			Basic	4,084	24.86
			Proficient	9,734	59.26
			Advanced	1,937	11.79
			Total	16,426	100.00
		Yes	Below Basic	441	30.00
			Basic	685	46.60
			Proficient	329	22.38
			Advanced	15	1.02
			Total	1,470	100.00

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Table 9.58 (continued). Achievement-Level Distributions—Individualized Education Program, Spring 2015

Test Period	Content Area	IEP	Achievement Level	Freq.	%
Spring 2015	Algebra II	No	Below Basic	2,878	14.04
			Basic	3,946	19.26
			Proficient	7,792	38.02
			Advanced	5,876	28.67
			Total	20,492	100.00
		Yes	Below Basic	143	36.86
			Basic	84	21.65
			Proficient	102	26.29
			Advanced	59	15.21
			Total	388	100.00
	Geometry	No	Below Basic	1,928	17.82
			Basic	1,976	18.26
			Proficient	5,076	46.91
			Advanced	1,840	17.01
			Total	10,820	100.00
		Yes	Below Basic	217	50.82
			Basic	82	19.20
			Proficient	109	25.53
			Advanced	19	4.45
			Total	427	100.00
	Government	No	Below Basic	1,941	4.72
			Basic	10,787	26.24
			Proficient	19,903	48.42
			Advanced	8,478	20.62
			Total	41,109	100.00
		Yes	Below Basic	1,239	27.14
			Basic	2,085	45.66
			Proficient	1,054	23.08
			Advanced	188	4.12
			Total	4,566	100.00
	Am. History	No	Below Basic	2,243	21.73
			Basic	2,623	25.41
			Proficient	3,280	31.78
			Advanced	2,175	21.07
			Total	10,321	100.00
		Yes	Below Basic	586	59.80
			Basic	219	22.35
			Proficient	126	12.86
			Advanced	49	5.00
			Total	980	100.00
	Physical Science	No	Below Basic	236	4.19
			Basic	3,739	66.35
			Proficient	1,413	25.08
			Advanced	247	4.38
			Total	5,635	100.00
		Yes	Below Basic	108	18.85
			Basic	433	75.57
			Proficient	29	5.06
			Advanced	--	--
			Total	573	100.00

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Table 9.59. Achievement-Level Distributions—Accommodations, Summer 2014

Test Period	Content Area	Accom.	Achievement Level	Freq.	%
Summer 2014	English II	No	Below Basic	45	12.64
			Basic	156	43.82
			Proficient	131	36.80
			Advanced	24	6.74
			Total	356	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Algebra I	No	Below Basic	128	14.92
			Basic	347	40.44
			Proficient	266	31.00
			Advanced	117	13.64
			Total	858	100.00
		Yes	Below Basic	--	--
			Basic	14	66.67
			Proficient	--	--
			Advanced	--	--
			Total	21	100.00
	Biology	No	Below Basic	66	21.15
			Basic	147	47.12
			Proficient	90	28.85
			Advanced	--	--
			Total	312	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	12	100.00

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Table 9.59 (continued). Achievement-Level Distributions—Accommodations, Summer 2014

Test Period	Content Area	Accom.	Achievement Level	Freq.	%
Summer 2014	English I	No	Below Basic	28	17.07
			Basic	57	34.76
			Proficient	57	34.76
			Advanced	22	13.41
			Total	164	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Algebra II	No	Below Basic	33	42.86
			Basic	33	42.86
			Proficient	--	--
			Advanced	--	--
			Total	77	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Geometry	No	Below Basic	31	28.97
			Basic	35	32.71
			Proficient	32	29.91
			Advanced	--	--
			Total	107	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Government	No	Below Basic	114	13.48
			Basic	226	26.71
			Proficient	313	37.00
			Advanced	193	22.81
			Total	846	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	11	100.00
	Am. History	No	Below Basic	54	31.40
			Basic	59	34.30
			Proficient	43	25.00
			Advanced	16	9.30
			Total	172	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--

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Table 9.60. Achievement-Level Distributions—Accommodations, Fall 2014

Test Period	Content Area	Accom.	Achievement Level	Freq.	%
Fall 2014	English II	No	Below Basic	306	13.20
			Basic	681	29.37
			Proficient	1,060	45.71
			Advanced	272	11.73
			Total	2,319	100.00
		Yes	Below Basic	37	32.74
			Basic	52	46.02
			Proficient	22	19.47
			Advanced	--	--
			Total	113	100.00
	Algebra I	No	Below Basic	1,086	22.22
			Basic	1,183	24.21
			Proficient	1,965	40.21
			Advanced	653	13.36
			Total	4,887	100.00
		Yes	Below Basic	123	50.62
			Basic	75	30.86
			Proficient	37	15.23
			Advanced	--	--
			Total	243	100.00
	Biology	No	Below Basic	628	21.01
			Basic	992	33.19
			Proficient	919	30.75
			Advanced	450	15.06
			Total	2,989	100.00
		Yes	Below Basic	100	55.56
			Basic	60	33.33
			Proficient	19	10.56
			Advanced	--	--
			Total	180	100.00

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Table 9.60 (continued). Achievement-Level Distributions—Accommodations, Fall 2014

Test Period	Content Area	Accom.	Achievement Level	Freq.	%
Fall 2014	English I	No	Below Basic	43	7.20
			Basic	133	22.28
			Proficient	316	52.93
			Advanced	105	17.59
			Total	597	100.00
		Yes	Below Basic	10	37.04
			Basic	12	44.44
			Proficient	--	--
			Advanced	--	--
			Total	27	100.00
	Algebra II	No	Below Basic	134	17.54
			Basic	132	17.28
			Proficient	254	33.25
			Advanced	244	31.94
			Total	764	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	--	--
	Geometry	No	Below Basic	88	12.07
			Basic	102	13.99
			Proficient	341	46.78
			Advanced	198	27.16
			Total	729	100.00
		Yes	Below Basic	16	48.48
			Basic	10	30.30
			Proficient	--	--
			Advanced	--	--
			Total	33	100.00
	Government	No	Below Basic	943	7.11
			Basic	4,405	33.20
			Proficient	5,479	41.30
			Advanced	2,440	18.39
			Total	13,267	100.00
		Yes	Below Basic	128	23.32
			Basic	290	52.82
			Proficient	112	20.40
			Advanced	19	3.46
			Total	549	100.00
	Am. History	No	Below Basic	173	27.72
			Basic	134	21.47
			Proficient	188	30.13
			Advanced	129	20.67
			Total	624	100.00
		Yes	Below Basic	26	72.22
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Total	36	100.00

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Table 9.61. Achievement-Level Distributions—Accommodations, Spring 2015

Test Period	Content Area	Accom.	Achievement Level	Freq.	%
Spring 2015	English II	No	Below Basic	2,185	3.75
			Basic	10,969	18.81
			Proficient	33,793	57.96
			Advanced	11,361	19.48
			Total	58,308	100.00
		Yes	Below Basic	941	23.55
			Basic	1,800	45.05
			Proficient	1,177	29.45
			Advanced	78	1.95
			Total	3,996	100.00
	Algebra I	No	Below Basic	9,180	15.67
			Basic	10,942	18.67
			Proficient	26,590	45.37
			Advanced	11,889	20.29
			Total	58,601	100.00
		Yes	Below Basic	2,193	53.01
			Basic	1,005	24.29
			Proficient	836	20.21
			Advanced	103	2.49
			Total	4,137	100.00
	Biology	No	Below Basic	1,282	2.19
			Basic	11,070	18.93
			Proficient	30,236	51.70
			Advanced	15,900	27.19
			Total	58,488	100.00
		Yes	Below Basic	596	14.58
			Basic	2,147	52.53
			Proficient	1,229	30.07
			Advanced	115	2.81
			Total	4,087	100.00
	English I	No	Below Basic	779	4.63
			Basic	4,253	25.30
			Proficient	9,837	58.51
			Advanced	1,943	11.56
			Total	16,812	100.00
		Yes	Below Basic	334	30.31
			Basic	521	47.28
			Proficient	238	21.60
			Advanced	--	--
			Total	1,102	100.00

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Table 9.61 (continued). Achievement-Level Distributions—Accommodations, Spring 2015

Test Period	Content Area	Accom.	Achievement Level	Freq.	%
Spring 2015	Algebra II	No	Below Basic	2,940	14.20
			Basic	3,995	19.30
			Proficient	7,847	37.90
			Advanced	5,922	28.60
			Total	20,704	100.00
		Yes	Below Basic	82	45.30
			Basic	36	19.89
			Proficient	49	27.07
			Advanced	14	7.73
			Total	181	100.00
	Geometry	No	Below Basic	2,003	18.21
			Basic	2,012	18.29
			Proficient	5,130	46.63
			Advanced	1,857	16.88
			Total	11,002	100.00
		Yes	Below Basic	144	56.69
			Basic	47	18.50
			Proficient	59	23.23
			Advanced	--	--
			Total	254	100.00
	Government	No	Below Basic	2,347	5.51
			Basic	11,429	26.82
			Proficient	20,274	47.57
			Advanced	8,566	20.10
			Total	42,616	100.00
		Yes	Below Basic	836	27.10
			Basic	1,455	47.16
			Proficient	691	22.40
			Advanced	103	3.34
			Total	3,085	100.00
	Am. History	No	Below Basic	2,412	22.70
			Basic	2,687	25.29
			Proficient	3,324	31.28
			Advanced	2,202	20.72
			Total	10,625	100.00
		Yes	Below Basic	420	61.40
			Basic	160	23.39
			Proficient	82	11.99
			Advanced	22	3.22
			Total	684	100.00
	Physical Science	No	Below Basic	273	4.69
			Basic	3,877	66.57
			Proficient	1,424	24.45
			Advanced	250	4.29
			Total	5,824	100.00
		Yes	Below Basic	71	18.30
			Basic	298	76.80
			Proficient	19	4.90
			Advanced	--	--
			Total	388	100.00

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Chapter 10: Reliability

10.1. Introduction

DESE is required by federal law to ensure that the instruments used to measure student achievement for school accountability provide reliable results. This chapter provides evidence that scores from the MO EOC Assessments measure student achievement in a reliable manner and that the size of the measurement error associated with reported test scores is reasonable, especially at the Proficient cut score.

10.2. Reliability and Measurement Error

10.2.1. Defining Reliability

Reliability refers to the consistency of student test scores. Measurement error refers to the random variability in the test scores. Both are indicators of the degree of precision in a test score. Measurement error and reliability are inversely related. When measurement error is large, reliability is small. Increasing reliability by minimizing measurement error is an important goal in the construction of any test.

Errors in measurement can result from any of a multitude of factors, including environmental factors (e.g., testing conditions) and examinee factors (e.g., fatigue, stress). Feldt and Brennan (1989) note that "Quantification of the consistency and inconsistency in examinee performance constitutes the essence of reliability analysis" (p. 105). Classical test theory (CTT) provides a means for this quantification of examinee inconsistency (i.e., measurement error). This approach builds on the notion of an ideal error-free, or true, measurement score. Any observed measurement, such as test score *X*, is defined as a composite of true score, *T*, and its associated random error component:

$$X = T + \text{error}.$$

The definitions or assumptions in CTT lead to several important properties. For example, it can be demonstrated that observed score variance equals the sum of true score variance plus error variance:

$$\sigma_x^2 = \sigma_t^2 + \sigma_e^2$$

The relationship among variance terms in the equation above is critical in defining important CTT concepts, including reliability and the standard error of measurement (SEM). For example, CTT equivalence reliability is defined as the correlation between observed scores on parallel test forms, which is also equal to the proportion of true score variance to observed score variance,

$$\rho_{x_1 x_2} = \frac{\sigma_t^2}{\sigma_x^2}$$

The CTT definition of the SEM can be derived from the above as the following:

$$\sigma_e = \sigma_x \sqrt{1 - \rho_{x_1 x_2}}$$

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10.2.2. Estimating Reliability

The reliability and SEM of a specific test cannot be estimated directly from the equations above. However, reliability can be estimated via the correlation of scores on forms assumed to be parallel (equivalence reliability), from test-retest data (stability reliability), or from a single test administration (internal consistency reliability) using any one of a variety of techniques (e.g., Brown, 1910; Cronbach, 1951; Kuder & Richardson, 1937). A standard index for describing internal consistency reliability based on a single test administration is Cronbach's coefficient alpha, which provides an estimate of reliability that is mathematically equivalent to the average of all possible split-half reliability estimates. For a test consisting of p items, in which the item scores Y_j are summed to get a total score X, coefficient alpha is as follows:

$$\alpha = \left(\frac{p}{1-p}\right)\left(1 - \frac{\sum_{j=1}^{p} \sigma_{Y_j}^2}{\sigma_X^2}\right)$$

10.2.3. Sources of Measurement Error

Errors in measurement can result from environmental factors and examinee factors. To reduce other sources of measurement error, the scoring of student responses to SR items was done electronically.

The PEs and WPs are also susceptible to scoring error due to the differences among raters and ambiguity in the scoring rubric. In order to minimize the effect of these errors, rubrics were written to balance generality and specificity and to cover the range of student responses, while at the same time allowing raters to easily identify the response characteristics distinguishing each score category. To minimize rater error, raters were thoroughly trained and monitored throughout the scoring process. Only raters who met criteria for consistent scoring during training were retained as scorers.

10.3. Evidence of Raw-Score Internal Consistency

Consistency of individual student performance was estimated using Cronbach's coefficient alpha, which is an appropriate index of internal consistency for use on untimed tests such as the MO EOC Assessments. Cronbach's alpha can be interpreted as a lower bound to reliability.

When using coefficient alpha, the SEM can be interpreted as "the square root of the average of the person-specific error variances of all examinees who participated in the reliability estimation experiment" (Traub, 1994, p. 114). SEMs were estimated by using alpha as the estimate of reliability, and the observed raw score standard deviation as the estimate of the population score standard deviation:

$$SEM = \sigma_X\sqrt{1-\alpha}$$

Separate analyses were performed for each EOC content area. Tables 10.1 – 10.25 show the SEMs based on the raw-score metric for the total population and for select student subgroups. A separate reliability coefficient, estimated through coefficient alpha, is reported for each group of students, provided at least 30 students are in the group.

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Finally, an effect size is reported within each group, provided minimal sample size requirements are met. Effect size is a measure of how much the scores of two groups of students differ from each other. It is based on score standard deviations, and is defined by the following equation, also known as Cohen's *d*:

$$d = \frac{\bar{X}_F - \bar{X}_R}{\hat{\sigma}_X}$$

where the numerator is the difference in average scores between a focal and a reference group, and the denominator is an estimate of total score standard deviation. In this case, the standard deviations across groups were pooled to generate the standard deviation estimate.

An effect size of one is equivalent to a difference of one standard deviation. An effect size of .8 is considered large; an effect size of .5 is considered medium; an effect size of .2 is considered small.

Effect size is reported whenever the reference and focal groups each have a minimum of 50 students.

Following EOC program convention, the reference groups are gender = Male, ethnicity = White, LEP status = no, IEP status = no, Migrant status = no, FRL status = no, Title 1 status = no, and Accommodations status = no.

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Table 10.1. Alpha Coefficients and Standard Errors of Measurement, English II, Summer 2014

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	362	21.90	7.15	--	0.84	2.86
Gender						
Female	141	22.56	7.04	0.15	0.83	2.91
Male	221	21.48	7.20	--	0.85	2.82
Ethnicity						
American Indian/ Alaskan Native	2	23.50	6.36	--	--	--
Asian	10	26.60	5.64	--	--	--
Pacific Islander	--	--	--	--	--	--
Black (not Hispanic)	166	20.57	6.31	-0.36	0.79	2.87
Hispanic	25	21.76	8.35	--	--	--
White (not Hispanic)	156	23.06	7.62	--	0.87	2.78
Multi-racial	3	19.67	7.77	--	--	--
LEP						
No	339	21.95	7.13	--	0.84	2.86
Yes	14	25.36	5.43	--	--	--
IEP						
No	318	22.42	7.21	--	0.84	2.85
Yes	35	19.06	5.09	--	0.68	2.89
Migrant						
No	353	22.08	7.10	--	0.84	2.86
Yes	--	--	--	--	--	--
FRL						
No	128	23.08	7.28	--	0.84	2.91
Yes	225	21.52	6.94	-0.22	0.83	2.83
Title I						
No	322	21.89	7.12	--	0.84	2.87
Yes	31	24.16	6.54	--	0.84	2.65
Accommodations						
No	356	21.97	7.18	--	0.84	2.86
Yes	6	17.83	3.19	--	--	--

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Table 10.2. Alpha Coefficients and Standard Errors of Measurement, Algebra I, Summer 2014

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	879	20.99	7.73	--	0.87	2.78
Gender						
Female	421	21.67	7.88	0.17	0.87	2.79
Male	458	20.37	7.54	--	0.87	2.77
Ethnicity						
American Indian/ Alaskan Native	2	12.50	4.95	--	--	--
Asian	10	21.90	7.88	--	--	--
Pacific Islander	3	17.00	5.57	--	--	--
Black (not Hispanic)	286	17.77	7.34	-0.74	0.86	2.78
Hispanic	43	18.07	6.71	--	0.81	2.94
White (not Hispanic)	526	23.13	7.26	--	0.86	2.75
Multi-racial	9	14.11	7.37	--	--	--
LEP						
No	845	21.12	7.76	--	0.87	2.78
Yes	25	18.56	6.21	--	--	--
IEP						
No	785	21.47	7.73	--	0.87	2.78
Yes	85	17.15	6.62	-0.57	0.82	2.79
Migrant						
No	870	21.04	7.73	--	0.87	2.78
Yes	--	--	--	--	--	--
FRL						
No	396	22.58	7.68	--	0.87	2.73
Yes	474	19.76	7.54	-0.37	0.86	2.82
Title I						
No	741	20.68	7.69	--	0.87	2.79
Yes	129	23.16	7.65	0.32	0.87	2.75
Accommodations						
No	858	21.14	7.71	--	0.87	2.79
Yes	21	15.00	6.11	--	--	--

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Table 10.3. Alpha Coefficients and Standard Errors of Measurement, Biology, Summer 2014

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	324	26.40	9.51	--	0.87	3.45
Gender						
Female	160	25.73	9.99	-0.14	0.88	3.46
Male	164	27.05	9.00	--	0.85	3.43
Ethnicity						
American Indian/ Alaskan Native	2	22.00	2.83	--	--	--
Asian	6	26.67	10.46	--	--	--
Pacific Islander	--	--	--	--	--	--
Black (not Hispanic)	133	23.29	9.17	-0.57	0.86	3.41
Hispanic	50	29.42	7.72	0.09	0.80	3.47
White (not Hispanic)	131	28.65	9.56	--	0.87	3.45
Multi-racial	2	14.00	2.83	--	--	--
LEP						
No	286	26.51	9.75	--	0.87	3.45
Yes	27	27.59	6.13	--	--	--
IEP						
No	275	27.00	9.55	--	0.87	3.44
Yes	38	23.79	8.63	--	0.83	3.51
Migrant						
No	313	26.61	9.49	--	0.87	3.46
Yes	--	--	--	--	--	--
FRL						
No	97	27.90	10.48	--	0.89	3.44
Yes	216	26.03	8.98	-0.20	0.85	3.46
Title I						
No	243	25.80	9.88	--	0.88	3.44
Yes	70	29.40	7.39	0.38	0.78	3.45
Accommodations						
No	312	26.48	9.54	--	0.87	3.44
Yes	12	24.17	8.71	--	--	--

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Table 10.4. Alpha Coefficients and Standard Errors of Measurement, English I, Summer 2014

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	164	22.68	7.84	--	0.88	2.75
Gender						
Female	77	23.29	7.24	0.15	0.85	2.79
Male	87	22.14	8.35	--	0.89	2.73
Ethnicity						
American Indian/ Alaskan Native	1	22.00	--	--	--	--
Asian	2	25.00	11.31	--	--	--
Pacific Islander	--	--	--	--	--	--
Black (not Hispanic)	31	21.13	6.56	--	0.82	2.78
Hispanic	36	18.50	6.72	--	0.82	2.87
White (not Hispanic)	90	24.99	7.95	--	0.89	2.68
Multi-racial	4	19.25	7.41	--	--	--
LEP						
No	143	23.64	7.70	--	0.87	2.73
Yes	21	16.10	5.29	--	--	--
IEP						
No	154	23.20	7.77	--	0.88	2.74
Yes	10	14.60	3.37	--	--	--
Migrant						
No	164	22.68	7.84	--	0.88	2.75
Yes	--	--	--	--	--	--
FRL						
No	63	27.54	6.32	--	0.83	2.61
Yes	101	19.64	7.16	-1.16	0.84	2.82
Title I						
No	112	24.14	8.17	--	0.89	2.69
Yes	52	19.52	6.03	-0.62	0.77	2.87
Accommodations						
No	164	22.68	7.84	--	0.88	2.75
Yes	--	--	--	--	--	--

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Table 10.5. Alpha Coefficients and Standard Errors of Measurement, Algebra II, Summer 2014

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	77	15.60	6.14	--	0.78	2.88
Gender						
Female	38	14.63	5.28	--	0.70	2.89
Male	39	16.54	6.81	--	0.82	2.87
Ethnicity						
American Indian/ Alaskan Native	--	--	--	--	--	--
Asian	--	--	--	--	--	--
Pacific Islander	--	--	--	--	--	--
Black (not Hispanic)	19	12.58	4.18	--	--	--
Hispanic	10	13.30	6.20	--	--	--
White (not Hispanic)	47	17.30	6.32	--	0.78	2.93
Multi-racial	1	16.00	--	--	--	--
LEP						
No	72	15.97	6.15	--	0.78	2.89
Yes	--	--	--	--	--	--
IEP						
No	69	16.06	6.24	--	0.78	2.89
Yes	3	14.00	3.46	--	--	--
Migrant						
No	72	15.97	6.15	--	0.78	2.89
Yes	--	--	--	--	--	--
FRL						
No	47	15.89	6.07	--	0.77	2.91
Yes	25	16.12	6.43	--	--	--
Title I						
No	52	14.90	5.66	--	0.74	2.87
Yes	20	18.75	6.63	--	--	--
Accommodations						
No	77	15.60	6.14	--	0.78	2.89
Yes	--	--	--	--	--	--

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Table 10.6. Alpha Coefficients and Standard Errors of Measurement, Geometry, Summer 2014

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	107	20.29	7.37	--	0.85	2.88
Gender						
Female	55	18.56	6.88	-0.50	0.82	2.92
Male	52	22.12	7.49	--	0.86	2.84
Ethnicity						
American Indian/ Alaskan Native	2	15.50	13.44	--	--	--
Asian	--	--	--	--	--	--
Pacific Islander	1	29.00	--	--	--	--
Black (not Hispanic)	38	15.82	5.22	--	0.70	2.87
Hispanic	11	17.45	5.66	--	--	--
White (not Hispanic)	54	23.93	6.90	--	0.83	2.83
Multi-racial	1	26.00	--	--	--	--
LEP						
No	105	20.47	7.32	--	0.84	2.89
Yes	2	11.00	2.83	--	--	--
IEP						
No	104	20.31	7.41	--	0.85	2.88
Yes	3	19.67	7.23	--	--	--
Migrant						
No	107	20.29	7.37	--	0.85	2.88
Yes	--	--	--	--	--	--
FRL						
No	54	22.67	8.28	--	0.89	2.79
Yes	53	17.87	5.39	-0.69	0.70	2.96
Title I						
No	66	19.29	7.82	--	0.87	2.85
Yes	41	21.90	6.34	--	0.79	2.89
Accommodations						
No	107	20.29	7.37	--	0.85	2.88
Yes	--	--	--	--	--	--

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Table 10.7. Alpha Coefficients and Standard Errors of Measurement, Government, Summer 2014

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	857	25.93	8.41	--	0.90	2.65
Gender						
Female	444	25.23	8.43	-0.17	0.90	2.68
Male	413	26.68	8.34	--	0.90	2.61
Ethnicity						
American Indian/ Alaskan Native	5	32.20	5.07	--	--	--
Asian	44	32.95	5.40	--	0.84	2.15
Pacific Islander	5	25.80	3.56	--	--	--
Black (not Hispanic)	155	21.18	7.75	-0.70	0.86	2.86
Hispanic	62	23.29	7.33	-0.44	0.85	2.80
White (not Hispanic)	573	26.89	8.22	--	0.90	2.60
Multi-racial	13	26.69	9.98	--	--	--
LEP						
No	816	26.15	8.41	--	0.90	2.64
Yes	28	22.39	6.85	--	--	--
IEP						
No	789	26.44	8.30	--	0.90	2.62
Yes	55	20.04	7.27	-0.78	0.84	2.93
Migrant						
No	843	26.02	8.39	--	0.90	2.64
Yes	1	28.00	--	--	--	--
FRL						
No	491	27.99	8.11	--	0.90	2.53
Yes	353	23.29	8.00	-0.58	0.88	2.80
Title I						
No	786	26.15	8.45	--	0.90	2.63
Yes	58	24.31	7.32	-0.22	0.86	2.76
Accommodations						
No	846	26.03	8.39	--	0.90	2.64
Yes	11	18.00	6.10	--	--	--

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Table 10.8. Alpha Coefficients and Standard Errors of Measurement, Am. History, Summer 2014

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	174	20.82	6.43	--	0.80	2.86
Gender						
Female	102	19.62	6.24	-0.47	0.79	2.87
Male	72	22.53	6.35	--	0.80	2.82
Ethnicity						
American Indian/ Alaskan Native	1	20.00	--	--	--	--
Asian	5	22.80	5.54	--	--	--
Pacific Islander	--	--	--	--	--	--
Black (not Hispanic)	24	17.58	5.12	--	--	--
Hispanic	38	17.74	4.88	--	0.64	2.91
White (not Hispanic)	104	22.66	6.64	--	0.82	2.80
Multi-racial	2	18.00	1.41	--	--	--
LEP						
No	156	21.13	6.47	--	0.81	2.84
Yes	17	17.76	5.41	--	--	--
IEP						
No	164	21.09	6.28	--	0.79	2.86
Yes	9	15.67	7.60	--	--	--
Migrant						
No	173	20.80	6.44	--	0.80	2.85
Yes	--	--	--	--	--	--
FRL						
No	70	23.49	6.39	--	0.81	2.77
Yes	103	18.98	5.83	-0.75	0.75	2.90
Title I						
No	127	21.87	6.62	--	0.82	2.82
Yes	46	17.85	4.86	--	0.64	2.90
Accommodations						
No	172	20.92	6.39	--	0.80	2.86
Yes	2	12.00	2.83	--	--	--

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Table 10.9. Alpha Coefficients and Standard Errors of Measurement, English II, Fall 2014

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	2,432	27.08	8.72	--	0.89	2.84
Gender						
Female	1,121	28.63	8.42	0.33	0.89	2.76
Male	1,311	25.75	8.76	--	0.89	2.90
Ethnicity						
American Indian/ Alaskan Native	15	27.47	11.70	--	--	--
Asian	55	25.64	9.97	-0.36	0.92	2.91
Pacific Islander	8	25.25	11.29	--	--	--
Black (not Hispanic)	774	24.11	8.23	-0.55	0.87	2.94
Hispanic	151	27.75	8.34	-0.11	0.88	2.84
White (not Hispanic)	1,373	28.72	8.52	--	0.89	2.76
Multi-racial	56	27.50	8.15	-0.14	0.89	2.74
LEP						
No	2,321	27.29	8.68	--	0.89	2.83
Yes	99	22.62	8.07	-0.54	0.86	3.00
IEP						
No	2,095	28.14	8.38	--	0.89	2.78
Yes	325	20.39	7.67	-0.93	0.84	3.05
Migrant						
No	2,420	27.10	8.70	--	0.89	2.84
Yes	--	--	--	--	--	--
FRL						
No	1,095	30.03	8.17	--	0.89	2.69
Yes	1,325	24.68	8.38	-0.65	0.88	2.93
Title I						
No	2,119	27.52	8.69	--	0.89	2.83
Yes	301	24.14	8.20	-0.39	0.88	2.88
Accommodations						
No	2,319	27.41	8.64	--	0.89	2.82
Yes	113	20.26	7.56	-0.83	0.84	3.06

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Table 10.10. Alpha Coefficients and Standard Errors of Measurement, Algebra I, Fall 2014

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	5,130	19.99	9.06	--	0.87	3.20
Gender						
Female	2,564	20.06	8.87	0.02	0.87	3.20
Male	2,566	19.92	9.23	--	0.88	3.20
Ethnicity						
American Indian/ Alaskan Native	31	18.55	8.78	--	0.87	3.18
Asian	116	25.05	12.02	0.42	0.93	3.10
Pacific Islander	10	21.80	9.73	--	--	--
Black (not Hispanic)	1,045	15.60	6.93	-0.65	0.80	3.08
Hispanic	252	17.95	8.13	-0.36	0.85	3.14
White (not Hispanic)	3,595	21.21	9.11	--	0.88	3.22
Multi-racial	81	21.95	8.37	0.08	0.85	3.23
LEP						
No	4,862	20.24	9.10	--	0.88	3.21
Yes	128	16.80	8.17	-0.38	0.86	3.09
IEP						
No	4,409	21.00	9.11	--	0.87	3.22
Yes	581	13.72	5.78	-0.83	0.74	2.96
Migrant						
No	4,990	20.15	9.09	--	0.88	3.21
Yes	--	--	--	--	--	--
FRL						
No	2,802	22.81	9.33	--	0.88	3.24
Yes	2,188	16.75	7.51	-0.71	0.83	3.11
Title I						
No	4,474	20.65	9.16	--	0.88	3.22
Yes	516	15.84	7.10	-0.54	0.81	3.06
Accommodations						
No	4,887	20.29	9.07	--	0.87	3.21
Yes	243	14.02	6.24	-0.70	0.77	2.98

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Table 10.11. Alpha Coefficients and Standard Errors of Measurement, Biology, Fall 2014

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	3,169	29.10	12.57	--	0.92	3.45
Gender						
Female	1,505	29.53	12.41	0.06	0.92	3.44
Male	1,664	28.71	12.71	--	0.93	3.45
Ethnicity						
American Indian/ Alaskan Native	23	25.00	12.38	--	--	--
Asian	89	35.89	13.81	0.28	0.95	3.19
Pacific Islander	11	27.55	9.10	--	--	--
Black (not Hispanic)	787	20.35	9.36	-1.08	0.87	3.41
Hispanic	189	25.51	11.17	-0.59	0.90	3.49
White (not Hispanic)	2,000	32.55	12.01	--	0.92	3.41
Multi-racial	70	31.49	10.72	-0.09	0.90	3.43
LEP						
No	3,047	29.44	12.54	--	0.92	3.45
Yes	113	20.75	10.02	-0.70	0.88	3.43
IEP						
No	2,772	30.25	12.36	--	0.92	3.44
Yes	388	21.13	11.04	-0.75	0.91	3.40
Migrant						
No	3,160	29.13	12.57	--	0.92	3.45
Yes	--	--	--	--	--	--
FRL						
No	1,608	34.67	11.87	--	0.92	3.35
Yes	1,552	23.40	10.53	-1.00	0.89	3.47
Title I						
No	2,763	30.56	12.47	--	0.92	3.43
Yes	397	19.19	7.82	-0.95	0.81	3.39
Accommodations						
No	2,989	29.74	12.47	--	0.92	3.44
Yes	180	18.54	9.08	-0.91	0.86	3.35

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Table 10.12. Alpha Coefficients and Standard Errors of Measurement, English I, Fall 2014

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	624	29.26	7.52	--	0.87	2.72
Gender						
Female	311	30.03	7.28	0.21	0.86	2.69
Male	313	28.49	7.69	--	0.87	2.75
Ethnicity						
American Indian/ Alaskan Native	3	29.00	8.66	--	--	--
Asian	10	32.30	9.56	--	--	--
Pacific Islander	3	17.33	14.64	--	--	--
Black (not Hispanic)	55	27.42	6.77	-0.26	0.84	2.71
Hispanic	32	29.31	7.39	--	0.86	2.75
White (not Hispanic)	508	29.35	7.49	--	0.87	2.72
Multi-racial	13	34.00	4.67	--	--	--
LEP						
No	615	29.38	7.40	--	0.86	2.72
Yes	9	20.89	10.89	--	--	--
IEP						
No	567	30.22	6.74	--	0.84	2.66
Yes	57	19.68	8.21	-1.53	0.86	3.03
Migrant						
No	624	29.26	7.52	--	0.87	2.72
Yes	--	--	--	--	--	--
FRL						
No	405	30.97	6.74	--	0.85	2.65
Yes	219	26.11	7.88	-0.68	0.87	2.84
Title I						
No	600	29.14	7.60	--	0.87	2.73
Yes	24	32.33	4.29	--	--	--
Accommodations						
No	597	29.67	7.23	--	0.86	2.70
Yes	27	20.19	8.25	--	--	--

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Table 10.13. Alpha Coefficients and Standard Errors of Measurement, Algebra II, Fall 2014

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	767	24.06	7.97	--	0.88	2.70
Gender						
Female	402	23.16	7.72	-0.24	0.87	2.75
Male	365	25.04	8.13	--	0.89	2.65
Ethnicity						
American Indian/ Alaskan Native	1	30.00	--	--	--	--
Asian	33	29.30	7.83	--	0.90	2.46
Pacific Islander	2	21.50	9.19	--	--	--
Black (not Hispanic)	73	18.47	6.70	-0.77	0.83	2.80
Hispanic	42	24.17	7.78	--	0.88	2.73
White (not Hispanic)	595	24.39	7.81	--	0.88	2.70
Multi-racial	21	25.48	8.00	--	--	--
LEP						
No	761	24.08	7.93	--	0.88	2.70
Yes	6	21.50	12.37	--	--	--
IEP						
No	757	24.08	7.95	--	0.88	2.71
Yes	10	22.20	9.80	--	--	--
Migrant						
No	767	24.06	7.97	--	0.88	2.70
Yes	--	--	--	--	--	--
FRL						
No	567	25.28	7.78	--	0.88	2.66
Yes	200	20.58	7.48	-0.61	0.86	2.82
Title I						
No	766	24.06	7.97	--	0.88	2.70
Yes	1	19.00	--	--	--	--
Accommodations						
No	764	24.09	7.96	--	0.88	2.70
Yes	3	14.67	4.73	--	--	--

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Table 10.14. Alpha Coefficients and Standard Errors of Measurement, Geometry, Fall 2014

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	762	24.18	7.40	--	0.87	2.67
Gender						
Female	377	23.70	7.22	-0.13	0.86	2.69
Male	385	24.65	7.56	--	0.88	2.65
Ethnicity						
American Indian/ Alaskan Native	3	27.33	10.26	--	--	--
Asian	29	28.55	7.89	--	--	--
Pacific Islander	3	15.67	5.86	--	--	--
Black (not Hispanic)	93	19.33	6.59	-0.79	0.82	2.81
Hispanic	42	21.67	6.73	--	0.83	2.76
White (not Hispanic)	568	24.93	7.22	--	0.87	2.65
Multi-racial	24	25.00	5.54	--	--	--
LEP						
No	740	24.30	7.36	--	0.87	2.67
Yes	21	20.48	7.92	--	--	--
IEP						
No	716	24.53	7.29	--	0.87	2.67
Yes	45	18.84	7.12	--	0.85	2.78
Migrant						
No	761	24.20	7.39	--	0.87	2.67
Yes	--	--	--	--	--	--
FRL						
No	560	25.09	7.02	--	0.86	2.65
Yes	201	21.70	7.83	-0.47	0.88	2.74
Title I						
No	761	24.20	7.39	--	0.87	2.67
Yes	--	--	--	--	--	--
Accommodations						
No	729	24.56	7.24	--	0.86	2.67
Yes	33	15.82	6.13	--	0.79	2.84

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Table 10.15. Alpha Coefficients and Standard Errors of Measurement, Government, Fall 2014

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	13,816	25.54	7.06	--	0.86	2.68
Gender						
Female	6,844	25.12	6.85	-0.12	0.84	2.70
Male	6,972	25.95	7.24	--	0.86	2.66
Ethnicity						
American Indian/ Alaskan Native	60	23.58	7.00	-0.41	0.85	2.73
Asian	371	29.26	6.72	0.42	0.87	2.47
Pacific Islander	33	26.55	6.65	--	0.83	2.71
Black (not Hispanic)	2,414	21.88	6.69	-0.66	0.82	2.84
Hispanic	622	24.23	7.08	-0.31	0.85	2.75
White (not Hispanic)	10,072	26.37	6.84	--	0.85	2.64
Multi-racial	244	25.51	6.89	-0.13	0.85	2.70
LEP						
No	13,555	25.63	7.03	--	0.85	2.68
Yes	244	20.86	6.74	-0.68	0.82	2.87
IEP						
No	12,489	26.15	6.80	--	0.85	2.66
Yes	1,310	19.74	6.83	-0.94	0.82	2.88
Migrant						
No	13,796	25.55	7.06	--	0.86	2.68
Yes	3	19.00	7.94	--	--	--
FRL						
No	8,444	27.41	6.55	--	0.84	2.59
Yes	5,355	22.61	6.82	-0.72	0.83	2.81
Title I						
No	13,125	25.68	7.03	--	0.86	2.68
Yes	674	22.87	7.10	-0.40	0.84	2.81
Accommodations						
No	13,267	25.78	6.98	--	0.85	2.67
Yes	549	19.64	6.53	-0.88	0.80	2.89

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Table 10.16. Alpha Coefficients and Standard Errors of Measurement, Am. History, Fall 2014

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	660	23.16	7.39	--	0.86	2.81
Gender						
Female	288	21.17	6.98	-0.49	0.83	2.87
Male	372	24.71	7.34	--	0.86	2.76
Ethnicity						
American Indian/ Alaskan Native	4	19.50	7.59	--	--	--
Asian	8	27.38	6.00	--	--	--
Pacific Islander	2	25.00	4.24	--	--	--
Black (not Hispanic)	84	19.18	7.22	-0.65	0.84	2.86
Hispanic	34	22.00	8.57	--	0.89	2.80
White (not Hispanic)	501	23.82	7.15	--	0.85	2.80
Multi-racial	27	23.93	7.41	--	--	--
LEP						
No	643	23.27	7.39	--	0.86	2.81
Yes	17	19.06	6.47	--	--	--
IEP						
No	608	23.64	7.31	--	0.85	2.80
Yes	52	17.52	5.85	-0.85	0.75	2.94
Migrant						
No	660	23.16	7.39	--	0.86	2.81
Yes	--	--	--	--	--	--
FRL						
No	407	25.07	6.80	--	0.83	2.77
Yes	253	20.10	7.29	-0.71	0.84	2.88
Title I						
No	660	23.16	7.39	--	0.86	2.81
Yes	--	--	--	--	--	--
Accommodations						
No	624	23.56	7.31	--	0.85	2.80
Yes	36	16.31	5.00	--	0.65	2.95

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Table 10.17. Alpha Coefficients and Standard Errors of Measurement, English II, Spring 2015

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	62,304	31.37	6.74	--	0.85	2.59
Gender						
Female	30,945	32.12	6.25	0.22	0.83	2.54
Male	31,359	30.64	7.12	--	0.86	2.64
Ethnicity						
American Indian/ Alaskan Native	296	30.06	7.38	-0.32	0.87	2.64
Asian	1,217	33.15	7.43	0.16	0.89	2.50
Pacific Islander	119	29.24	6.52	-0.45	0.83	2.70
Black (not Hispanic)	9,100	27.69	7.02	-0.68	0.84	2.78
Hispanic	2,860	29.92	6.70	-0.34	0.84	2.67
White (not Hispanic)	47,482	32.13	6.42	--	0.84	2.55
Multi-racial	1,230	31.51	6.46	-0.10	0.84	2.58
LEP						
No	61,044	31.49	6.68	--	0.85	2.59
Yes	1,227	25.36	6.97	-0.92	0.83	2.89
IEP						
No	56,086	32.17	6.18	--	0.83	2.55
Yes	6,185	24.13	7.25	-1.28	0.84	2.93
Migrant						
No	62,258	31.38	6.74	--	0.85	2.59
Yes	13	21.08	6.81	--	--	--
FRL						
No	35,424	33.23	5.89	--	0.82	2.48
Yes	26,847	28.92	7.00	-0.67	0.85	2.72
Title I						
No	57,501	31.70	6.60	--	0.85	2.58
Yes	4,770	27.43	7.15	-0.64	0.85	2.77
Accommodations						
No	58,308	31.88	6.43	--	0.84	2.57
Yes	3,996	23.96	6.91	-1.23	0.82	2.95

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Table 10.18. Alpha Coefficients and Standard Errors of Measurement, Algebra I, Spring 2015

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	62,738	25.59	9.20	--	0.87	3.35
Gender						
Female	31,153	25.87	8.95	0.06	0.86	3.34
Male	31,585	25.31	9.44	--	0.87	3.36
Ethnicity						
American Indian/ Alaskan Native	280	24.43	9.11	-0.22	0.87	3.35
Asian	1,256	32.34	10.08	0.65	0.90	3.24
Pacific Islander	123	24.64	8.81	-0.19	0.86	3.31
Black (not Hispanic)	9,202	21.03	7.76	-0.60	0.82	3.26
Hispanic	3,138	24.16	8.41	-0.25	0.84	3.33
White (not Hispanic)	47,460	26.41	9.16	--	0.87	3.36
Multi-racial	1,279	25.11	9.12	-0.14	0.86	3.37
LEP						
No	61,153	25.67	9.21	--	0.87	3.36
Yes	1,506	22.56	8.61	-0.34	0.86	3.24
IEP						
No	56,363	26.46	8.99	--	0.86	3.36
Yes	6,296	17.81	7.25	-0.98	0.81	3.19
Migrant						
No	62,638	25.59	9.20	--	0.87	3.35
Yes	21	21.43	7.03	--	--	--
FRL						
No	34,416	28.03	9.16	--	0.87	3.35
Yes	28,243	22.62	8.34	-0.61	0.84	3.32
Title I						
No	56,708	25.95	9.20	--	0.87	3.36
Yes	5,951	22.19	8.53	-0.41	0.85	3.29
Accommodations						
No	58,601	26.16	9.08	--	0.86	3.36
Yes	4,137	17.43	6.74	-0.98	0.78	3.17

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Table 10.19. Alpha Coefficients and Standard Errors of Measurement, Biology, Spring 2015

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	62,575	36.14	9.71	--	0.88	3.36
Gender						
Female	30,948	36.50	9.44	0.07	0.87	3.34
Male	31,627	35.78	9.95		0.89	3.36
Ethnicity						
American Indian/ Alaskan Native	277	34.38	9.42	-0.34	0.87	3.41
Asian	1,219	39.22	10.07	0.19	0.90	3.16
Pacific Islander	129	32.58	10.67	-0.53	0.90	3.46
Black (not Hispanic)	9,075	29.68	9.87	-0.84	0.87	3.54
Hispanic	2,919	33.91	9.84	-0.39	0.88	3.45
White (not Hispanic)	47,697	37.45	9.12	--	0.87	3.30
Multi-racial	1,259	35.86	9.37	-0.17	0.87	3.39
LEP						
No	61,265	36.32	9.62	--	0.88	3.35
Yes	1,265	27.89	9.95	-0.88	0.87	3.58
IEP						
No	56,448	37.24	9.04	--	0.87	3.31
Yes	6,082	25.99	9.73	-1.23	0.87	3.54
Migrant						
No	62,511	36.15	9.70	--	0.88	3.36
Yes	19	24.16	8.47	--	--	--
FRL						
No	36,129	38.94	8.59	--	0.86	3.21
Yes	26,401	32.32	9.83	-0.72	0.87	3.49
Title I						
No	58,136	36.67	9.47	--	0.88	3.34
Yes	4,394	29.19	10.10	-0.79	0.88	3.55
Accommodations						
No	58,488	36.88	9.30	--	0.87	3.32
Yes	4,087	25.49	9.08	-1.23	0.85	3.55

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Table 10.20. Alpha Coefficients and Standard Errors of Measurement, English I, Spring 2015

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	17,914	28.87	6.57	--	0.84	2.67
Gender						
Female	8,976	29.78	6.30	0.28	0.83	2.61
Male	8,938	27.95	6.71	--	0.84	2.71
Ethnicity						
American Indian/ Alaskan Native	98	27.96	6.77	-0.20	0.84	2.75
Asian	221	30.50	6.75	0.19	0.85	2.60
Pacific Islander	35	28.17	6.39	--	0.82	2.67
Black (not Hispanic)	1,463	25.52	7.10	-0.57	0.85	2.78
Hispanic	677	27.51	6.39	-0.27	0.82	2.72
White (not Hispanic)	15,124	29.25	6.43	--	0.83	2.65
Multi-racial	296	28.35	6.19	-0.14	0.80	2.75
LEP						
No	17,572	28.95	6.54	--	0.83	2.66
Yes	324	24.22	6.69	-0.72	0.82	2.86
IEP						
No	16,426	29.53	6.16	--	0.82	2.64
Yes	1,470	21.49	6.49	-1.30	0.80	2.89
Migrant						
No	17,888	28.87	6.57	--	0.84	2.67
Yes	8	22.75	8.10	--	--	--
FRL						
No	9,264	30.53	6.00	--	0.81	2.59
Yes	8,632	27.09	6.69	-0.54	0.83	2.74
Title I						
No	16,437	28.94	6.54	--	0.83	2.66
Yes	1,459	28.03	6.87	-0.14	0.85	2.70
Accommodations						
No	16,812	29.36	6.28	--	0.82	2.65
Yes	1,102	21.40	6.42	-1.27	0.80	2.90

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Table 10.21. Alpha Coefficients and Standard Errors of Measurement, Algebra II, Spring 2015

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	20,885	23.80	7.27	--	0.86	2.72
Gender						
Female	11,178	23.41	7.07	-0.11	0.85	2.73
Male	9,707	24.23	7.46	--	0.87	2.70
Ethnicity						
American Indian/ Alaskan Native	111	22.57	7.15	-0.20	0.85	2.74
Asian	692	28.82	6.81	0.68	0.87	2.48
Pacific Islander	30	24.23	6.60	--	0.82	2.77
Black (not Hispanic)	1,428	19.47	6.93	-0.64	0.83	2.82
Hispanic	752	22.42	6.89	-0.22	0.84	2.76
White (not Hispanic)	17,453	24.01	7.14	--	0.86	2.71
Multi-racial	419	24.18	7.50	0.02	0.87	2.71
LEP						
No	20,677	23.81	7.25	--	0.86	2.72
Yes	203	22.77	8.29	-0.14	0.89	2.72
IEP						
No	20,492	23.88	7.23	--	0.86	2.72
Yes	388	19.52	7.87	-0.60	0.87	2.81
Migrant						
No	20,878	23.80	7.27	--	0.86	2.72
Yes	2	22.50	3.54	--	--	--
FRL						
No	15,321	24.82	7.12	--	0.86	2.69
Yes	5,559	20.96	6.91	-0.55	0.84	2.80
Title I						
No	20,308	23.95	7.23	--	0.86	2.71
Yes	572	18.47	6.35	-0.76	0.80	2.83
Accommodations						
No	20,704	23.85	7.24	--	0.86	2.71
Yes	181	17.74	7.22	-0.84	0.84	2.89

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Table 10.22. Alpha Coefficients and Standard Errors of Measurement, Geometry, Spring 2015

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	11,256	22.13	7.03	--	0.85	2.74
Gender						
Female	5,897	21.53	6.97	-0.18	0.84	2.75
Male	5,359	22.79	7.04	--	0.85	2.71
Ethnicity						
American Indian/ Alaskan Native	56	20.84	6.31	-0.20	0.82	2.69
Asian	232	28.44	7.67	0.89	0.90	2.46
Pacific Islander	13	23.08	5.63	--	--	--
Black (not Hispanic)	706	19.32	7.03	-0.42	0.84	2.79
Hispanic	436	21.58	6.99	-0.10	0.84	2.76
White (not Hispanic)	9,676	22.24	6.91	--	0.84	2.74
Multi-racial	137	20.18	7.08	-0.30	0.85	2.75
LEP						
No	11,077	22.14	7.03	--	0.85	2.74
Yes	170	21.29	7.14	-0.12	0.85	2.76
IEP						
No	10,820	22.35	6.95	--	0.85	2.73
Yes	427	16.49	6.75	-0.84	0.83	2.79
Migrant						
No	11,246	22.13	7.03	--	0.85	2.74
Yes	1	11.00	--	--	--	--
FRL						
No	6,929	23.24	7.00	--	0.85	2.71
Yes	4,318	20.34	6.71	-0.42	0.83	2.77
Title I						
No	10,700	22.16	7.03	--	0.85	2.73
Yes	547	21.54	7.01	-0.09	0.85	2.75
Accommodations						
No	11,002	22.28	6.97	--	0.85	2.73
Yes	254	15.25	6.13	-1.01	0.79	2.81

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Table 10.23. Alpha Coefficients and Standard Errors of Measurement, Government, Spring 2015

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	45,701	25.86	6.95	--	0.86	2.63
Gender						
Female	22,564	25.67	6.71	-0.05	0.85	2.64
Male	23,137	26.04	7.18	--	0.87	2.62
Ethnicity						
American Indian/ Alaskan Native	219	25.69	6.34	-0.16	0.82	2.66
Asian	834	26.78	7.21	0.01	0.87	2.58
Pacific Islander	99	24.04	7.33	-0.41	0.87	2.67
Black (not Hispanic)	6,711	21.63	6.87	-0.76	0.83	2.79
Hispanic	1,979	24.21	6.76	-0.38	0.84	2.71
White (not Hispanic)	34,999	26.74	6.66	--	0.85	2.59
Multi-racial	860	25.91	6.71	-0.13	0.85	2.64
LEP						
No	44,705	25.98	6.92	--	0.86	2.62
Yes	970	20.40	6.42	-0.81	0.80	2.85
IEP						
No	41,109	26.57	6.60	--	0.84	2.60
Yes	4,566	19.46	6.82	-1.07	0.83	2.85
Migrant						
No	45,666	25.86	6.95	--	0.86	2.63
Yes	9	15.11	3.66	--	--	--
FRL						
No	26,300	27.78	6.27	--	0.84	2.53
Yes	19,375	23.25	6.98	-0.69	0.85	2.74
Title I						
No	41,800	26.30	6.79	--	0.85	2.61
Yes	3,875	21.12	6.93	-0.76	0.84	2.80
Accommodations						
No	42,616	26.33	6.74	--	0.85	2.61
Yes	3,085	19.29	6.55	-1.05	0.81	2.86

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Table 10.24. Alpha Coefficients and Standard Errors of Measurement, Am. History, Spring 2015

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	11,309	23.26	7.53	--	0.86	2.79
Gender						
Female	5,573	22.18	7.31	-0.29	0.85	2.83
Male	5,736	24.32	7.59	--	0.87	2.75
Ethnicity						
American Indian/ Alaskan Native	61	23.34	7.72	-0.04	0.87	2.79
Asian	120	23.64	8.38	0.00	0.89	2.74
Pacific Islander	11	24.64	8.03	--	--	--
Black (not Hispanic)	645	18.00	6.99	-0.76	0.83	2.88
Hispanic	340	21.90	7.21	-0.24	0.84	2.85
White (not Hispanic)	9,956	23.65	7.43	--	0.86	2.79
Multi-racial	176	22.89	7.64	-0.10	0.87	2.81
LEP						
No	11,210	23.30	7.53	--	0.86	2.80
Yes	91	19.80	7.55	-0.46	0.86	2.85
IEP						
No	10,321	23.87	7.29	--	0.85	2.78
Yes	980	16.97	7.10	-0.95	0.84	2.87
Migrant						
No	11,300	23.27	7.53	--	0.86	2.79
Yes	1	34.00	--	--	--	--
FRL						
No	6,425	24.97	7.22	--	0.85	2.75
Yes	4,876	21.02	7.34	-0.54	0.85	2.85
Title I						
No	10,912	23.41	7.52	--	0.86	2.79
Yes	389	19.37	6.81	-0.54	0.82	2.88
Accommodations						
No	10,625	23.70	7.38	--	0.86	2.79
Yes	684	16.52	6.62	-0.98	0.81	2.89

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Table 10.25. Alpha Coefficients and Standard Errors of Measurement, Physical Science, Spring 2015

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	6,212	20.20	6.19	--	0.77	2.97
Gender						
Female	3,012	19.60	5.90	-0.19	0.74	2.99
Male	3,200	20.77	6.41	--	0.79	2.94
Ethnicity						
American Indian/ Alaskan Native	27	17.78	4.61	--	--	--
Asian	45	21.58	7.43	--	0.85	2.92
Pacific Islander	6	16.00	5.02	--	--	--
Black (not Hispanic)	278	17.44	5.56	-0.48	0.70	3.02
Hispanic	193	18.74	5.92	-0.27	0.75	2.99
White (not Hispanic)	5,581	20.41	6.19	--	0.77	2.97
Multi-racial	82	19.45	6.12	-0.15	0.76	2.98
LEP						
No	6,159	20.22	6.19	--	0.77	2.97
Yes	49	17.61	6.22	--	0.76	3.03
IEP						
No	5,635	20.70	6.11	--	0.77	2.96
Yes	573	15.27	4.60	-0.91	0.58	2.98
Migrant						
No	6,208	20.20	6.19	--	0.77	2.97
Yes	--	--	--	--	--	--
FRL						
No	3,279	21.56	6.35	--	0.79	2.94
Yes	2,929	18.68	5.64	-0.48	0.72	3.00
Title I						
No	5,818	20.33	6.23	--	0.77	2.97
Yes	390	18.38	5.30	-0.32	0.68	2.99
Accommodations						
No	5,824	20.54	6.16	--	0.77	2.97
Yes	388	15.21	4.25	-0.88	0.51	2.98

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10.4. Conditional Standard Error Estimates for Scale Scores

The overall SEM in Tables 10.1 – 10.25 represent the standard deviations of projected replications of the testing procedure averaged over all students. In contrast, conditional standard errors of measurement (CSEMs) are conditioned on the ability of the student. Rasch-based CSEMs (CSEM (θ)) for each scale score are defined as the reciprocal of the square root of the test information function (I(θ)) at the point on the ability continuum that corresponds to each scale score (Hambleton & Swaminathan, 1985):

$$CSEM(\theta) = \frac{1}{\sqrt{I(\theta)}}.$$

CSEMs are especially useful for characterizing measurement precision in the neighborhood of score levels used for decision making, such as cut scores at various achievement levels. The CSEMs for the Proficient cut scores for the MO EOC Assessments are presented in Table 10.26. CSEMs for other scale scores are reported in Chapter 7 of this report. Note that CSEMs are smaller in the middle of the score distribution than at the extremes. This pattern is expected for CSEMs based on item response theory (IRT). The value for all CSEMs was either 6 or 7 scale-score points for English II, Algebra I, and Biology and between 7 and 9 scale-score points for English I, Algebra II, Geometry, Government, American History, and Physical Science.

Table 10.26. CSEMs at the Proficient Cut Score

Test Period	Content Area	SS Cut*	CSEM
Summer 2014	English II	200	6
	Algebra I	200	7
	Biology	200	6
	English I	200	8
	Algebra II	200	7
	Geometry	200	7
	Government	200	7
	Am. History	200	9
Fall 2014	English II	200	5
	Algebra I	200	7
	Biology	200	6
	English I	200	6
	Algebra II	200	8
	Geometry	200	7
	Government	200	7
	Am. History	200	9
Spring 2015	English II	200	6
	Algebra I	200	7
	Biology	200	6
	English I	200	6
	Algebra II	200	8
	Geometry	200	7
	Government	200	7
	Am. History	200	9
	Physical Science	200	8

*See Tables 7.7 – 7.31 in Chapter 7 for the CSEM at each scale score.

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10.5. Evidence Supporting Scorer Reliability

10.5.1. Inter-rater Reliabilities

Questar performed the scoring of the PE/WPs for the 2014–2015 MO EOC administration. Please see Chapter 7 for more information on Questar's scoring procedures. Tables 10.27, 10.28, and 10.29 depict the inter-rater reliability, including perfect and adjacent agreement for each item for Summer 2014, Fall 2014, and Spring 2015, respectively. The tables also provide the total n-count for each item and the n-count of double reads (i.e., the responses that received a second read). The agreement rates were calculated based on the double reads.

Table 10.27. Inter-rater Reliability for Summer 2014

Item	# of Score Points	N-Count	N-Count of Double Reads	Perfect Agreement Plan	Perfect Agreement Actual	Perfect + Adjacent Plan	Perfect + Adjacent Actual
Summer 2014							
Algebra I – 100076686	4	872	–	80%	100%	100%	–
English II – 100076788	4	352	–	80%	100%	100%	–
Biology 1 – 100089022	1	310	30	100%	100%	100%	100%
Biology 2 – 100089024	1	323	62	100%	100%	100%	100%
Biology 3 – 100089025	1	325	62	100%	100%	100%	100%
Biology 4 – 100089027	1	323	64	100%	100%	100%	100%
Biology 5 – 100089029	3	310	56	85%	100%	100%	100%
Biology 6 – 100089030	4	316	62	80%	100%	100%	100%
Biology 7 – 100089033	2	310	56	95%	100%	100%	100%
Biology 8 – 100089034	1	325	64	100%	100%	100%	100%
Biology 9 – 100089035	2	309	60	95%	100%	100%	100%
Biology 10 – 100089036	1	321	64	100%	100%	100%	100%
Biology 11 – 100089038	1	319	62	100%	100%	100%	100%
Biology 12 – 100089039	1	309	58	100%	100%	100%	100%
Biology 13 – 100089040	1	314	60	100%	100%	100%	100%

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Table 10.28. Inter-rater Reliability for Fall 2014

Item	# of Score Points	N-Count	N-Count of Double Reads	Perfect Agreement Plan	Perfect Agreement Actual	Perfect + Adjacent Plan	Perfect + Adjacent Actual
Fall 2014							
Algebra I – 100076683-1	2	5,071	489	95%	96%	100%	100%
Algebra I – 100076683-2	4	5,071	379	80%	91%	100%	100%
Algebra I – 100076683-3	1	5,071	419	100%	100%	100%	100%
Algebra I – 100076683-4	3	5,071	440	85%	88%	100%	100%
English I – 100085793	4	622	61	80%	72%	100%	100%
English II – 100085923	4	2,412	232	80%	78%	100%	99%
Biology 1 – 100075926	1	3,137	307	100%	100%	100%	100%
Biology 2 – 100075936	1	3,135	301	100%	100%	100%	100%
Biology 3 – 100075927	1	3,132	303	100%	100%	100%	100%
Biology 4 – 100075929	4	3,104	306	80%	87%	100%	100%
Biology 5 – 100075928	2	3,121	301	95%	96%	100%	100%
Biology 6 – 100075933	2	3,088	295	95%	95%	100%	100%
Biology 7 – 100075930	2	3,105	299	95%	96%	100%	100%
Biology 8 – 100075934	1	3,087	295	100%	100%	100%	100%
Biology 9 – 100075935	1	3,081	295	100%	100%	100%	100%
Biology 10 – 100075937	3	2,981	489	85%	89%	100%	100%
Biology 11 – 100075938	2	2,911	379	95%	98%	100%	100%

Table 10.29. Inter-rater Reliability for Spring 2015

Item	# of Score Points	N-Count	N-Count of Double Reads	Perfect Agreement Plan	Perfect Agreement Actual	Perfect + Adjacent Plan	Perfect + Adjacent Actual
Spring 2015							
Algebra I – 100076622-1	4	62,449	6158	80%	98%	100%	100%
Algebra I – 100076622-2	2	62,449	6129	95%	97%	100%	100%
Algebra I – 100076622-3	4	62,449	5974	80%	82%	100%	99%
English I – 100085793	4	17,951	1736	80%	70%	100%	100%
English II – 100085792	4	62,200	6093	80%	76%	100%	98%
Biology 1 – 100075983	1	62,433	6217	100%	94%	100%	100%
Biology 2 – 100075984	1	62,374	6208	100%	85%	100%	100%
Biology 3 – 100075985	1	62,387	6224	100%	99%	100%	99%
Biology 4 – 100075986	3	62,380	6184	85%	85%	100%	99%
Biology 5 – 100075992	2	62,169	6181	95%	80%	100%	99%
Biology 6 – 100075987	3	62,328	6183	85%	93%	100%	99%
Biology 7 – 100075989	4	62,170	6162	80%	82%	100%	97%
Biology 8 – 100075988	3	61,397	6038	85%	71%	100%	98%
Biology 9 – 100075990	1	62,280	6208	100%	100%	100%	100%
Biology 10 – 100075991	1	62,266	6210	100%	99%	100%	100%

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10.6. Reliability of Classifications

Decision consistency is the extent to which a student's achievement level can be replicated given a second, parallel form of the test. As in previous years, the reliability of student achievement-level classifications (Below Basic, Basic, Proficient, and Advanced) was evaluated using a computer program developed by Huynh (1979). This program is based on the beta-binomial model that also provides standard errors (SEs) for the consistency estimates. Classification consistency refers to the degree to which each student's achievement level can be replicated and is similar to the traditional test-retest or equivalent forms reliability. Using the maximum possible score, mean, standard deviation, and KR-21 reliability estimate, the program computes parameters (α, β) for the beta-binomial distribution. Kappa indices, which estimate the level of improvement in decision consistency beyond chance when test data are used, are then computed (Huynh, 1979). The Kappa indices are shown in Table 10.30.

Table 10.31 shows the decision consistency (Huynh, 1979) measure for each achievement level by content area. Across achievement levels and content areas, the decision consistency indices (p) are typically in the 60s. A second analysis was conducted to determine the indices if a student's achievement was labeled 'pass' for a classification of Proficient or Advanced, or 'fail' for a classification of Below Basic or Basic. As indicated in Table 10.33, the indices would then be in the 80s range. Kappa statistics shown in Table 10.32 were also higher than those in Table 10.30.

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Table 10.30. Classification Consistency Coefficients

Test Period	N-Count	#Items	Raw Cut Scores			Mean	SD	Kappa	SE (*k*)
			Basic	Proficient	Advanced				
Summer 2014									
English II	362	36	14	24	33	21.90	7.15	0.53	0.0107
Algebra I	879	36	13	23	31	20.99	7.73	0.54	0.0076
Biology	324	48	18	32	44	26.40	9.51	0.59	0.0106
English I	164	40	15	24	32	22.68	7.84	0.50	0.0193
Algebra II	77	40	14	23	32	15.60	6.14	0.45	0.0325
Geometry	107	40	16	23	32	20.29	7.37	0.47	0.0239
Government	857	40	16	25	34	25.93	8.41	0.55	0.0078
Am. History	174	40	18	24	31	20.82	6.43	0.40	0.0211
Fall 2014									
English II	2,432	38	17	27	38	27.08	8.72	0.62	0.0033
Algebra I	5,130	44	13	18	32	19.99	9.06	0.54	0.0034
Biology	3,169	46	18	32	45	29.10	12.57	0.70	0.0024
English I	624	38	18	27	37	29.26	7.52	0.58	0.0088
Algebra II	767	40	16	21	30	24.06	7.97	0.51	0.0095
Geometry	762	40	16	20	30	24.18	7.40	0.48	0.0103
Government	13,816	40	15	25	33	25.54	7.06	0.48	0.0021
Am. History	660	40	19	24	31	23.16	7.39	0.46	0.0109
Spring 2015									
English II	62,304	38	19	28	38	31.37	6.74	0.56	0.0009
Algebra I	62,738	43	17	22	35	25.59	9.20	0.56	0.0010
Biology	62,575	45	16	30	44	36.14	9.71	0.68	0.0007
English I	17,914	38	18	27	37	28.87	6.57	0.52	0.0016
Algebra II	20,885	40	16	21	29	23.80	7.27	0.46	0.0020
Geometry	11,256	40	16	20	30	22.13	7.03	0.44	0.0029
Government	45,701	40	15	24	33	25.86	6.95	0.48	0.0012
Am. History	11,309	40	18	24	31	23.26	7.53	0.47	0.0026
Physical Science	6,212	45	12	24	33	20.20	6.19	0.40	0.0035

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Table 10.31. Raw Agreement Consistency Coefficients

Test Period	N-Count	#Items	Raw Cut Scores			Mean	SD	*p*	SE (*p*)
			Basic	Proficient	Advanced				
Summer 2014									
English II	362	36	14	24	33	21.90	7.15	0.69	0.0023
Algebra I	879	36	13	23	31	20.99	7.73	0.68	0.0028
Biology	324	48	18	32	44	26.40	9.51	0.74	0.0027
English I	164	40	15	24	32	22.68	7.84	0.64	0.0085
Algebra II	77	40	14	23	32	15.60	6.14	0.67	0.0148
Geometry	107	40	16	23	32	20.29	7.37	0.63	0.0128
Government	857	40	16	25	34	25.93	8.41	0.68	0.0039
Am. History	174	40	18	24	31	20.82	6.43	0.58	0.0127
Fall 2014									
English II	2,432	38	17	27	38	27.08	8.72	0.76	0.0003
Algebra I	5,130	44	13	18	32	19.99	9.06	0.69	0.0015
Biology	3,169	46	18	32	45	29.10	12.57	0.79	0.0010
English I	624	38	18	27	37	29.26	7.52	0.73	0.0017
Algebra II	767	40	16	21	30	24.06	7.97	0.65	0.0057
Geometry	762	40	16	20	30	24.18	7.40	0.65	0.0047
Government	13,816	40	15	25	33	25.54	7.06	0.65	0.0007
Am. History	660	40	19	24	31	23.16	7.39	0.60	0.0073
Spring 2015									
English II	62,304	38	19	28	38	31.37	6.74	0.75	0.0001
Algebra I	62,738	43	17	22	35	25.59	9.20	0.70	0.0004
Biology	62,575	45	16	30	44	36.14	9.71	0.79	0.0002
English I	17,914	38	18	27	37	28.87	6.57	0.72	0.0002
Algebra II	20,885	40	16	21	29	23.80	7.27	0.62	0.0012
Geometry	11,256	40	16	20	30	22.13	7.03	0.62	0.0011
Government	45,701	40	15	24	33	25.86	6.95	0.65	0.0004
Am. History	11,309	40	18	24	31	23.26	7.53	0.60	0.0016
Physical Science	6,212	45	12	24	33	20.20	6.19	0.68	0.0007

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Table 10.32. Classification Consistency Coefficients (Two Classification Categories)

Test Period	N-Count	#Items	Raw Cut Scores Proficient/ Advanced	Mean	SD	Kappa	SE (*k*)
Summer 2014							
English II	362	36	24	21.90	7.15	0.67	0.0136
Algebra I	879	36	23	20.99	7.73	0.70	0.0079
Biology	324	48	32	26.40	9.51	0.69	0.0135
English I	164	40	24	22.68	7.84	0.67	0.0194
Algebra II	77	40	23	15.60	6.14	0.51	0.0512
Geometry	107	40	23	20.29	7.37	0.64	0.0270
Government	857	40	25	25.93	8.41	0.72	0.0075
Am. History	174	40	24	20.82	6.43	0.57	0.0258
Fall 2014							
English II	2,432	38	27	27.08	8.72	0.77	0.0039
Algebra I	5,130	44	18	19.99	9.06	0.70	0.0032
Biology	3,169	46	32	29.10	12.57	0.82	0.0025
English I	624	38	27	29.26	7.52	0.74	0.0092
Algebra II	767	40	21	24.06	7.97	0.68	0.0093
Geometry	762	40	20	24.18	7.40	0.64	0.0109
Government	13,816	40	25	25.54	7.06	0.64	0.0024
Am. History	660	40	24	23.16	7.39	0.65	0.0104
Spring 2015							
English II	62,304	38	28	31.37	6.74	0.73	0.0010
Algebra I	62,738	43	22	25.59	9.20	0.72	0.0009
Biology	62,575	45	30	36.14	9.71	0.81	0.0008
English I	17,914	38	27	28.87	6.57	0.68	0.0020
Algebra II	20,885	40	21	23.80	7.27	0.64	0.0020
Geometry	11,256	40	20	22.13	7.03	0.62	0.0028
Government	45,701	40	24	25.86	6.95	0.63	0.0014
Am. History	11,309	40	24	23.26	7.53	0.66	0.0024
Physical Science	6,212	45	24	20.20	6.19	0.51	0.0050

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Table 10.33. Raw Agreement Consistency Coefficients (Two Classification Categories)

Test Period	N-Count	#Items	Raw Cut Scores Proficient/ Advanced	Mean	SD	*p*	SE (*p*)
Summer 2014							
English II	362	36	24	21.90	7.15	0.83	0.0066
Algebra I	879	36	23	20.99	7.73	0.85	0.0039
Biology	324	48	32	26.40	9.51	0.87	0.0055
English I	164	40	24	22.68	7.84	0.84	0.0096
Algebra II	77	40	23	15.60	6.14	0.88	0.0153
Geometry	107	40	23	20.29	7.37	0.83	0.0125
Government	857	40	25	25.93	8.41	0.86	0.0036
Am. History	174	40	24	20.82	6.43	0.80	0.0113
Fall 2014							
English II	2,432	38	27	27.08	8.72	0.89	0.0019
Algebra I	5,130	44	18	19.99	9.06	0.86	0.0015
Biology	3,169	46	32	29.10	12.57	0.91	0.0013
English I	624	38	27	29.26	7.52	0.89	0.0037
Algebra II	767	40	21	24.06	7.97	0.86	0.0039
Geometry	762	40	20	24.18	7.40	0.86	0.0040
Government	13,816	40	25	25.54	7.06	0.83	0.0011
Am. History	660	40	24	23.16	7.39	0.83	0.0052
Spring 2015							
English II	62,304	38	28	31.37	6.74	0.90	0.0004
Algebra I	62,738	43	22	25.59	9.20	0.88	0.0004
Biology	62,575	45	30	36.14	9.71	0.93	0.0002
English I	17,914	38	27	28.87	6.57	0.86	0.0009
Algebra II	20,885	40	21	23.80	7.27	0.84	0.0008
Geometry	11,256	40	20	22.13	7.03	0.82	0.0013
Government	45,701	40	24	25.86	6.95	0.83	0.0006
Am. History	11,309	40	24	23.26	7.53	0.83	0.0012
Physical Science	6,212	45	24	20.20	6.19	0.79	0.0020

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Chapter 11: Validity

11.1. Introduction

Validity is the most fundamental consideration in educational and psychological testing. It refers to "the degree to which evidence and theory support the interpretations of test scores for proposed uses of tests" (AERA, APA, & NCME, 2014, p. 11). Validity evidence for the MO EOC Assessments is gathered and demonstrated from content, criterion, and construct. Since test forms used in the 2013–2014 testing year were intact forms previously administered, relevant information documented in previous technical reports is included in this chapter to provide historical information and assist with understanding validity evidence for the MO EOC Assessments.

According to the Standards (AERA, APA, & NCME, 1999), "Ultimately, the validity of an intended interpretation of test scores relies on all the available evidence relevant to the technical quality of a testing program. This includes evidence of careful test construction; adequate score reliability; appropriate test administration and scoring; accurate score scaling, equating, and standard setting; and careful attention to fairness for all examinees" (p. 17). While this chapter summarizes evidence that supports claims about the validity of the MO EOC Assessment scores, many other parts of this technical report also provide appropriate evidence for validity. Some of this evidence is cross-referenced below. The procedural and empirical evidence available, along with the rationale presented below, provides support for the standards-based interpretations of the MO EOC Assessments.

This chapter begins with a brief review of important federal statutes related to the MO EOC Assessments and explains the purposes and intended uses of test scores, suggesting the value implications of these assessments for schools, teachers, students, and parents. Validity evidence related to test content is presented in terms of the adequacy and appropriateness of the MO EOC Assessments for measuring progress on the Missouri content standards. Then, validity evidence based on the internal structure of the MO EOC Assessments is provided through a correlational analysis of MO EOC Assessment content clusters. References to specific standards are provided where appropriate.

11.2. Federal Authority for School Accountability

The U.S. Department of Education bases accountability on a school's achievement of annual measurable objectives (AMOs) in Reading/Language Arts and Mathematics. AMO determinations refer to the target percent proficient for each school and district during the course of one year. For Missouri schools and school districts, AMOs are set in terms of the percentage of all students, and all student groups of sufficient size, scoring Proficient or above on the required assessments including the English II and Algebra I MO EOC Assessments.

11.3. Purpose and Intended Uses of Test Scores

The Standards state that "Validation logically begins with an explicit statement of the proposed interpretation of the test scores, along with a rationale for the relevance of the interpretation to

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the proposed use" (AERA, APA, and NCME 1999).[22] The MO EOC Assessments were developed for the following purposes and uses:

- Measuring and reflecting students' mastery toward post-secondary readiness
- Identifying students' strengths and weaknesses
- Communicating expectations for all students
- Serving as the basis for state and national accountability plans
- Evaluating programs

The valid interpretation and appropriate use of MO EOC Assessment scores are supported in a variety of ways, including the training and consultation provided by personnel of DESE and publications such as the Test Administration Manual, Guide to Interpreting Results, and this technical report. The training and documentation provided to test users help them better administer, understand, and use test score results.

11.4. MO EOC Assessment Scores

The MO EOC Assessment scores are scaled in several ways: raw-score points, item response theory (IRT) derived scale scores, and achievement level (based on scale score cuts). Missouri actively promotes the use of achievement-level results, reporting them annually on each assessment at the student, school, district, and state levels. Individual student and average scale scores are also used, but they play a secondary role and are generally interpreted with reference to their distance from achievement-level cut points. Test results are reported for students as a whole as well as by student group, including gender, ethnicity, migrant status, free and reduced lunch (FRL) status, English language proficiency, Title I, Individualized Education Program (IEP) status, and accommodations used during testing. Scores are reported to schools and districts in annually published reports (see Chapter 9 of this report for more information).

The MO EOC Assessment score indicates that an individual student performs at the Below Basic, Basic, Proficient, or Advanced level in a given content area. Achievement-level descriptors (ALDs) provide details about the content expectations that students at each level meet or exceed. No stakes for teachers are attached to student-level scores by the state. Teachers are encouraged to consider student performance on the MO EOC Assessments in determining course grades. DESE recommends that EOC scores account for at least 10 percent but not more than 25 percent of a student's grade in a course with a corresponding MO EOC Assessment. Districts generally receive students' scores on the MO EOC Assessments within five business days after test administration, and DESE provides districts with "curved percentages" to assist teachers in appropriately considering EOC scores in determining course grades (http://dese.mo.gov/sites/default/files/asmt-eoc-curved-percentages-2012.pdf). Teachers are counseled to interpret individual student scores only in the context of other assessment results and their own experience.

[22] **Standard 1.2:** The test developer should set forth clearly how test scores are intended to be interpreted and used. The population(s) for which a test is appropriate should be clearly delimited, and the construct that the test is intended to assess should be clearly described (p. 17).

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11.5. Content-Related Evidence of Validity

Baker and Linn (2002) suggest that "Two questions are central in the evaluation of content aspects of validity. Is the definition of the content domain to be assessed adequate and appropriate? Does the test provide an adequate representation of the content domain the test is intended to measure?" (p. 6). The following sections help answer these two questions and address Standard 1.6[23], which specifically relates to the definition and development of test content.

11.5.1. Appropriateness of Content Definition

In 1993, the Missouri legislature passed the Outstanding Schools Act (Senate Bill 380), requiring the State Board of Education to adopt challenging academic performance standards that define the skills and competencies necessary for students to successfully advance through the public school system, prepare for post-secondary education and the workplace, and participate as citizens in a democratic society. The Missouri State Board of Education formally adopted the academic standards known as the Show-Me Standards in January 1996.

In addition to mandating the development of rigorous academic standards, the Outstanding Schools Act of 1993 required the development and implementation of a comprehensive, primarily performance-based assessment program to measure student proficiency in the knowledge, skills, and competencies identified in the standards. Upon adoption of the standards in 1996, Missouri began developing the Missouri Assessment Program (MAP).

In January 2007, the Missouri State Board of Education approved a plan to replace the MAP for high school students, beginning in August of the 2008–2009 school year, with MO EOC Assessments in English II, Algebra I, and Biology. The remaining MO EOC Assessments (English I, Algebra II, Geometry, Government, and American History) were added the following year. The intent was to provide MO EOC Assessments that are an integral part of the statewide assessment system and, as such, are a logical extension of MAP Grade-Level Assessments.

11.5.2. Adequacy of Content Representation

Adequacy of the content representation of the MO EOC Assessments is critically important because the tests must provide an indication of student progress toward achieving the knowledge and skills identified in the Missouri Course-Level Expectations (CLEs), and they must fulfill the requirements of NCLB.

Adequate representation of the content domains defined in the CLEs is assured through the use of a test blueprint and a carefully documented test construction process. CLEs and the Show-Me Standards are taken into consideration in the writing of SR items. Each assessment must align with and proportionally represent the subdomains of the test blueprint. Following development of all MO EOC Assessments, DESE contracted for external studies to support the alignment of the assessments to the Show-Me Standards and CLEs. Results of those studies are available for review at http://dese.mo.gov/college-career-readiness/assessment/assessment-technical-support-materials. Evidence to support the content validity of the MO EOC Assessments was provided in

[23] **Standard 1.6:** When the validation rests in part on the appropriateness of test content, the procedures followed in specifying and generating test content should be described and justified in reference to the construct the test is intended to measure or the domain it is intended to represent. If the definition of the content sampled incorporates criteria such as importance, frequency, or criticality, these criteria should also be clearly explained and justified (p. 18).

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Chapter 2 through the documentation of the test specifications and blueprints, item-writing processes, and item-review processes.

Additional evidence to support the content validity of the MO EOC Assessments was provided in Chapter 2 and also in Chapter 4. Chapter 2 outlined the target strand and CLE point distributions on the English II, Algebra I, Biology, English I, Algebra II, Geometry, Government, and American History operational forms.

11.6. Validity Evidence Based on the Internal Structure of the MO EOC Assessments

Standard 1.11[24] pertains to the relationships between the parts of the test. Because the MO EOC Assessments measure student performance in several content areas, it is important to study the pattern of relationships among the content domains and clusters. One way to study patterns of relationships to provide evidence supporting the inferences made from test scores is the multitrait-multimethod matrix. Tables 11.1 – 11.10 summarize Pearson correlation coefficients among test domains and clusters for English II, Algebra I, Biology, Algebra II, Geometry, Government, and Physical Science. Because both English I and American History have only one content cluster, correlation coefficients were not calculated for these MO EOC Assessments. The correlations between clusters within each assessment are in the moderate to moderately high range, suggesting strong relationships between the clusters. Note that the high correlations between cluster scores and total assessment scores are inflated due to the overlap of items.

Table 11.1. Pearson Correlation Coefficients Between Domains and Clusters for English II

		Reading	Writing
Summer 2014	English II	0.97	0.75
	Reading	1.00	0.57
	Writing		1.00
Fall 2014	English II	0.98	0.79
	Reading	1.00	0.65
	Writing		1.00
Spring 2015	English II	0.98	0.60
	Reading	1.00	0.47
	Writing		1.00

Table 11.2. Pearson Correlation Coefficients Between Domains and Clusters for Algebra I—Summer 2014

		Number and Operations	Algebraic Relationships	Data and Probability
Summer 2014	Algebra I	0.83	0.96	0.77
	Number and Operations	1.00	0.70	0.56
	Algebraic Relationships		1.00	0.64
	Data and Probability			1.00

[24] **Standard 1.11:** If the rationale for a test use or interpretation depends on premises about the relationships among parts of the test, evidence concerning the internal structure of the test should be provided (p. 20).

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Table 11.3. Pearson Correlation Coefficients Between Domains and Clusters for Algebra I—Fall 2014 and Spring 2015

		Number and Quantity	Algebra	Functions	Statistics and Probability
Fall 2014	Algebra I	0.56	0.95	0.87	0.72
	Number and Quantity	1.00	0.49	0.40	0.32
	Algebra		1.00	0.72	0.60
	Functions			1.00	0.58
	Statistics and Probability				1.00
Spring 2015	Algebra I	0.60	0.93	0.91	0.64
	Number and Quantity	1.00	0.49	0.48	0.34
	Algebra		1.00	0.73	0.48
	Functions			1.00	0.53
	Statistics and Probability				1.00

Table 11.4. Pearson Correlation Coefficients Between Domains and Clusters for Biology

		Characteristics and Interactions	Changes in Ecosystems	Scientific Inquiry[25]
Summer 2014	Biology	0.89	0.83	0.87
	Characteristics and Interactions	1.00	0.68	0.63
	Changes in Ecosystems		1.00	0.57
Fall 2014	Biology			1.00
	Characteristics and Interactions	0.93	0.86	0.93
	Changes in Ecosystems	1.00	0.75	0.76
	Scientific Inquiry		1.00	0.71
Spring 2015	Biology			1.00
	Characteristics and Interactions	0.89	0.84	0.89
	Changes in Ecosystems	1.00	0.66	0.64
	Scientific Inquiry		1.00	0.65

Table 11.5. Pearson Correlation Coefficients Between Domains and Clusters for Algebra II—Summer 2014

		Algebraic Relationships	Data and Probability	Numbers and Operations
Summer 2014	Algebra II	0.73	0.91	0.75
	Algebraic Relationships	1.00	0.54	0.43
	Data and Probability		1.00	0.49
	Numbers and Operations			1.00

[25] Scientific Inquiry was measured by PEs, which were not included in the Summer 2012 operational test forms.

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Table 11.6. Pearson Correlation Coefficients Between Domains and Clusters for Algebra II—Fall 2014 and Spring 2015

		Algebra	Functions
Fall 2014	Algebra I	0.90	0.96
	Algebra	1.00	0.75
	Functions		1.00
Spring 2015	Algebra I	0.90	0.95
	Algebra	1.00	0.71
	Functions		1.00

Table 11.7. Pearson Correlation Coefficients Between Domains and Clusters for Geometry—Summer 2014

		Algebraic Relationships	Geometric and Spatial Relationships	Measurement
Summer 2014	Geometry	0.79	0.95	0.82
	Algebraic Relationships	1.00	0.66	0.53
	Geometric and Spatial Relationships		1.00	0.67
	Measurement			1.00

Table 11.8. Pearson Correlation Coefficients Between Domains and Clusters for Geometry—Fall 2014 and Spring 2015

		Geometry	Statistics and Probability
Fall 2014	Geometry	0.98	0.80
	Geometry (Strand)	1.00	0.68
	Statistics and Probability		1.00
Spring 2015	Geometry	0.98	0.79
	Geometry (Strand)	1.00	0.66
	Statistics and Probability		1.00

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Table 11.9. Pearson Correlation Coefficients Between Domains and Clusters for Government

		Principles and processes of governance systems	Principles in constitutional democracy
Summer 2014	Government	0.96	0.96
	Principles and processes of governance systems	1.00	0.83
	Principles in constitutional democracy		1.00
Fall 2014	Government	0.94	0.93
	Principles and processes of governance systems	1.00	0.75
	Principles in constitutional democracy		1.00
Spring 2015	Government	0.94	0.93
	Principles and processes of governance systems	1.00	0.75
	Principles in constitutional democracy		1.00

Table 11.10. Pearson Correlation Coefficients Between Domains and Clusters for Physical Science

		Properties and Principles of Matter and Energy	Properties and Principles of Force and Motion
Spring 2015	Physical Science	0.81	0.95
	Properties and Principles of Matter and Energy	1.00	0.58
	Properties and Principles of Force and Motion		1.00

11.7. Discriminant Validity Evidence for the MO EOC Assessments

The Standards state the following regarding convergent and divergent validity: "Relationships between test scores and other measures intended to assess similar constructs provide convergent evidence, whereas relationships between test scores and measures purportedly of different constructs provide discriminant evidence" (AERA, APA, & NCME, 1999, p. 14). The MO EOC assessments were designed to measure different constructs as shown by both the standards they assess and the content coverage detailed in the test blueprints. To gather validity evidence for the MO EOC assessments, DESE commissioned a full convergent and divergent study. The results showed that, in general, the MO EOC Assessments are appropriately related to each other and measure their own content areas, regardless of when the tests are administered. The report was approved by the United Stated Department of Education during the peer review process. For the full report on this study, see Appendix B in the *2011–2012 MO EOC Technical Report* at http://dese.mo.gov/college-career-readiness/assessment/assessment-technical-support-materials.

The data presented in Table 11.11 show evidence of divergent validity for the content areas with both SRs and PE/WPs, using scale scores. The data sets used for the analysis were drawn from the Spring 2015 operational test administration. The students in the data sets were merged using Missouri's unique student identification number. Any student who took at least two of the three operational tests was included in the correlations. Table 11.11 shows the Pearson correlation coefficients between scale scores for the Spring 2015 administration, as well as the n-count for each correlation.

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The results shown in Table 11.11 contain evidence of divergent validity. Evidence of divergent validity is supported by the lower correlations between content areas that measure dissimilar constructs. For example, the correlation between English II and Algebra I (0.56) is in a range typical of achievement constructs that are positively related primarily by virtue of their relation to general school achievement.

For English II and Biology, challenging language and reading on both tests could account for the higher correlation value (0.74). This correlation value is still lower than the tests measuring a similar construct and is in the range of the correlations among high school MAP content area tests (the precursor to the MO EOC Assessments) as reported in the Missouri Assessment Program Technical Report, 2008 (Missouri Department of Elementary and Secondary Education, 2008).

Table 11.11. Pearson Correlation Among Assessments with PEs, Spring 2015

	English II	Algebra I	Biology	English I
English II	1.00	0.56	0.74	0.79
Algebra I		1.00	0.68	0.53
Biology			1.00	0.71
English I				1.00

The data presented in Table 11.12 show evidence of divergent validity for the content areas with only SR items, using scale scores. The data sets used for the analysis were drawn from the Spring 2015 operational test administration. The student records in the data sets were merged using Missouri's unique student identification number. Any student who took at least two of the five operational tests was included in the correlations. Table 11.12 shows the Pearson correlation coefficients between scale scores, as well as the n-count for each correlation.

Table 11.12. Pearson Correlation Coefficients Among Assessments with only SRs, Spring 2015

	Algebra I	Geometry	Government	Am. History	Physical Science
Algebra II	1.00	0.73	0.54	0.47	0.65
Geometry		1.00	0.51	0.50	0.64
Government			1.00	0.81	0.67
Am. History				1.00	0.64
Physical Science					1.00

The results shown in Table 11.12 contain evidence of divergent validity. Evidence of divergent validity is supported by the lower correlations between content areas that measure dissimilar constructs as compared to content areas that assess similar constructs. For example, the correlations between the similar constructs of Algebra II and Geometry (0.73), and Government

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and American History (0.81) are higher than the correlations between the dissimilar constructs of Algebra II and American History (0.47).

Table 11.13 provides more evidence of discriminant validity with correlations between content areas with PE/WPs and content areas with only SR items content areas. Evidence of discriminant validity emerges when comparing correlations between the similar contents of Algebra I and Geometry (0.71), Algebra I and Algebra II (0.74), and Biology and Physical Science (0.73), as well as the dissimilar contents of English II and Algebra II (0.46) and English II and Geometry (0.49).

Table 11.13. Pearson Correlation Among All Assessments

	Algebra II	Geometry	Government	Am. History	Physical Science
English II	0.46	0.49	0.74	0.68	0.56
Algebra I	0.74	0.71	0.59	0.49	0.55
Biology	0.59	0.62	0.76	0.68	0.73
English I	0.42	0.47	0.74	0.64	0.60

11.8. Additional Validity Evidence for the MO EOC Assessments

Validity evidence related to other standards is described below.

Standard 1.5[26] relates to the characteristics of the sample of examinees from which validity evidence is inferred. The sample of examinees from which the validity evidence for the MO EOC Assessments was obtained is described in detail in Chapter 10 of this report, which includes tables with descriptive statistics for raw score, scale score, and achievement-level distributions. Statistics include n-counts, means, standard deviations, minimum and maximum values, for a variety of student groups.

Standard 1.7[27] relates to human judgment at various points in the test development and reporting process. For the MO EOC Assessments, human judgment was especially prevalent during the standard setting process. Chapter 3 contains summary information about the standard setting procedures used for the MO EOC Assessments. From Spring 2008 through Spring 2010 and again in 2014–2015, PE/WPs were handscored. Chapter 6 contains detailed information about the processes involved with Questar's handscoring of the 2014–2015 PE/WPs, including scorer selection and training.

[26] **Standard 1.5:** The composition of any sample of examinees from which validity evidence is obtained should be described in as much detail as is practical, including major relevant sociodemographic and developmental characteristics (p. 18).

[27] **Standard 1.7:** When a validation rests in part on the opinions or decisions of expert judges, observers, or raters, procedures for selecting such experts and for eliciting judgments or ratings should be fully described. The qualifications, and experience, of the judges should be presented. The description of procedures should include any training and instructions provided, should indicate whether participants reached their decisions independently, and should report the level of agreement reached. If participants interacted with one another or exchanged information, the procedures through which they may have influenced one another should be set forth (p. 19).

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Standard 1.13[28] relates to the conditions under which the data used to support validity claims were collected. Chapter 5 contains information about how data were gathered in both the online and accommodated administrations, including the testing environment, materials distribution and security, Test Examiner training, student preparation, and allowable accommodations.

11.9. Summary

Validity is not an all-or-nothing property of a test; rather, validity evidence must be documented for a specific purpose and in the context of how the test scores will be interpreted and used. Much of the information contained in this technical report is documentation of the validity of the MO EOC Assessments for their stated purpose. This chapter provides a summary of the evidence presented elsewhere in the technical report and provides some additional types of validity evidence relevant to the content and internal structure of the assessments.

The overall technical quality of the MO EOC Assessments, as demonstrated by technical information and statistics, was sound. The Spring 2008 and Spring 2009 standalone field tests, the Spring 2009 embedded field test, and the Spring 2010 embedded field test produced pools of technically sound items, with more than a 90% retention rate after psychometric and content criteria were applied. From those pools, forms that were psychometrically similar were assembled, and that similarity helped support the pre-equating model that is in place. Application of item response theory (IRT) pre-equating resulted in congruent raw score to scale score conversions between the Summer, Fall, and Spring forms at the achievement level cuts.

Post-administration test analyses supported the technical quality of the MO EOC Assessments. Evaluations of IRT model assumptions supported the use of the Rasch model for all tests. Test reliabilities ranged from 0.77 to 0.92 across the content areas and administrations for the 2014–2015 test forms. Conditional standard errors of measurement (CSEMs) were between 6 and 9 scale score points at the cut scores. The item analyses also showed that the MO EOC Assessments have sound psychometric properties. The p-value ranges were sufficiently broad, indicating that the items do measure achievement across a broad range of difficulty. Most of the items had discrimination values > .15, and 32 items had a value < .10. Speededness was not a factor in students' test performance. Item bias analyses conducted on the pools further indicated that items were functioning equivalently for different gender and ethnic groups.

[28] **Standard 1.13:** When validity evidence includes statistical analyses of test results, either alone or together with data on other variables, the conditions under which the data were collected should be described in enough detail that users can judge the relevance of the statistical findings to local conditions.

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References

American Educational Research Association (AERA), American Psychological Association (APA), & National Council on Measurement in Education (NCME). (1999). *Standards for educational and psychological testing*. Washington, D.C.: AERA.

Baker, E. L., & Linn, R. L. (2002). *Validity issues for accountability systems*. Technical report 585. Los Angeles: Center for the Study of Evaluation.

Bond, T. G., & Fox, C. M. (2007). *Applying the Rasch model: Fundamental measurement in the human sciences* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum Associates, Inc.

Brown, W. (1910). Some experimental results in the correlation of mental abilities. *British Journal of Psychology, 3(3)*, 296–322.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika, 16(3)*, 297–334.

Dorans, N. J., & Holland, P. W. (1992). D*IF detection and description: Mantel-Haenszel and standardization* (ETS Research Report No. RR-92-10).

Feldt, L. S., & Brennan, R. L. (1989). Reliability. In R. L. Linn (Ed.), *Educational measurement* (3rd ed., pp. 105–146). New York: Macmillan.

Hambleton, R. K., & Swaminathan, H. (1985). *Item response theory: Principles and applications*. Boston: Kluwer-Nijhoff Publishing.

Huynh, H. (1979). Statistical inference for two reliability indices in mastery testing based on the beta-binomial model. *Journal of Educational Statistics, 4(3)*, 231–246.

Kolen, M. J., & Brennan, R. L. (2004). *Test equating, scaling, and linking: Methods and practices* (2nd ed.). New York: Springer-Verlag.

Kuder, G. F., & Richardson, M. W. (1937). The theory of the estimation of test reliability. *Psychometrika, 2(3)*, 151–160.

Linacre, J. M. (2006a). *A user's guide to WINSTEPS Rasch-model computer programs*. Chicago: Winsteps.

Linacre, J. M. (2006b). WINSTEPS® (Version 3.64) [Computer Software].

Mantel, N., & Haenszel, W. (1959). Statistical aspects of the analysis of data from retrospective studies of disease. *Journal of National Cancer Institute, 22*, 719–748.

Masters, G. N. (1982). A Rasch model for partial credit scoring. *Psychometrika, 47(2)*, 149–174.

Rasch, G. (1960). *Probabilistic models for some intelligence and attainment tests*. Copenhagen: Danish Institute for Educational Research.

Thompson, S. J., Johnstone, C. J., & Thurlow, M. L. (2002). *Universal design applied to large scale assessments* (Synthesis Report 44). Minneapolis: University of Minnesota, National Center on Educational Outcomes. Retrieved December 21, 2009, from http://education.umn.edu/NCEO/OnlinePubs/Synthesis44.html

Traub, R. E. (1994). *Reliability for the social sciences*. London: Sage Publications, Inc.

Wright, B. D., & Stone, M. H. (1979). *Best test design*. Chicago: MESA Press.

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OFFICE OF COLLEGE AND CAREER READINESS

End-of-Course Assessments Training for Test Examiners

Fall 2014-Spring 2015

Updated January 2015

Missouri Department of Elementary and Secondary Education

End-of-Course Examiner Training

Audio Problems?

2

If you are not able to hear audio, please do the following:

- Check to see if your speakers are on, plugged in, and the volume is turned up (not muted)
- If you still can't hear the audio, please contact your District or School Information Technology Coordinator (DITC or SITC) for help

End-of-Course Examiner Training

Non-Discrimination

3

- The Department of Elementary and Secondary Education does not discriminate on the basis of race, color, religion, gender, national origin, age, or disability in its programs and activities. Inquiries related to Department programs and to the location of services, activities, and facilities that are accessible by persons with disabilities may be directed to the Jefferson State Office Building, Office of the General Counsel, Coordinator – Civil Rights Compliance (Title VI/Title IX/504/ADA/Age Act), 6th Floor, 205 Jefferson Street, P.O. Box 480, Jefferson City, MO 65102-0480; telephone number 573-526-4757 or TTY 800-735-2966; email civilrights@dese.mo.gov.

End-of-Course Examiner Training

Who Receives Training?

4

Two-part Test Examiner training is available for End-of-Course (EOC) Assessments

- The first is presented by DESE
- The second is presented by Questar

Test Examiners must view training

- Test Examiners include general classroom teachers, special education teachers, translators, proctors, and other district personnel helping with test administration
- District or School Test Coordinator is the 'go-to' person for questions

End-of-Course Examiner Training

Resources

5

Recorded Training and Resources are provided

- This pre-recorded training, accompanying print-ready PowerPoint slides and other training resources are available on the DESE website at: http://dese.mo.gov/communications/webinar/webinar-recorded
- The Questar training is located in iTester under the Help tab

End-of-Course Examiner Training

Overview – What hasn't changed

6

- Online administration unless paper/pencil, Braille, or Large Print accommodation specified in student's IEP
- Administration, scoring, and reporting provided by EOC vendor, Questar
- Students can test on a desktop, laptop, iPad or Android tablet, or Chromebook device
- Three testing windows available
- Students should test when they have completed the associated course content

End-of-Course Examiner Training

Overview – What new in Fall 2014-Spring 2015

7

- Suite of available EOC Assessments includes:
  - Algebra I*
  - Algebra II
  - Geometry
  - English I
  - English II*
  - Biology*
  - Physical Science
  - American History
  - U.S. Government*

  * Required for accountability

End-of-Course Examiner Training

Overview – What's new in Fall 2014-Spring 2015 (cont.)

8

- Updated English language arts and Mathematics assessments
  - English I, English II, Algebra I, Algebra II, and Geometry EOC assessments aligned to Missouri Learning Standards
  - Missouri Learning Standards: http://dese.mo.gov/college-career-readiness/curriculum/missouri-learning-standards
  - 2014-2015 EOC Blueprints: http://dese.mo.gov/college-career-readiness/assessment/end-course
  - New English I/II Writing Prompt Rubrics: http://dese.mo.gov/college-career-readiness/curriculum/english-language-arts/resources
  - New Algebra I PE Rubrics

End-of-Course Examiner Training

Overview – What's new in Fall 2014-Spring 2015 (cont.)

9

- Online Pre-Tests
  - Full online forms of all EOCs available through Questar's iTester system
  - Accessible any time
  - 24-hour turnaround for selected response items (raw scores only)
  - Local scoring of performance events and writing prompts
  - TAM Supplement, a training webinar, PDFs of test forms, and scoring materials for PEs posted in iTester

End-of-Course Examiner Training

Overview – What's new in Fall 2014-Spring 2015 (cont.)

10

- New Accommodations Procedures
  - Universal Tools, Designated Supports, and Accommodations
  - Updated codes: http://dese.mo.gov/college-career-readiness/assessment/end-course
- Things to note:
  - With the exception of ELA reading passages, all items may be read to a student by a trained reader. Read aloud of ELA reading passages requires an IEP or 504 plan
  - There are no accommodations that result in a LOSS

End-of-Course Examiner Training

Overview – What's new in Fall 2014-Spring 2015 (cont.)

11

- Braille/Large Print and Paper/Pencil Test Administration Procedures
  - All transcription completed locally
  - See Appendices D-F of the Test Administration Manual for specific procedures related to transcribing

End-of-Course Examiner Training

The Test Administration Manual (TAM)

12

- Step-by-Step Instructions for:
  - Preparing for testing
  - Handling special circumstances
  - Accessing and working within iTester
  - Administering assessments online
  - Administering accommodated test forms (Braille/Large Print, Paper Pencil Editions)
  - Accessing and reviewing test results
- Available on the DESE webpage at http://dese.mo.gov/college-career-readiness/assessment/end-course and in iTester under the Help tab

End-of-Course Examiner Training

Preparing for Testing

13

- Identify students for testing
  - Students should test when they complete appropriate course content
  - All students (including, but not limited to Missouri Option students, homebound students, and students in out-of-district placement) must complete required EOC assessments
  - Questions about exceptions? DTC should contact Accountability Data – 573-526-4886

End-of-Course Examiner Training

Preparing for Testing – Scheduling

14

- District content windows
  - 7-business day content window for the district
  - Content windows may overlap, but all testing must be completed within the statewide testing window
  - After the 7-business day content window ends, iTester **LOCKS** and students may no longer log into iTester in that content area
  - Questar will reopen a window only on a limited basis

End-of-Course Examiner Training

Preparing for Testing – Scheduling

15

Content	Time Suggestions
English II	Session I: 90 – 110 min / Session II: 90 – 110 min
Algebra I	Session I: 90 – 110 min / Session II: 60 - 70 min
Biology	Session I: 55 – 60 min / Session II: 65 - 70 min
English I	Session I: 90 – 110 min / Session II: 90 – 110 min
Algebra II	90 – 110 min
Geometry	90 – 110 min
American History	60 – 80 min
Government	60 – 80 min
Physical Science	60 – 80 min

End-of-Course Examiner Training

Preparing for Testing – iTester System

16

- Two components
  - iTester Admin
  - iTester Student
- Test Examiner logins
  - Test Examiners can review students' support and accommodation codes and check testing status

End-of-Course Examiner Training

Preparing for Testing – Tutorials

17

- Tutorials are available in iTester Student for students to practice using the tools within the system.
- Login information in the TAM

End-of-Course Examiner Training

Preparing for Testing – Testing Location

18

In the testing facility, if in doubt, cover or move materials

- Cover or remove materials that are related to processes or content
- Remove or cover anything that could not easily be defended during a Quality Assurance visit

End-of-Course Examiner Training

Test Administration - Test Security

19

Everyone **MUST** follow security procedures

- Examiners and proctors **MUST NOT** read, copy, score, or review test books, except for transcribing purposes
- Translators **MUST NOT** discuss test items or answers with anyone at any time
- Student testing materials must be stored **OUTSIDE** of the classroom in a secure locked location before and after testing
- Computer labs must be prepared with test security as a top concern when using the online platform
- Students must not be allowed access to cell phones or other electronic devices during testing
  - If cell phones or other electronic devices are allowed into the testing room, they must be collected and stored in a central location until testing is completed

End-of-Course Examiner Training

Test Administration – iTester Student

20

Students test in iTester Student

- Tests download to a student's workstation
- In the event of a lost connection, do NOT turn off the student's device
- Directions for walking students through the iTester Student login process are located in the TAM
- Test Examiners can track students' testing status in iTester Admin

End-of-Course Examiner Training

Test Administration – Status Codes

21

Only two status codes are found in iTester

- Absent: Use the absent status code for a student who will *never* take the assessment prior to graduation
- Teacher Invalidation: This code is *only* used when a student is caught cheating

End-of-Course Examiner Training

Test Administration – Designated Supports & Accommodations

22

- All Designated Supports and Accommodations must be marked in iTester Admin under the Test Sessions tab
  - Exception – Braille and Large Print must be marked on the Student Demographics page
- All **Accommodations** must be documented in the student's IEP or 504 plan

End-of-Course Examiner Training

Test Administration - Paper/Pencil Edition

23

In order to take a Paper/Pencil edition, students must meet one of these criteria:

- The student has an IEP stating that a computer may not be used for testing. Mark accommodation code A102.
- The student is testing out-of-district
- The student is a homebound student who cannot test at school
- Immediately return the Paper/Pencil assessment to the STC/DTC for shipment to Questar

End-of-Course Examiner Training

Test Administration - Paper/Pencil Edition (cont.)

24

- Each Paper/Pencil edition test book has a unique security code on every page
- The Examiner is accountable for a 100% return to the STC of every page of each hard copy test
- Talk to the School Test Coordinator about any contaminated testing materials

End-of-Course Examiner Training

Test Administration – Braille/Large Print Administration

25

- DTCs order Braille/Large Print assessments from Questar
- Test Examiners will receive a kit for Braille and Large Print test administration
- Accommodation code A012 for Braille or A021 for Large Print marked in iTester
- Test Examiner will transcribe student responses into iTester Student
- Return all testing materials to the DTC or STC
- Consult DTC/STC regarding contaminated testing materials

End-of-Course Examiner Training

Test Administration – Permitted Tools

26

- Some Universal Tools and the Mathematics Reference Sheet are provided in iTester
- Hard copies of the Mathematics Reference Sheet may be printed from the iTester **Help** tab
- Calculators that meet the guidelines
- The English I and English II performance events allow for scratch paper, English dictionary, and/or a thesaurus
- Unlabeled grid or graph paper for the mathematics assessments

End-of-Course Examiner Training

Test Administration - Calculator Policy

27

During testing, calculators:

- Are not needed or required, and are not provided, endorsed, or recommended by DESE
- Cannot have Internet connectivity or connect to anyone inside or outside of the classroom during testing
- Cannot contain stored equations or functions at the time of testing
- Can only be used where specified in the TAM

End-of-Course Examiner Training

Test Administration - Disruption During Testing

28

A student may need to move during testing because of disruption or illness

- Procedures are in the TAM
- The student must be escorted and not allowed to converse with other students

End-of-Course Examiner Training

Test Results

29

Test results are available online via iTester Admin

- Students' scores are available 5 business days after the end of the district 7-day content window
  - For assessments that have been updated, or are new (English I, English II, Algebra I, Geometry and Algebra II, and Physical Science), only raw scores will be reported 5 business days after the content window closes. Updated reports with scale scores and achievement levels will be posted following the Spring adminstration
- Test Examiners can view and print scores for their students from the Reports tab in iTester

End-of-Course Examiner Training

Thank You!

30

- Questions? Please contact your DTC.
- 2014-2015 LEA Guide to the Missouri Assessment Program http://dese.mo.gov/college-career-readiness/assessment
- (Resources Tab)

Thank you for attending training!

OFFICE OF COLLEGE AND CAREER READINESS

End-of-Course Assessments Training for District and School Test Coordinators

Fall 2014/Spring 2015

Updated January 2015

Missouri Department of Elementary and Secondary Education

End-of-Course DTC/STC Training

Audio Problems?

2

If you are not able to hear audio, please do the following:

- Check to see if your speakers are on, plugged in, and the volume is turned up (not muted)
- If you still can't hear the audio, please contact your District or School Information Technology Coordinator (DITC or SITC) for help

End-of-Course DTC/STC Training

Non-Discrimination

3

- The Department of Elementary and Secondary Education does not discriminate on the basis of race, color, religion, gender, national origin, age, or disability in its programs and activities. Inquiries related to Department programs and to the location of services, activities, and facilities that are accessible by persons with disabilities may be directed to the Jefferson State Office Building, Office of the General Counsel, Coordinator – Civil Rights Compliance (Title VI/Title IX/504/ADA/Age Act), 6th Floor, 205 Jefferson Street, P.O. Box 480, Jefferson City, MO 65102-0480; telephone number 573-526-4757 or TTY 800-735-2966; email civilrights@dese.mo.gov.

End-of-Course DTC/STC Training

Who Receives Training?

4

- District Test Coordinators
- School Test Coordinators
- Test Examiners, including general classroom teachers, special education teachers, translators, proctors, and other district personnel helping with test administration will view a separate training
- District and School Technology Coordinators

End-of-Course DTC/STC Training

Resources

5

Recorded Training and Resources are provided

- This pre-recorded training, accompanying print-ready PowerPoint slides and other training resources are available on the DESE website at: http://dese.mo.gov/communications/webinar/webinar-recorded
- The Questar training is located in iTester under the Help tab.

End-of-Course DTC/STC Training

Overview – What hasn't changed

6

- Online administration unless paper/pencil, Braille, or Large Print accommodation specified in student's IEP
- Administration, scoring, and reporting provided by EOC vendor, Questar
- Requires secure browser download for all students (available at http://moeoc.questarai.com/Admin/)
- Students can test on a desktop, laptop, iPad or Android tablet, or Chromebook device
- Three testing windows available
- Students should test when they have completed the associated course content

End-of-Course DTC/STC Training

Overview – What's new in Fall 2014-Spring 2015

7

- Suite of available EOC Assessments includes:
  - Algebra I
  - Algebra II
  - Geometry
  - English I
  - English II
  - Biology
  - Physical Science
  - American History
  - U.S. Government

End-of-Course DTC/STC Training

Overview – What's new in Fall 2014-Spring 2015 (cont.)

8

- Accountability
  - Algebra I, English II, Biology, and U.S. Government required for high school accountability purposes
  - Algebra II required for accelerated students completing Algebra I EOC prior to high school
- Questions about accountability?
  - Missouri School Improvement Program – 573-751-4426 or MSIP@dese.mo.gov

End-of-Course DTC/STC Training

Overview – What's new in Fall 2014-Spring 2015 (cont.)

9

- Non-Required EOC Assessments
  - Districts may purchase EOC assessments that are not required for accountability purposes for local use.
  - Testing windows and report turnaround are the same for all EOCs, whether being administered for accountability purposes or for local use.
  - Districts will enroll students in all EOCs, whether being administered for accountability purposes or for local use, through the precode process.
  - Questar will invoice districts for all EOCs administered for local use.

End-of-Course DTC/STC Training

Overview – What's new in Fall 2014-Spring 2015 (cont.)

10

- Assessment Cost for Districts

EOCs Required for Accountability Purposes	
Algebra I	$1.80
English II	$1.80
Biology	$1.80
U.S. Government	Free
EOCs Not Required for Accountability Purposes	
English I	$3.84
Algebra II, Geometry, American History, Physical Science	$1.88

  - Cost of a Paper/Pencil Edition not required by a student's IEP is $15
  - Cost of an accommodated test form (paper/pencil PDF, Braille, or Large Print) for assessments not required for accountability purposes is $15 per student

End-of-Course DTC/STC Training

Overview – What's new in Fall 2014-Spring 2015 (cont.)

11

- Updated English language arts and Mathematics assessments
  - English I, English II, Algebra I, Algebra II, and Geometry EOC assessments aligned to Missouri Learning Standards
  - Missouri Learning Standards: http://dese.mo.gov/college-career-readiness/curriculum/missouri-learning-standards
  - 2014-2015 EOC Blueprints: http://dese.mo.gov/college-career-readiness/assessment/end-course
  - New English I/II Writing Prompt Rubrics: http://dese.mo.gov/college-career-readiness/curriculum/english-language-arts/resources
  - New Algebra I PE Rubric

End-of-Course DTC/STC Training

Overview – What's new in Fall 2014-Spring 2015 (cont.)

12

- Online Pre-Tests
  - Full online forms of all EOCs available through Questar's iTester system
  - No charge to districts
  - Accessible any time
  - 24-hour score turnaround for selected response items (raw scores only)
  - Local scoring of performance events and writing prompts
  - TAM Supplement with information about accessing and administering pre-tests, a brief training webinar, PDFs of all test forms, and scoring materials for PEs and WPs are posted in iTester

End-of-Course DTC/STC Training

Overview – What's new in Fall 2014-Spring 2015 (cont.)

13

- New Accommodations Procedures
  - Universal Tools, Designated Supports, and Accommodations
  - Updated codes: http://dese.mo.gov/college-career-readiness/assessment/end-course
- Things to note:
  - With the exception of ELA reading passages, all items may be read to a student by a trained reader as a designated support. Read aloud of ELA reading passages requires an IEP or 504 plan
  - There are no accommodations that result in a LOSS

End-of-Course DTC/STC Training

Overview – What's new in Fall 2014-Spring 2015 (cont.)

14

- Braille/Large Print and Paper Pencil Test Administration Procedures
  - All transcription completed locally
  - See Appendices D-F of the TAM for specific procedures related to transcribing

End-of-Course DTC/STC Training

The Test Administration Manual (TAM)

15

- Step-by-Step Instructions for:
  - Preparing for testing
  - Handling special circumstances
  - Enrolling students
  - Accessing and working within iTester
  - Administering assessments online
  - Administering accommodated test forms (Braille/Large Print, Paper/Pencil Editions)
  - Accessing and distributing test results
- Available on the DESE webpage at http://dese.mo.gov/college-career-readiness/assessment/end-course and in iTester under the Help tab

End-of-Course DTC/STC Training

Preparing for Testing

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- Inform parents/guardians
- Identify students for testing
  - Students should test when they complete appropriate course content
  - All students (including, but not limited to Missouri Option students, homebound students, and students in out-of-district placement) must complete required EOC assessments
  - Exceptions – Accountability Data – 573-526-4886
  - EOC History Report (http://mcds.dese.mo.gov/Pages/default.aspx)

End-of-Course DTC/STC Training

Preparing for Testing -- Scheduling

17

- Schedule tests
  - 7-business day content window for the district
  - Content windows may overlap, but all testing must be completed within the statewide testing window
  - After the 7-business day content window ends, iTester **LOCKS** and students may no longer log into iTester in that content area
  - Questar will reopen a window only on a limited basis

End-of-Course DTC/STC Training

Preparing for Testing -- Scheduling

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Content	Time Suggestions
English II	Session I: 90 – 110 min / Session II: 90 – 110 min
Algebra I	Session I: 90 – 110 min / Session II: 60 - 70 min
Biology	Session I: 55 – 60 min / Session II: 65 - 70 min
English I	Session I: 90 – 110 min / Session II: 90 – 110 min
Algebra II	90 – 110 min
Geometry	90 – 110 min
American History	60 – 80 min
Government	60 – 80 min
Physical Science	60 – 80 min

End-of-Course DTC/STC Training

Preparing for Testing – Enroll students

19

- Enroll students to test using the precode process

Testing Window	Precode File Due to DESE	Students can begin testing
October 6, 2014-January 23, 2015 (Fall)	September 19, 2014	October 6, 2014
	November 7, 2014	November 24, 2014
February 23, 2014-May 22, 2015 (Spring)	January 30, 2015	February 23, 2015
	March 6, 2015	March 23, 2015
	April 3, 2015	April 27, 2015

- Students who are enrolled in pretests through iTester must still be precoded for the operational assessments

End-of-Course DTC/STC Training

Preparing for Testing – iTester System

20

- iTester Admin and iTester Student
- iTester supports Windows, MAC, and Linux operating systems, as well as iPad and Android tablet devices and Chromebooks
- All devices must have current iTester Student client

End-of-Course DTC/STC Training

Preparing for Testing – Tutorials

21

- Tutorials are available in iTester Student for students to practice using the tools within the system.
- Login information in the TAM

End-of-Course DTC/STC Training

Test Administration – iTester Admin

22

- Questar provides DTCs with login information
- iTester Admin generates Test Examiner login information
  - A Text Examiner's name remains in iTester until the end of the statewide window
  - Test Examiners reload into iTester with each statewide window according to the precode file
  - DTCs and STCs can resend or reset Test Examiners' passwords
  - DTCs may contact Questar to request removal of an inactive Test Examiner

End-of-Course DTC/STC Training

Test Administration – Status Codes

23

Only two status codes are found in iTester

- Absent: Use the absent status code for a student who will *never* take the assessment prior to graduation
- Teacher Invalidation: This code is *only* used when a student is caught cheating
  - See specific instructions in the TAM regarding DESE notification in the event of Teacher Invalidation

End-of-Course DTC/STC Training

Test Administration – Designated Supports and Accommodations

24

- All Designated Supports and Accommodations must be marked in iTester Admin under the Test Sessions tab
  - Exception – Braille and Large Print must be marked on the Student Demographics page
- All **Accommodations** must be documented in the student's IEP or 504 plan

End-of-Course DTC/STC Training

Test Administration -- Braille/Large Print Editions

25

Order Large Print and Braille through Questar's Missouri Customer Service

- (800) 571-2545
- MOCustomerSupport@QuestarAI.com

Administer Braille and Large Print assessments according to instructions in the TAM

- Check – A012 for Braille and A021 for Large Print
- Students' responses to Braille and Large Print assessments must be transcribed into iTester at the district
- Return Braille and Large Print testing materials to Questar

End-of-Course DTC/STC Training

Test Administration -- Paper/Pencil Edition

26

In order to take Paper/Pencil editions, students must meet one of these criteria:

- The student has an IEP stating that a computer may not be used for testing (mark accommodation code A102)
- The student is testing out-of-district
- The student is a homebound student who cannot test at school

A Paper/Pencil edition is downloadable as a PDF

- Download a test for each qualifying student
- Each test has a unique security barcode located on every page

End-of-Course DTC/STC Training

Test Administration -- Paper/Pencil Edition (Cont.)

27

- Transcribe all Paper/Pencil editions immediately after test administration and ship all Paper/Pencil editions to Questar within 24 hours of the end of the district's content window using Questar provided shipping labels

End-of-Course DTC/STC Training

Test Administration – Test Book Accountability Form

28

- Report all Braille, Large Print, and Paper/Pencil assessments to Questar using the Test Book Accountability Form
- The DTC Test Book Accountability Form is available at http://dese.mo.gov/college-career-readiness/assessment/end-course/general-resources
- See the TAM for instructions for handling contaminated test books

End-of-Course DTC/STC Training

Test Administration – Test Security

29

- Test security is of the utmost importance
- Remember, districts are required to have a local test security policy in place
- Students should not have access to cell phones or other electronic devices in the testing room
  - If cell phones or other electronic devices are allowed in the testing room, they **must** be collected and stored in a central location
- In the computer lab, ensure adequate distance between student work spaces
- Ensure that tablets are properly prepared
- Ensure that Braille/Large Print and Paper/Pencil edition testing materials are kept secure

End-of-Course DTC/STC Training

Test Administration – iTester Student

30

Students test in iTester Student

- Tests download to a student's workstation
- In the event of a lost connection, do NOT turn off the student's device
- Contact Questar Missouri Customer Service

End-of-Course DTC/STC Training

Test Administration – Permitted Tools

31

What tools can be used during testing?

- Some Universal Tools and the Mathematics Reference Sheet are provided in iTester
- Hard copies of the Mathematics Reference Sheet may be printed from the iTester **Help** tab
- Calculators that meet the guidelines
- The English I and English II performance events allow for scratch paper, English dictionary, and/or a thesaurus
- Unlabeled grid or graph paper for the mathematics assessments

End-of-Course DTC/STC Training

Test Administration -- Calculator Policy

32

During testing, calculators:

- Are not needed or required, and are not provided, endorsed, or recommended by DESE
- Cannot have Internet connectivity or connect to anyone inside or outside of the classroom during testing
- Cannot <u>contain</u> stored equations or functions at the time of testing
- Can only be used where specified in the TAM

End-of-Course DTC/STC Training

Test Administration -- Disruptions During Testing

33

A student may need to move during testing because of disruption or illness

- Procedures are in the TAM
- The student must be escorted and not allowed to converse with other students

End-of-Course DTC/STC Training

Following Testing – EOC Score Reports

34

District will receive raw scores and official Individual Student Results Reports (ISRs)

- 5 business days after the district's content window closes, the DTC will be able to:
  - Download a list of all students' raw scores
  - Download and print the Individual Student Results
- Student Score Labels after all testing is complete
- 15 days to notify parents/guardians that scores are available

End-of-Course DTC/STC Training

Following Testing -- Guide To Interpreting Results

35

Review the Guide to Interpreting Results (GIR)

- The GIR is on the DESE website
- Use reports available through the Missouri Comprehensive Data System (MCDS) Portal
- For questions about score results, reports, and appeals, please contact Accountability Data at 573-526-4886

End-of-Course DTC/STC Training

Contact Information and Resources

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Who should the district contact with questions?

- **First** – Questar's Missouri Customer Service:
  - (800) 571-2545
  - MOCustomerSupport@QuestarAI.com
- **Second** – DESE Assessment:
  - (573) 751-3545
  - assessment@dese.mo.gov

2014-2015 LEA Guide to the Missouri Assessment Program
http://dese.mo.gov/college-career-readiness/assessment (under the Resources Tab)

End-of-Course DTC/STC Training

Thank you

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Thank you for attending this training

- Good luck with 2014-2015 End-of-Course Assessments

Accommodations For Students With Disabilities

- The following is a list of accommodations for the End-of-Course assessments.
- The accommodation must appear in an IEP/504 plan to be allowed.
- ELL students include those receiving services (RCV) or not receiving services (NRC). ELL students do not include those students in monitored status (MY1 or MY2).

Accommodation	Format	Description	Code
Abacus	Any	Students may have access to an abacus.	A391
Alternate Response Options	Any	Students may respond to items using an alternate option, including but not limited to: Adapted Keyboards, StickyKeys, MouseKeys, FilterKeys, Adapted Mouse, Touch Screen, Head Wand, Switches.	A441
American Sign Language (ASL) (For math, science, social studies items and ELA listening items)	Any	Students may have math, science, social studies items and ELA listening items translated into ASL.	A052
Braille	Paper	Students with visual impairments may access the assessment via a Braille version. Tactile overlays and graphics tools may be used to assist the student in accessing the content.	A012
Large Print	Paper	Students with visual impairments may access the assessment via a Large Print version.	A021
Multiplication Table	Any	Students taking End-of-Course assessments may have access to a single digit multiplication table.	A395
Paper Based Assessment	Paper	Students may have access to a paper based version of the assessment.	A102
Read-Aloud (ELA reading passages)	Online - Not Embedded	Students may use assistive technology text-to-speech software to allow ELA reading passages to be read aloud.	A044
	Any	Students may have English language arts reading passages to be read aloud to them by a trained reader.	A045
	Any	ELL students may have English language arts reading passages to be read aloud to them in their native language by a trained translator.	A112
Read-Aloud (ELA reading passages)	Paper	Blind students in any grade who do not yet have adequate Braille skills may have ELA reading passages read aloud.	A046
Scribe (For ELA writing)	Any	Students may dictate their responses to a trained scribe, who must follow the administration guidelines.	A351

Accommodation	Format	Description	Code
Specialized Calculator (For Calculator Allowed Items Only)	Any	Students may have access, on items where calculator use is allowed, to a specialized calculator, including talking calculators or Braille calculators, when appropriate.	A396
Speech-To-Text	Online - Not Embedded	The system allows students to use voice recognition software so the student may use their voice to dictate responses or give commands.	A352

2015 Standard Setting Report for the Physical Science Missouri End-of-Course (MO EOC) Assessment

Presented by
Questar Assessment, Inc.

April 2015

5550 Upper 147th Street West
Apple Valley, MN 55124
(952) 997-2700
www.questarAI.com

1. Introduction

1.1. Overview of the Document

This document presents the results of the two-day standard setting meeting conducted by Questar Assessment, Inc. (Questar) for the Physical Science Missouri End-of-Course (MO EOC) Assessment. During the workshop, one panel of Missouri educators and professionals recommended cut scores using the Angoff method. The standard setting was necessary because Physical Science was administered for the first time in Fall 2014.

The standard setting workshop was conducted in Columbia, Missouri, from Feb. 17–18, 2015. Achievement level descriptors (ALDs) for Physical Science were also reviewed and updated.

1.2. Overview of the MO EOC Assessments

There are currently nine MO EOC Assessments: English I, English II, Algebra I, Algebra II, Geometry, Biology, Physical Science, Government, and American History. The MO EOC Assessments were first administered in 2008–2009 for English II, Algebra I, and Biology and in 2009–2010 for English I, Algebra II, Geometry, Government, and American History. The Physical Science Assessment was administered for the first time in Fall 2014.

Prior to 2014–2015, all MO EOC Assessments were required. However, beginning in Fall 2014, five MO EOC Assessments are required (English II, Algebra I, Algebra II[1], Biology, and Government) and four MO EOC Assessments are optional (English I, Geometry, Physical Science, and American History).

The MO EOC Assessments are aligned to the Missouri Learning Standards, which include English Language Arts and Mathematics (English I, English II, Algebra I, Algebra II, and Geometry). Course-level expectations (CLEs) provide clear objectives for each course, or content area. Each MO EOC Assessment is tailored to a specific content area and is administered when a student has completed the content defined for that course. Districts can offer EOC course content in any grade and in a variety of configurations. Although many districts offer EOC course content within a course bearing the same name, EOC course content can also be embedded within a course or across several courses.

English I, English II, Algebra I, and Biology contain both selected-response (SR) items and performance events/writing prompts (PE/WPs), whereas Algebra II, Geometry, Government, American History, and Physical Science contain only SR items. These assessments are administered in approximately one testing period and are not strictly timed. They are administered online with Paper/Pencil, Braille, or Large Print forms available for students requiring accommodations.

2. Achievement Level Descriptors (ALDs)

The MO EOC Assessments use the same achievement level labels used for the grade-level Missouri Assessment Program (MAP): Below Basic, Basic, Proficient, and Advanced. For each

[1] For students who complete the Algebra I EOC Assessment prior to high school, Algebra II is the required high school Mathematics assessment for accountability purposes. (http://dese.mo.gov/college-career-readiness/assessment/end-course)

of these levels, the ALDs describe the specific knowledge and skills that a student at that level must be able to demonstrate.

Questar's Assessment Design and Psychometrics team worked with Missouri's Department of Elementary and Secondary Education (DESE) to create draft ALDs for Physical Science prior to the standard setting (see Appendix A for these draft ALDs). During the workshop, the draft ALDs were used as guidelines for evaluating student performance and were beneficial to the panelists as they defined the borderline students and established recommended cut scores. Panelists also discussed and fine-tuned the draft ALDs during the meeting. At the conclusion of the standard setting, DESE collected the panelist recommendations for ALD revisions for consideration in the final wording of the Physical Science ALDs (see Appendix B for the final ALDs).

3. Overview of the 2015 Standard Setting

A standard setting workshop was conducted from Feb. 17–18, 2015, to establish recommended cut scores for Physical Science using the Angoff method. The Physical Science Assessment was administered for the first time in Fall 2014, so cut scores needed to be established for the new assessment. The recommended cut scores from the standard setting panelists would then be used by DESE and the Missouri State Board of Education to finalize the cut scores.

The modified Angoff method was used for the initial standard settings for the MO EOC Assessments in 2008 and 2009. However, during the MO EOC Technical Advisory Committee (TAC) meeting on Dec. 5, 2014, it was determined that the traditional Angoff method should be used for the Physical Science standard setting because only two students took the Physical Science Assessment in Fall 2014.

Both the Angoff and the modified Angoff methods are well recognized and heavily researched for establishing student performance standards for assessments, and both methods typically require three rounds of panelist judgments. The main difference between Angoff and modified Angoff is that impact data is typically provided after Round 1 and Round 2 in the modified Angoff procedure, whereas it is not included in the traditional Angoff procedure.

Impact data shows the percentages of students statewide whose performance would likely be labeled the various achievement levels (e.g., Below Basic, Basic, Proficient, and Advanced) based on the group recommended cut scores. Although no impact data for Physical Science was available during standard setting, the impact data based on the Biology Assessment was provided as a reference. The facilitator cautioned the panelists about relying too much on these impact data since it was for a different content area.

3.1. Staffing

Questar provided staff members experienced in conducting standard setting to facilitate the panelist group. The facilitator was experienced with the Angoff and modified Angoff methods, and all panelists were trained on the method prior to implementation with ample time for any questions to be addressed. Psychometricians and a statistical analyst attended the workshop to assist with data analysis, oversee data quality control, and observe the activities. A Questar program manager was present to serve as a resource for questions related to the meeting logistics. DESE was also available during the standard setting workshop.

3.2. Security

Because the standard setting was conducted using Questar's secure online content management system, a minimal amount of printed material was needed during the workshop. The computers used secure servers, and usernames and passwords were locked in a secure location when not in use.

3.3. Panels

The standard setting panel had seven members. Panelists included classroom teachers who taught Physical Science, Biology and Chemistry in Missouri schools; had administered the MO EOC Assessments in their respective content area; and were familiar with the standards.

Consistent to the previous standard settings conducted for the MO EOC Assessments, the requirements for participation were as follows:

- For classroom teachers: The teacher must have taught the course for which he or she is being nominated to serve as a panelist for a minimum of five years. The teacher should be familiar with the Missouri Learning Standards and the applicable CLEs. Finally, the teacher should be recognized as "outstanding" in professional performance.

- For nonteacher educators and post-secondary educators: The educator may be a nonteacher educational staff member in a building or district central office, or an instructor or administrator at a post-secondary institution. The educator must have familiarity with the course content for which he or she is being nominated to serve as a panelist. He or she should be familiar with the Missouri Learning Standards and applicable CLEs. Finally, the educator must be recognized as "outstanding" in professional performance by the individual making the nomination.

- For business professionals: The business professional must have familiarity with the course content for which he or she is being nominated to serve as a panelist. The individual should either use high school course content for the applicable content area in his or her daily professional work *or* be familiar with the knowledge and skills that high school students completing the applicable courses must possess to have a firm foundation for further coursework or for the workplace. Finally, the business professional must not be a current or former employee of the public school system.

Effort was made to ensure representation of the state's urban, suburban, and rural schools and communities, as well as to include representation from the state's nine Regional Professional Development Center (RPDC) regions. Additionally, as much as possible given the nomination pool, an attempt was made to include panelists with expertise in working with English language learners (ELLs) and students with special needs. By design, panel slots were heavily populated with classroom teachers.

3.3.1. Panel Characteristics

Table 1 summarizes the demographic characteristics of the panel. None of the panelists indicated that they had participated in the previous MO EOC standard setting workshops or item development activities. Half the panelists were male and half were female. All panelists were white, and most of them were classroom teachers from rural areas. They came from different areas of Missouri represented by the RPDC regions.

Table 1. Panel Characteristics

Category		Physical Science
Gender	Male	3
	Female	4
Race	White	7
	Black	0
Community Size	Rural	5
	Suburban	1
	Urban	1
Position	Classroom Teacher	6
	Instructional Coach	--
	Curriculum Specialist	1
	Administrator	--
RPDC* Region	Southeast	--
	Kansas City	--
	Northeast	2
	South Central	--
	St. Louis	1
	Heart of MO	1
	West Central	1
	Northwest	2
Years of Experience	0–5 years	1
	6–10 years	1
	11–14 years	--
	15+ years	--
	Missing	5

*Regional Professional Development Center

4. Standard Setting Process

The main purpose of the standard setting meeting was to establish recommend cut scores for the Physical Science Assessment using the Angoff method and Fall 2014 data. Unlike the item mapping method that requires ordering the items by difficulty, Angoff requires panelists to determine the percentage of students meeting the borderline definition that would respond correctly to each item. Panelists must then figure out that percentage for every borderline student definition (i.e., panelists must determine these percentages for each cut score recommendation).

During three rounds of ratings, panelists considered each item as a whole and made judgments of the percentage of borderline students who would answer the item correctly. The overall recommended cut score was computed from the expected scores for individual items.

The facilitator clearly communicated to the panelists that the results of their standard setting activities would be purely advisory to DESE and that DESE would consider the recommendations presented to them and to the Missouri State Board of Education for final approval.

4.1. Cut Scores

A cut score is the minimum score a student must achieve on an assessment in order to be placed in a certain achievement level. Cut scores are determined between two adjacent achievement levels. Therefore, three recommended cut scores were determined for the Physical Science Assessment:

- The cut score that differentiates Below Basic performance from Basic performance
- The cut score that differentiates Basic performance from Proficient performance
- The cut score that differentiates Proficient performance from Advanced performance

4.2. Materials

The following materials were provided during standard setting:

- Draft Physical Science ALDs (Appendix A)
- Agenda (Appendix C)
- PowerPoint presentation (Appendix D)
- Pre-survey (Appendix E)
- Readiness form (Appendix F)
- Evaluation survey (Appendix H)
- Fall 2014 operational test form
- Missouri Learning Standards
- Course-level expectations (CLEs)
- Test blueprint

4.3. Defining the Borderline Students

Borderline student definitions were used during standard setting to help panelists consider the percentage of students obtaining a correct response or mean score for each achievement level. Therefore, before determining the cut score recommendations, panelists first discussed the ALDs for Physical Science to determine 3–5 distinguishing characteristics between each adjacent set of achievement levels. These characteristics were used to describe the borderline students, or the students just at the cusp, or threshold, of two achievement levels (see Appendix G for the borderline student definitions). In other words, a borderline student has a test score close to the lower boundary of an achievement level (e.g., a “minimally Advanced” student).

Therefore, three borderline student definitions were established to help panelists as they determined their cut score recommendations:

- The <u>Basic borderline student</u>: between Below Basic and Basic (i.e., the “minimally Basic” student)
    - What skills does a low Basic student possess that a high Below Basic student does not?
- The <u>Proficient borderline student</u>: between Basic and Proficient (i.e., the “minimally Proficient” student)
    - What skills does a low Proficient student possess that a high Basic student does not?

- The Advanced borderline student: between Proficient and Advanced (i.e., the "minimally Advanced" student)
    - What skills does a low Advanced student possess that a high Proficient student does not?

The Physical Science Assessment contains only SR items. Therefore, for each item that appeared on the assessment, panelists estimated the probability that a student performing at the borderline of each achievement level would respond correctly to that item. To do this, the panelists thought of a class of 100 students whose performance just met that of the ALDs for a particular level and estimated the number of correct responses from 100 borderline students.

4.4. Standard Setting Procedure

4.4.1. Day 1

4.4.1.1. General Process Overview

The standard setting agenda is located in Appendix C. A PowerPoint presentation (see Appendix D) was used throughout the meeting to guide panelists through the standard setting activities. The first part of the meeting served as a high-level introduction and overview to the general standard setting process, as well as the cutpoint validation process since the standard setting and cutpoint validation panelists received the general process overview at the same time.[2] This introduction included an overview of the MO EOC Assessments and the purpose and intended outcomes of the standard setting and cutpoint validation. It also included an overview of the previous MO EOC standard settings using the modified Angoff method.

Panelists were also provided with a general overview of the Physical Science ALDs and their importance to standard setting and cutpoint validation. Because the panelists reviewed, edited, and expanded on the draft versions of the ALDs, it was important for panelists to understand the critical role of ALDs in the standard setting and cutpoint validation processes.

4.4.1.2. Taking the Operational Assessment

Next, the cutpoint validation and standard setting panelists split up into their respective panels. For the standard setting panel, the facilitator reiterated the high-level standard setting processes discussed during the opening session. Panelists then took and scored the Fall 2014 operational Physical Science Assessment. For this activity, panelists used Questar's online content management system and had access to the test administration procedures, the actual test content, and all relevant scoring materials provided in electronic format.

Because these were "live" materials, the facilitator stressed the confidentiality of the items. The primary purpose of this activity was to familiarize panelists with the assessment content prior to the standard setting judgments. Panelists then discussed the assessment content such as difficulty, sources of challenges, scoring issues, and general and specific reactions. This exercise provided the panelists with a context concerning the definition of different achievement levels as conveyed by the assessment.

[2] The cutpoint validation meeting was conducted at the same time as the standard setting meeting from Feb. 17–18, 2015, for the English I, English II, Algebra I, Algebra II, and Geometry Assessments. The purpose of the meeting was to review and validate the existing cutpoints for those assessments. The cutpoint validation summary and results are presented in a separate report.

4.4.1.3. Discussing and Fine-Tuning the ALDs

The facilitator provided panelists with the draft ALDs, blueprint, and the appropriate CLEs and Missouri Learning Standards so that the panelists could discuss and fine-tune the draft ALDs for Physical Science. Using these materials as references and drawing on the expertise of the panelists, the facilitator led the panelists in an extended discussion and exercise to refine and elaborate on each of the ALDs. Once this activity was complete, panelists relied on the resulting ALDs as a reference during the actual standard setting. Panelists were also allowed to make appropriate, though generally minor, revisions and refinements to the ALDs during and after the standard setting activities.

Panelists began this activity with a review of the draft ALDs (see Appendix A). This review was highly interactive, with panelists suggesting changes and other refinements, both substantive and editorial. The ultimate task was to operationalize specific behaviors indicating performance at the Below Basic, Basic, Proficient, and Advanced levels. Panelist suggestions were discussed until consensus was reached and then recorded on the draft ALDs, a copy of which was given to the panelists. Panelists referred to these pages, along with the original drafts, during the actual judgment activities. The thoroughness of the ALD refinement activities and the extent to which the panelists, individually and as a group, internalized the ALDs significantly impacted the soundness of the subsequent standard setting activities.

Panelists also determined 3–5 distinguishing characteristics between each adjacent set of achievement levels, which were used to describe the borderline students (as described earlier). The borderline student definitions are provided in Appendix G. At the conclusion of the standard setting, DESE collected the panelist recommendations for ALD revisions for consideration in the wording of the final ALDs (see Appendix B for the final ALDs).

4.4.1.4. Introduction to the Angoff Method

Next, the facilitator oriented the panelists to the specific tasks involved with the Angoff standard setting process. Angoff requires panelists to read and make judgments about each successive item in the operational form. When reviewing an item, panelists considered the item's importance in the context of the underlying CLE, the task(s) required of the student, and the item's difficulty. The panelists decided what percentage of minimally Proficient students (i.e., the Proficient borderline students) should be able to answer the item correctly. Panelists then decided what percentage of minimally Advanced students would answer the item correctly, followed by what percentage of minimally Basic students would answer the item correctly.

The panelists considered their judgments in this order (Proficient, Advanced, and Basic) as it anchored the item judgments on the most important cut: Proficient. Once panelists made their judgment for the Proficient borderline students, they had a clearer, more defined range of values to consider for the other two cuts.

The facilitator reminded the panelists of the following points throughout the standard setting process:

- Panelists should focus on the threshold of performance in each achievement level (i.e., the borderline students).
- Panelists should review and recall what each ALD means.

- Panelists should focus on MO EOC students statewide, not just in the school or district in which they work.

Throughout the discussion, the facilitator explained that the panelists' judgments should be made independently and anonymously and that security of the testing materials should be maintained at all times.

4.4.1.5. Practice Exercise and Pre-Survey

Next, the facilitator led the panelists in a practice exercise using the Angoff rating procedures and several items in the operational form. During this exercise, panelists practiced the mechanical aspects of the standard setting procedure for recording their recommendations. The practice test allowed the facilitator to check the panelists' understanding of the mechanics of the technique and corresponding recording of judgments prior to the actual standard setting. The practice judgments were reviewed on a group basis by discussing the range of judgments made about each item.

Following completion of the practice exercise and before participating in the actual standard setting process, panelists took a five-question pre-survey concerning the standard setting procedures using Questar's online content management system (see Appendix E). This pre-survey was used to ensure that all panelists understood the importance of the ALDs and selected elements of the Angoff procedure before beginning the process of making item judgments. At the completion of the pre-survey, the facilitator reviewed the results and led a discussion with the panelists on how the ALDs and borderline student definitions could be used to establish their ratings.

Table 2 presents the pre-survey results.

Table 2. Pre-Survey Results

	Panelist Responses				
Panelist	**Question 1**	**Question 2**	**Question 3**	**Question 4**	**Question 5**
1	B	D	B	A	C
2	B	D	B	C	B
3	B	A	B	A	B
4	B	D	B	B	B
5	A	A	B	A	B
6	A	D	B	A	C
7	B	D	B	A	B
Correct Answer	**B**	**D**	**B**	**A**	**C**

4.4.1.6. Round 1

In Round 1, panelists reviewed each item while thinking about the borderline definition for the Proficient achievement level to determine the percentage of these students who would respond correctly to each item. Panelists then considered the borderline definition for the next achievement levels (Advanced and Basic) and determined the percentage of those borderline students who would respond correctly to that item. The panelists did this for each item until all items were rated.

Round 1 was completed anonymously and independently using Questar's online content management system. Using this system, panelists reviewed the items and provided ratings for each item and achievement level. The facilitator also used this online system to monitor the rating process. The individual panelist data were known only to the individual panelist and Questar staff.

There was no time limit for this activity. The panelists worked steadily and completed their judgments before the end of Day 1. They appeared to have understood the Angoff rating process based on the earlier discussions and how well the practice exercise went.

4.4.2. Day 2

4.4.2.1. Discussion of Round 1 Judgments

Day 2 of standard setting began with a review of the Round 1 results. The panelists were presented with a list of items with many of them flagged by the facilitator. The following 39 items were flagged, which indicated that there was a large range in ratings for any of the three cuts: 2–8, 10–19, 21–23, 26–36, and 38–45.

The facilitator reviewed the tables and figures with the panelists to ensure that everyone understood how to interpret the information contained in them. The facilitator then led an extended discussion of the Round 1 judgments, starting with the flagged items. This discussion focused primarily on the panelists' judgments of individual items. The facilitator actively engaged all the panelists in the discussion to gauge whether they had indicated the item percentage values that they intended, that the reasoning processes they followed in making their judgments were consistent with good practice, and that the panelists clearly understood the mechanics of making item judgments.

Appendix I contains screenshots of the Round 1 results from Questar's content management system for items 1–45. The appendix also contains a frequency display of all three cut scores (Basic, Proficient, and Advanced) recommended by each panelist after the Round 1 ratings. This bar graph displays all the panelists' judgments on a single graph so that areas of dispersion or overlap in the raw cut scores could be apparent.

Throughout these discussions, the facilitator focused on the following key elements of the standard setting process:

- Establishing the threshold (borderline) of each cutpoint
- Projecting the cutpoints for a statewide population of students who took the Physical Science Assessment
- Focusing on the Physical Science content area and achievement levels

Much like a jury deliberation, these discussions allowed the panelists to hear their peers' comments and rationales for their judgments. The facilitator permitted discussion to continue until all panelists were prepared to make their second round of judgments.

After the discussion was completed for each item in Round 1, panelists indicated on a readiness form within Questar's online content management system that they understood the procedures and were prepared to make Round 2 recommendations (see Appendix F). Panelists then began Round 2.

4.4.2.2. Round 2

During Round 2, panelists again worked independently to make judgments about the percentage of students at the threshold of each achievement level (borderline students) who would answer each item correctly. The facilitator explained to the panelists that they were free to maintain their Round 1 judgments or to revise them as they deemed appropriate. The facilitator encouraged panelists to consider the discussion regarding the specific item the panelists were rating, while reminding them of the key elements of the process and to remain focused on the ALDs.

After panelists completed their Round 2 judgments and recorded their recommendations in the online content management system, they were excused for a break.

4.4.2.3. Discussion of Round 2 Judgments

When the panels convened after the break, the facilitator presented the results of Round 2 (see Appendix J). The reports showing the Round 2 results were used to guide another discussion of specific items. The presentation and discussion at this stage were similar to but more focused than those following Round 1. Six items in particular (5, 10, 18, 26, 27, and 30) were discussed in detail, although all other items were given opportunities for further review.

4.4.2.4. Round 3, Presentation of Impact Data, and Beuk Standard Setting

During Round 3, the panelists were once again allowed to change or modify the percentage of the borderline students who would respond correctly to each item. Panelists were given unlimited time to complete their final recommendations. All panelists clearly understood that the Round 3 judgments counted as their final recommendations. The facilitator again encouraged the panelists to consider the discussion regarding the specific item the panelists were rating, while reminding them of the key elements of the process and to remain focused on the ALDs. Appendix K contains the final frequency summary for the Round 3 recommended cuts.

Following Round 3, the facilitator provided panelists with estimated statewide impact data based on prior Fall operational administrations for Biology. As discussed earlier, Physical Science was a new assessment in Fall 2014 and only two students took the assessment at the time of the standard setting workshop. Therefore, there were no historical impact data from which the panelists could consider their recommended Angoff cut scores, so DESE recommended presenting data from Biology as a reference point.

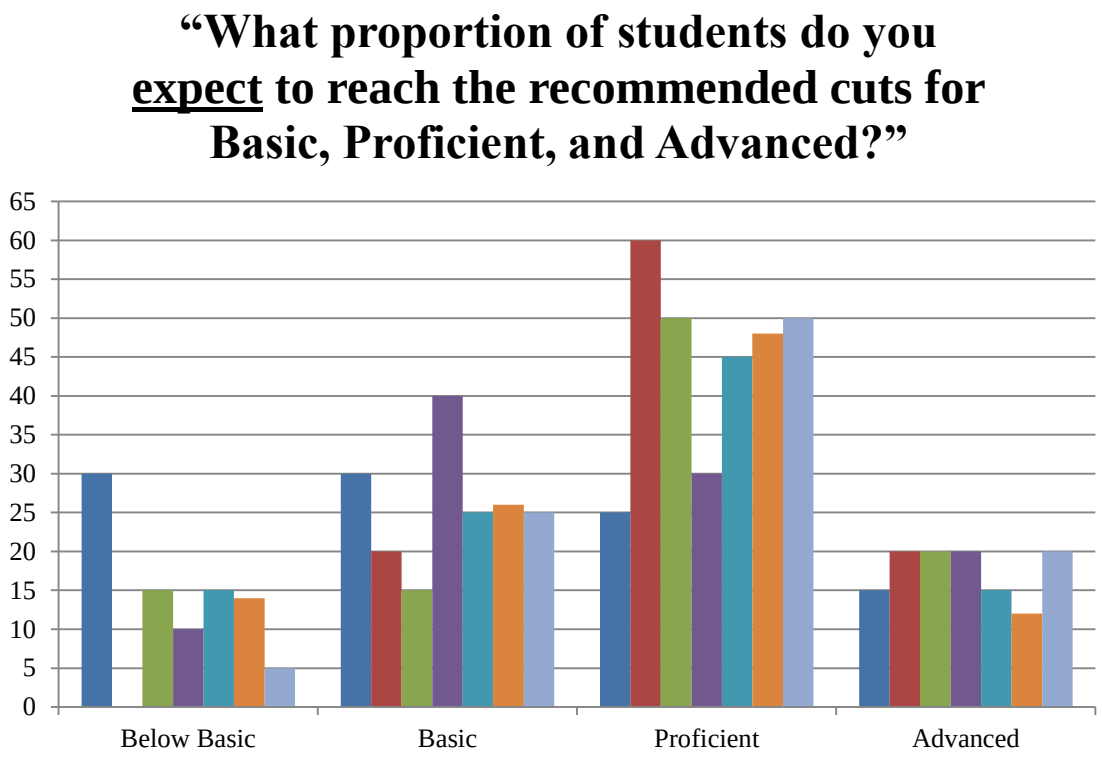
The Biology impact data was presented as percentages of students in each achievement level. Therefore, to prepare the panelists for a discussion of the Biology impact data (shown in Appendix L), the facilitator posed the following Beuk standard setting question to the panelists: "What proportion of students do you expect to reach the recommended cuts for Basic, Proficient, and Advanced"?

The Beuk standard setting method is an additional check on the validity of the ratings. It allows panelists to set a cut score based on their estimated performance expectations. An average passing rate is calculated based on the panelists' responses to the question posed. That rate is then applied to the distribution of actual scores to identify a recommended cut score. During a Beuk standard setting, panelists are asked to consider the assessment they just rated; to consider all of the students who may take that assessment within the state; and to provide the percentage of students they believe will achieve each cut score. The panelists make this rating based on their

understanding of the population of students who take the assessment, as well as what they know about the assessment they just rated in the workshop.

Figure 1 presents the results of the Beuk ratings provided by the panelists for the Physical Science Assessment. The results of the Beuk ratings were then used as a reference point as the panelists discussed the Biology impact data from the past five years of Fall administrations. After discussing the Beuk results and the Biology impact data, the panelists felt confident in their results since their expectations of performance, represented as proficiency rates, aligned with those known to occur for students in the Biology Assessment. The Beuk ratings will be used in data analysis by Questar once an adequate number of students complete the Physical Science Assessment.

Figure 1. Results of the Beuk Ratings



4.4.2.5. Evaluation Survey and Final Review of the ALDs

After completing their final round of judgments and participating in the Beuk discussion, individual panelists completed an evaluation survey (see Appendix H) that focused on the panelists' understanding of the standard setting process, cut scores, and their confidence in their judgments. The survey also contained an open-ended question for the panelists to provide comments concerning the workshop. Results from the evaluation survey are summarized in Section 5.2.

After completing the evaluation survey, panelists performed a final review of the ALDs. During this time, panelists discussed and, if necessary, fine-tuned or revised the ALDs. After the facilitator collected the evaluation surveys and ALD revisions, the panelists were thanked for their participation and dismissed.

5. Standard Setting Results

5.1. Cut Score Recommendations

Table 3 presents the standard setting cuts cores for Physical Science for the three rounds. Most values in this table are percentages, not raw scores. The last row in the table provides raw cut scores based on item ratings for each round.

Table 3. Standard Setting Results for Physical Science

	Round 1			Round 2			Round 3		
Panelist	**Basic**	**Proficient**	**Advanced**	**Basic**	**Proficient**	**Advanced**	**Basic**	**Proficient**	**Advanced**
1	24%	54%	79%	22%	47%	66%	23%	50%	72%
2	24%	53%	74%	29%	54%	74%	29%	54%	74%
3	20%	42%	56%	22%	49%	71%	23%	49%	68%
4	33%	58%	76%	29%	55%	76%	23%	54%	78%
5	33%	58%	77%	30%	56%	77%	33%	58%	75%
6	33%	57%	78%	23%	54%	78%	29%	55%	76%
7	16%	43%	63%	33%	58%	75%	30%	56%	77%
Average	26%	52%	72%	27%	53%	74%	27%	54%	74%
Overall Raw Score	**12**	**23**	**32**	**12**	**24**	**33**	**12**	**24**	**33**

5.2. Evaluation Survey Summary

Table 4 provides a summary of the panelists' responses to the nine multiple-choice questions in the evaluation survey (see Appendix H for the survey questions). Overall, most panelists agreed or strongly agreed with all the statements in the survey. Two panelists selected "neutral" to two questions, and one panelist selected "disagree" to one question. Overall, most panelists felt that they understood the standard setting process and were comfortable with their cut score recommendations.

Table 4. Summary of Evaluation Survey Responses

Question	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**
Strongly Agree	1	5	2	2	3	3	3	3	3
Agree	6	2	4	4	4	4	4	3	4
Neutral	0	0	1	1	0	0	0	0	0
Disagree	0	0	0	0	0	0	0	1	0
Strongly Disagree	0	0	0	0	0	0	0	0	0

Table 5 provides the panelists' comments and suggestions collected from the open-ended question. Most comments were positive and indicated that they enjoyed the experience. Panelists also indicated that Questar's online content management system worked very well. Results from the evaluation survey indicate overall satisfactory and positive feedback regarding the procedure used in setting cut scores for Physical Science.

Table 5. Open-Ended Responses from the Evaluation Survey

Additional Comments	Suggestions
I would have liked to have a copy of the EOC's and Gles's on hand for each person to make a better decision about the ALD's.	No
It was great learned a lot	no it went well no technical difficulties
I really enjoyed learning the process of of standard setting. I feel much more informed about how DESE produces these tests.	
It would have been helpful to have a copy of the CLEs, even though our facilitator did access them whenever we asked. Our facilitator did a great job keeping the group focused and on task in a friendly way.	It would be nice to take the test like the kids with the online assessment instead of just a PDF of the test.

Appendix A: Draft MO EOC ALDs for Physical Science

Missouri End-of-Course Assessment Achievement Level Descriptors (ALDs)

Physical Science

Below Basic	Basic	Proficient	Advanced
Students performing at the Below Basic level on the Missouri Physical Science End-of-Course Assessment demonstrate a limited understanding of the course-level expectations for Physical Science. Students scoring at the Below Basic level demonstrate little ability to apply the skills, knowledge, and concepts from the course.	Students performing at the Basic level on the Missouri Physical Science End-of-Course Assessment demonstrate an incomplete understanding of the course-level expectations for Physical Science. In addition to understanding and applying the skills at the Below Basic level, students scoring at the Basic level demonstrate an incomplete ability to apply the skills, knowledge, and concepts from the course.	Students performing at the Proficient level on the Missouri Physical Science End-of-Course Assessment demonstrate an understanding of the course-level expectations for Physical Science. In addition to understanding and applying the skills at the Basic level, students scoring at the Proficient level demonstrate an ability to apply the skills, knowledge, and concepts from the course.	Students performing at the Advanced level on the Missouri Physical Science End-of-Course Assessment demonstrate a thorough understanding of the course-level expectations for Physical Science. In addition to understanding and applying the skills at the Proficient level, students scoring at the Advanced level demonstrate a complete ability to apply the skills, knowledge, and concepts from the course.
Students at this level:	**In addition to understanding and applying the skills at the Below Basic level, students at this level:**	**In addition to understanding and applying the skills at the Basic level, students at this level:**	**In addition to understanding and applying the skills at the Proficient level, students at this level:**
• Classify a substance as being made up of one kind of atom when given the structural formula for the substance • Contrast the common properties of metals and nonmetals • Contrast the properties of acidic and basic solutions • Using the Kinetic Theory model, explain the changes that occur in the temperature of a substance as energy is absorbed or released • Predict the effect of a temperature change on the volume of a gas • Predict the effect of a pressure change on the volume of a gas • Calculate the number of protons of an element given its atomic number • Describe the information provided by the atomic number • Classify elements as metals	• Identify pure substances by their physical properties • Classify a substance as being made up of one kind of atom or a compound when given the structural formula for the substance • Compare and contrast the common properties of metals and nonmetals • Compare and contrast the properties of acidic and basic solutions • Using the Kinetic Theory model, explain the changes that occur in the distance between atoms/molecules of a substance as energy is absorbed or released • Predict the effect of a temperature change on the pressure and volume of a liquid or gas • Predict the effect of a pressure change on the volume and density of a liquid or gas	• Identify pure substances by their chemical properties • Classify a substance as being made up of one kind of atom or a compound when given the molecular formula for the substance • Compare and contrast the common properties of metals, nonmetals, metalloids and noble gases • Compare and contrast the properties of acidic, basic, and neutral solutions • Using the Kinetic Theory model, explain the changes that occur in the distance between atoms/molecules and temperature of a substance as energy is absorbed or released • Predict the effect of a temperature change on the properties of a liquid or gas • Predict the effect of a pressure change on the properties of a liquid or gas	• Compare the densities of regular and irregular objects using their respective measures of volume and mass • Identify pure substances by their physical and chemical properties • Classify a substance as being made up of one kind of atom or a compound when given the molecular formula or structural formula for the substance • Using the Kinetic Theory model, explain the changes that occur in the distance between atoms/molecules and temperature of a substance as energy is absorbed or released during a phase change • Predict the effect of a temperature change on the properties of a material • Predict the effect of pressure changes on the properties of a material

Below Basic	Basic	Proficient	Advanced
and nonmetals according to their location on the Periodic Table • Distinguish between physical and chemical changes in matter • Differentiate between examples of conductors and insulators • Describe the effect of different frequencies of electromagnetic waves on living organisms • Interpret examples of heat transfer as conduction or radiation • Measure and analyze an object's motion in terms of speed • Describe gravity as an attractive force among all objects • Compare the gravitational forces between two objects in terms of the distances between them • Recognize that inertia is a property of matter • Identify forces acting on a falling object and how those forces affect the rate of acceleration • Describe the relationship between applied net force and the distance an object moves • Formulate testable questions • Explain the importance of the public presentation of scientific work to the scientific community • Recognize contributions to science are not limited to the work of one particular group, but are made by a diverse group of scientists representing various ethnic and gender groups • Explain why accurate record-keeping and openness are essential for maintaining an investigator's credibility	• Describe the atom as having a dense, positive nucleus surrounded by a cloud of negative electrons • Calculate the number of protons and electrons of an element given its atomic number • Describe the information provided by the atomic number and the mass number • Classify elements as metals, nonmetals, and noble gases according to their location on the Periodic Table • Contrast the types of chemical bonds • Differentiate between thermal energy and temperature • Differentiate between the properties and examples of conductors and insulators • Describe common uses of different forms of energy • Identify advantages/disadvantages of using various sources of energy for human activity • Describe the effect of different frequencies of electromagnetic waves on the Earth and living organisms • Interpret examples of heat transfer as convection, conduction, or radiation • Distinguish between examples of kinetic and potential energy within a system • Describe the effect of work on an object's potential energy • Identify the role of nuclear energy as it serves as a source of energy for the Earth and human activity • Measure and analyze an object's motion in terms of speed and velocity • Compare the momentum of two objects in terms of mass and velocity	• Calculate the number of protons, neutrons, and electrons of an element given its mass number and atomic number • Explain the structure of the periodic table in terms of the elements with common properties • Classify elements as metals, nonmetals, metalloids, and noble gases according to their location on the Periodic Table • Predict the chemical reactivity of elements using the Periodic Table • Describe how the valence electron configuration determines how atoms interact and may bond • Compare and contrast the types of chemical bonds • Compare the mass of the reactants to the mass of the products in a physical change as support for the Law of Conservation of Mass • Differentiate between thermal energy, heat, and temperature • Describe sources and common uses of different forms of energy • Identify and evaluate advantages/disadvantages of using various sources of energy for human activity • Relate kinetic energy to an object's mass and its velocity • Relate an object's gravitational potential energy to its weight and height relative to the surface of the Earth • Describe the effect of work on an object's kinetic and potential energy • Identify stars as producers of electromagnetic energy • Identify the role of nuclear energy as it serves as a source of energy for the	• Calculate the number of protons, neutrons, and electrons of an element/isotopes given its mass number and atomic number • Explain the structure of the periodic table in terms of the elements with common properties and repeating properties • Predict the chemical reactivity of elements, and the type of bonds that may result between them, using the Periodic Table • Compare the mass of the reactants to the mass of the products in a chemical reaction or physical change as support for the Law of Conservation of Mass • Describe how electromagnetic energy is transferred through space as electromagnetic waves of varying wavelength and frequency • Describe how changes in the nucleus of an atom during a nuclear reaction result in emission of radiation • Compare the efficiency of systems • Classify the different ways to store energy and describe the transfer of energy as it changes from kinetic to potential, while the total amount of energy remains constant, within a system • Represent and analyze the motion of an object graphically • Compare and describe the gravitational forces between two objects in terms of their masses and the distances between them • Explain how the efficiency of a mechanical system can be expressed as a ratio of work output to work input • Describe power in terms of

Below Basic	Basic	Proficient	Advanced
	• Identify the forces acting on an object using a force diagram • Compare and describe the gravitational forces between two objects in terms of the distances between them • Describe weight in terms of the force of a planet's or moon's gravity acting on a given mass • Recognize all free falling bodies accelerate at the same rate due to gravity regardless of their mass • Recognize that inertia is a property of matter that can be described as an object's tendency to resist a change in motion • Analyze force pairs when given a scenario and describe their magnitudes and directions. • Predict the path of an object when the net force changes • Describe the relationship between work and the distance an object moves • Predict eclipses when given the relative positions of the moon, planet, and Sun • Explain orbital motions of moons around planets, and planets around the Sun, as the result of gravitational forces between those objects • Formulate testable questions and hypotheses • Identify the components when analyzing an experiment • Recognize the relationships linking technology and science • Identify current theories that are being questioned • Identify major scientific and technological challenges to society • Identify the ethical issues in experimentation • Identify and evaluate the role of models as an ethical	Earth, stars, and human activity • Describe the transfer of energy that occurs as energy changes from kinetic to potential within a system • Describe the transfer of energy as it changes from kinetic to potential, while the total amount of energy remains constant, within a system • Analyze the velocity of two objects in terms of distance and time • Measure and analyze an object's motion in terms of speed, velocity, and acceleration • Explain that the total momentum remains constant within a system • Identify and describe the forces acting on an object using a force diagram • Compare the gravitational forces between two objects in terms of their masses and the distances between them • Recognize that inertia is a property of matter that can be described as an object's tendency to resist a change in motion, and is dependent upon the object's mass • Determine the effect of the sum of the forces acting on an object • Determine the effect on acceleration using information about net force and mass • Describe the relationships among work, applied net force, and the distance an object moves • Describe and analyze the relationships among force, distance, and work • Explain how Earth's environmental characteristics and location in the universe provide a life-supporting environment	work and time • Describe and analyze the relationships among force, distance, work, efficiency, and power • Predict the moon rise/set times, phases of the moon, and/or eclipses when given the relative positions of the moon, planet, and Sun • Explain how the gravitational forces, due to the relative positions of a planet, moon, and Sun, determine the height and frequency of tides • Recognize that the gender and ethnicity of scientists often influence the questions asked and/or the methods used in scientific research and may limit or advance science knowledge and/or technology • Identify and analyze current theories that are being questioned, and compare them to new theories that have emerged to challenge older ones • Analyze the roles of science and society as they interact to determine the direction of scientific and technological progress • Identify and describe major scientific and technological challenges to society and their ramifications for public policy • Analyze and evaluate the drawbacks benefits, and factors affecting progress toward meeting major scientific and technological challenges • Identify and evaluate the need for informed consent in experimentation

Below Basic	Basic	Proficient	Advanced
	alternative to direct experimentation • Explain why accurate record-keeping, openness, and replication are essential for maintaining an investigator's credibility with other scientists	• Identify information that the electromagnetic spectrum provides about the stars and the universe • Predict the phases of the moon and/or eclipses when given the relative positions of the moon, planet, and Sun • Identify the components and explain their importance to the design of a valid experiment when analyzing an experiment • Recognize that the gender and ethnicity of scientists often influence the questions asked and/or the methods used in scientific research • Identify and describe how explanations of scientific phenomena have changed over time as a result of new evidence • Identify current theories that are being questioned, and compare them to new theories that have emerged to challenge older ones • Identify and describe major scientific and technological challenges to society • Analyze factors affecting progress toward meeting major scientific and technological challenges • Identify the need for informed consent in experimentation • Identify the role of models as an ethical alternative to direct experimentation • Evaluate a given source for its scientific credibility • Explain why accurate record-keeping, openness, and replication are essential for maintaining an investigator's credibility with other scientists and society	

Appendix B: Final ALDs for Physical Science

Missouri End-of-Course Assessment Achievement Level Descriptors (ALDs)

Physical Science

Below Basic	Basic	Proficient	Advanced
Students performing at the Below Basic level on the Missouri Physical Science End-of-Course Assessment demonstrate a limited understanding of the course-level expectations for Physical Science. In addition to demonstrating these skills, students scoring at the Below Basic level use very few strategies and demonstrate a limited understanding of important Physical Science content and concepts.	Students performing at the Basic level on the Missouri Physical Science End-of-Course Assessment demonstrate a partial understanding of the course-level expectations for Physical Science. In addition to demonstrating, understanding, and applying the skills at the Below Basic level, students scoring at the Basic level use some strategies.	Students performing at the Proficient level on the Missouri Physical Science End-of-Course Assessment demonstrate an understanding of the course-level expectations for Physical Science. In addition to demonstrating, understanding, and applying the skills at the Basic level, students scoring at the Proficient level use a range of strategies.	Students performing at the Advanced level on the Missouri Physical Science End-of-Course Assessment demonstrate a thorough understanding of the course-level expectations for Physical Science. In addition to demonstrating, understanding, and applying the skills at the Proficient level, students scoring at the Advanced level use a range of strategies.
Students at this level:	**In addition to understanding and applying the skills at the Below Basic level, students at this level:**	**In addition to understanding and applying the skills at the Basic level, students at this level:**	**In addition to understanding and applying the skills at the Proficient level, students at this level:**
• Classify a substance as being made up of one kind of atom when given the structural formula for the substance • Compare the common properties of metals and nonmetals • Using the Kinetic Theory model, explain the particle motion during phase changes • Describe the information provided by the atomic number • Classify elements as metals and nonmetals according to their location on the Periodic Table • Differentiate between examples of conductors and insulators • Classify examples of heat transfer as conduction or radiation • Describe an object's motion in terms of speed and velocity • Describe gravity as an	• Identify pure substances by their physical properties • Distinguish between physical and chemical changes in matter • Identify acidic and basic solutions based on the pH scale • Predict the effect of a temperature change on the properties of a material • Describe the atom as having a dense, positive nucleus surrounded by a cloud of negative electrons • Describe the information provided by the atomic number and the mass number • Explain the relationship between kinetic energy and temperature • Differentiate between the properties and examples of conductors and insulators • Describe sources and common uses of different forms of energy	• Compare the densities of regular and irregular objects using their respective measures of volume and mass • Describe power in terms of work and time • Compare and contrast the properties of acidic and basic solutions • Predict the effect of pressure changes on the properties of a material • Classify a substance as being made up of one kind of atom or a compound when given the structural and molecular formula for the substance • Identify pure substances by their physical and chemical properties • Using the Kinetic Theory model, explain the changes that occur in the distance between atoms/molecules and temperature of a substance as energy is	• Predict the effect of a temperature change on the pressure, volume, and density of a liquid or gas • Describe how valence electrons determine how atoms interact and may bond • Compare and contrast the types of chemical bonds • Compare the mass of the reactants to the mass of the products in a chemical reaction or physical change as support for the Law of Conservation of Mass • Describe how electromagnetic energy is transferred through space as electromagnetic waves of varying wavelength and frequency • Describe how changes in the nucleus of an atom during a nuclear reaction result in emission of radiation • Classify the different ways to store energy and describe the

Below Basic	Basic	Proficient	Advanced
attractive force among all objects • Compare the gravitational forces between two objects in terms of the distances between them • Identify forces acting on an object	• Identify advantages/disadvantages of using various sources of energy for human activity • Identify stars as producers of electromagnetic energy • Classify examples of heat transfer as convection, conduction, or radiation • Distinguish between examples of kinetic and potential energy within a system • Describe the effect of work on an object's potential energy • Measure and analyze an object's motion in terms of speed and velocity • Describe the relationship between applied net force and the distance an object moves • Compare and describe the gravitational forces between two objects in terms of the distances between them • Recognize the difference between weight and mass • Identify and describe balanced and unbalanced forces acting on an object • Recognize all free falling bodies accelerate at the same rate due to gravity regardless of their mass Recognize that inertia is a property of matter that can be described as an object's tendency to resist a change in motion	absorbed or released • Calculate the number of protons, neutrons, and electrons of an element given its mass number and atomic number • Contrast various types of chemical bonds • Explain the structure of the periodic table in terms of the elements with common properties • Predict the chemical reactivity of elements using the Periodic Table • Compare the mass of the reactants to the mass of the products in a physical change as support for the Law of Conservation of Mass • Differentiate among thermal energy, heat, and temperature • Interpret examples of heat transfer as convection, conduction, or radiation • Identify and evaluate advantages/disadvantages of using various sources of energy for human activity • Relate kinetic energy to an object's mass and its velocity • Compare the efficiency of two systems • Relate an object's gravitational potential energy to its weight and height relative to the surface of the Earth • Describe the effect of work on an object's kinetic and potential energy • Describe the effect of different frequencies of electromagnetic waves on the Earth and living organisms • Identify the role of nuclear energy as it serves as a source of energy for the Earth, stars, and human activity • Describe weight in terms of	transfer of energy as it changes from kinetic to potential, while the total amount of energy remains constant, within a system • Interpret graphic displays of an object's motion in terms of speed, velocity, and acceleration using dimensional analysis • Compare and describe the gravitational forces between two objects in terms of their masses and the distances between them • Explain how the efficiency of a mechanical system can be expressed as a ratio of work output to work input • Identify information that the electromagnetic spectrum provides about the stars and the universe • Explain that the total momentum remains constant within a system

Below Basic	Basic	Proficient	Advanced
		the force of a planet's or moon's gravity acting on a given mass • Compare the momentum of two objects in terms of mass and velocity • Compare the gravitational forces between two objects in terms of their masses and the distances between them • Describe the transfer of energy as it changes from kinetic to potential, while the total amount of energy remains constant, within a system • Analyze the velocity of two objects in terms of distance and time • Identify forces acting on a falling object and how those forces affect the rate of acceleration • Analyze and determine the effect of the sum of the forces acting on an object using a force diagram • Measure and analyze graphically an object's motion in terms of speed, velocity, and acceleration • Determine the effect on acceleration using information about net force and mass • Describe and analyze the relationships among force, distance, and work	

Appendix C: Standard Setting Agenda

Day 1: Tuesday, Feb. 17, 2015
8:00 a.m.: Registration and breakfast
(large-group session with both standard setting and cutpoint validation panels together)

8:30 a.m.: Welcome and General Process Overview
- Welcome, introductions, and logistics (DESE)
- General process overview (Questar)
    - Overview of the MO EOC Assessments
    - Overview of the standard setting and cutpoint validation workshops
    - Overview of the ALDs
    - Brief review of previous MO EOC standard setting

10:00 a.m.: Break
Panelists will now break into individual groups that will be facilitated separately. All subsequent panel work will take place in the separate sessions.

- Panelists "experience" the assessment—panelists take the Fall 2014 operational assessment
- Discussion and fine-tuning of the ALDs
- Introduction to the Angoff procedure

Noon: Lunch

1:00 p.m.: Pre-survey and practice exercise
2:30 p.m.: Round 1 judgments
5:30 p.m.: Panelists excused

Day 2: Wednesday, Feb. 18, 2015
8:00 a.m.: Registration and breakfast

8:30 a.m.: Round 2
- Review of Round 1 judgments and preparation for Round 2
- Round 2 judgments

Noon: Lunch

1:00 p.m.: Round 3
- Review of Round 2 judgments and preparation for Round 3 (final round)
- Round 3 (final) judgments

5:00 p.m.: Wrap-up, final review of the ALDs, and post-evaluation

Appendix D: PowerPoint Presentation

MISSOURI END-OF-COURSE (MO EOC) ASSESSMENTS

Standard Setting and Cutpoint Validation Overview

February 17–19, 2015

QUESTAR® ASSESSMENT, INC.

Overview

- Welcome and Housekeeping
- MO EOC Assessment and ALD overview
- Standard setting and cutpoint validation overview
- Review of previous MO EOC standard setting procedure
- Report to assigned room
- Small-group focused training
  - Standard Setting
    - Physical Science
  - Cutpoint Validation
    - Panel I: English I, English II
    - Panel II: Algebra I, Algebra II, Geometry
- Complete standard setting and cutpoint validation

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Welcome!

- Missouri DESE
  - Shaun Bates
  - Susan Newbold
  - Jeremy Ellis
  - Melia Franklin
- Questar
  - Dr. Canda Mueller
  - Mary Rehm
  - Dr. Lei Yu
  - Dr. Ping Yin
  - Dr. Jonghwan (Jay) Lee
  - Jared Agrimson
  - Luke Johnson
  - Elizabeth Shamla

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Housekeeping

- Agenda
- DESE forms

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MO EOC Assessments

- The Missouri Assessment Program (MAP) assesses students' progress toward the Missouri Learning Standards, which are Missouri's content standards.
- MO EOC Assessments are taken when a student has received instruction on the Missouri Learning Standards for an assessment, regardless of grade level.

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MO EOC Assessments

- Beginning in Fall 2014, five MO EOC Assessments are required and four are optional.
  - Required: English II, Algebra I, Algebra II, Biology, Government
  - Optional: English I, Geometry, Physical Science, American History
- Physical Science was administered for the first time in Fall 2014.

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MO EOC Assessments

- Fall 2014 also reflected changes in English I, English II, Algebra I, Algebra II, and Geometry.
  - Revised test blueprints
  - New test forms
  - Alignment of existing items in ELA and Mathematics to the Missouri Learning Standards
  - New scoring rubrics for performance events (PEs) and change of PE scores
  - Change of test length and total score points
  - Addition of PEs to English I
  - Updated ALDs

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Achievement Level Descriptors (ALDs)

- The MO EOC Assessments have four achievement levels:
  - Below Basic
  - Basic
  - Proficient
  - Advanced
- The ALDs describe the specific knowledge and skills that a student at that level must be able to demonstrate.
- Questar worked with DESE to update previous ALDs for English I, English II, Algebra I, Algebra II, and Geometry (align to the Missouri Learning Standards).
- Questar worked with DESE to create draft ALDs for Physical Science.

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Achievement Level Descriptors (ALDs)

- You will review draft ALDs in your respective content area to help you determine your cut score recommendations or evaluate existing cut scores throughout standard setting and the cutpoint validation process.
- You will also have opportunities to fine-tune the draft ALDs as part of the standard setting and cutpoint validation process.
- DESE will collect your recommendations for ALD revisions for consideration in the final wording of the ALDs.

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Previous MO EOC Standard Setting

- Standard setting using the Modified Angoff procedure:
  - Nov. 3–5, 2008, for English II and Algebra I
  - Nov. 2–5, 2009, for English I, Algebra II, and Geometry
- Panelists determined the percentage of students meeting the borderline definition that will respond correctly to each item
- Three rounds of panelist judgment

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Standard Setting (Physical Science)

- Key elements:
  - Take the operational assessment.
  - Discuss ALDs and identify 3–5 distinguishing characteristics between achievement levels.
  - Define the borderline students.
  - Pre-survey.
  - Group practice exercise.
  - Provide item rating (2 rounds, third round optional).

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Cutpoint Validation

- Key elements:
  - Review the operational assessment.
  - Discuss ALDs and identify 3–5 distinguishing characteristics between achievement levels.
  - Define the borderline students.
  - Presentation of impact data
    - Percentages of students statewide whose performance would likely be labeled Below Basic, Basic, Proficient, or Advanced

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Cutpoint Validation

- Presentation of ordered item booklet (OIB)
  - An OIB orders the items from easiest to most difficult based on Fall 2014 data.
  - Each multiple-choice item appears in the OIB only once.
  - Each constructed-response item appears in the OIB once for each score point. For example, a 4-point constructed-response item will appear 4 times in the OIB.
  - Existing cut points are identified in the OIB.
- Panelists validate cutpoints in the OIB

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What to Expect Next

- Meet in assigned rooms
- More detailed training and discussion about standard setting/cutpoint validation
- Introduction to Questar's online management system
  - Previous and draft ALDs
  - Fall 2014 operational test forms
  - Missouri Learning Standards
  - Test blueprints
  - Pre-survey (SS)
  - Post-survey

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Questions? Comments?

- Take a 10-minute break and then report to your assigned room.

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MISSOURI END-OF-COURSE (MO EOC) ASSESSMENTS

Standard Setting (Physical Science)

February 17–18, 2015

Mary Rehm, Director of Test Development

QUESTAR® ASSESSMENT, INC.

Are you in the right room?

- Any additional questions from the group overview?

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Discuss and Fine-Tune the ALDs

- Materials:
  - Draft ALDs
  - Blueprint
  - Course-Level Expectations (CLEs)
  - Missouri Learning Standards
- Facilitator will lead the discussion and record updates in the draft ALDs
- DESE will collect your recommendations for ALD revisions for consideration in the final wording of the ALDs
- You will determine 3–5 distinguishing characteristics between each adjacent set of achievement levels, which will be used to define the borderline students

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Borderline Student

- The student just at the threshold of two achievement levels
- Three borderline student definitions will be established:
  - Basic borderline student: between Below Basic and Basic (i.e., the "minimally Basic" student)
    - What skills does a low Basic student possess that a high Below Basic student does not?
  - Proficient borderline student: between Basic and Proficient (i.e., the "minimally Proficient" student)
    - What skills does a low Proficient student possess that a high Basic student does not?
  - Advanced borderline student: between Proficient and Advanced (i.e., the "minimally Advanced" student)
    - What skills does a low Advanced student possess that a high Proficient student does not?

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Introduction to Angoff

- You will determine the percentage of students meeting the borderline definition that will respond correctly to each item
  - Consider the item's importance in the context of the underlying CLE.
    - the task(s) required of the student
    - the item's difficulty
  - Focus on 3–5 distinguishing characteristics for borderline students.
  - Focus on MO EOC students statewide, not just in the school or district in which you work.

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Take the Pre-Survey

- Five questions related to the Modified Angoff procedure
- Group discussion

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Practice Exercise

- Facilitator will lead the group exercise to practice the mechanical aspects of the Angoff procedure using Questar's online content management system.
- Group discussion

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Are You Ready?

- Think about the borderline student definitions
  - Basic
  - Proficient
  - Advanced
- Complete the readiness form
- You may begin Round 1

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Borderline Student Definition

- **Basic**
  - Explain terms (versus a below basic would only be able to define terms)
  - Describe, distinguish between, compare and contrast various concepts (versus a below basic who can classify, group, etc.)
  - Explain the difference between Kinetic energy and temperature
  - Measure and analyze speed and velocity (versus a below basic would only be able to describe)
  - Distinguish between balanced and unbalanced forces (versus a below basic will only be able to identify the forces)
  - Insert Borderline Student Definition

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Borderline Student Definition

- **Proficient**
  - Apply a piece of conceptual knowledge or apply a model
  - Using a kinetic theory model, explain how energy is absorbed or released during a phase change
  - Understand the structure of the periodic table
  - Calculate the numbers of protons, neutrons, and electrons using atomic and mass numbers
  - Measure and analyze acceleration in terms of velocity (versus a basic would only be able to measure and calculate speed)
  - Analyze a basic force diagram

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Borderline Student Definition

- **Advanced**
  - Apply models to make predictions
  - Can infer and make connections among areas of knowledge
  - Predict the effect of changing pressure, temperature and volume
  - Graphically analyze an object's motion
  - Describe the number of valence electrons and how they are used to form bonds
  - Describe electromagnetic energy in terms of wave length and frequency

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Round 2

- Based on the discussion, take another look at your judgment
- Consider Round 1 results
- Remember that any statistical information will be relevant to, but not essential for standard setting
- Make any changes you deem appropriate
- Are you comfortable with your decisions?

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Impact Data

- Impact data based on Fall 2014 administration is not available
- Impact data for Biology is provided instead
- Remember that any statistical information will be relevant to, but not essential for standard setting

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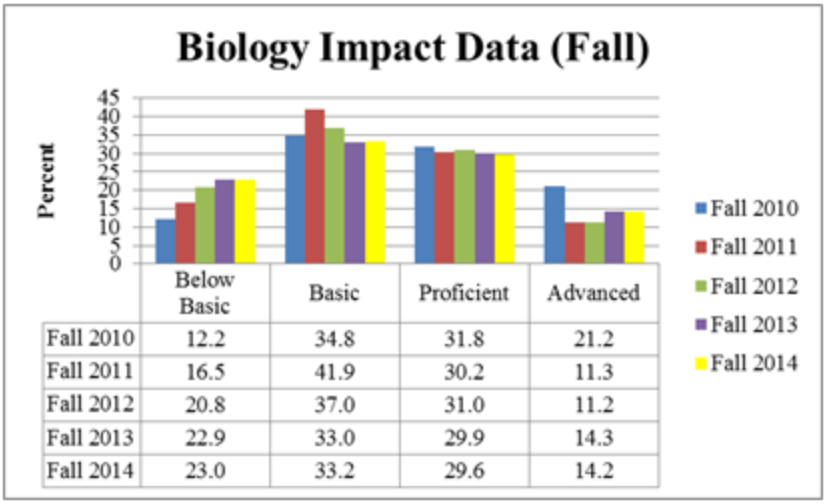
Impact Data



	Below Basic	Basic	Proficient	Advanced
Fall 2010	12.2	34.8	31.8	21.2
Fall 2011	16.5	41.9	30.2	11.3
Fall 2012	20.8	37.0	31.0	11.2
Fall 2013	22.9	33.0	29.9	14.3
Fall 2014	23.0	33.2	29.6	14.2

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Thank you for your participation

- Please remember:
  - You cannot take secure materials with you.
  - You cannot discuss the outcome of this meeting.
- Please fill out your post-survey.

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Appendix E: Pre-Survey

1. Why are achievement level descriptors (ALDs) such an integral part of the standard setting process?
    a. They provide an anchor that gives concrete meaning to the terms Basic, Proficient, and Advanced.
    b. They describe critical knowledge and skills that all students at a given achievement level should possess.
    c. They define all of the items in the MO EOC Assessments.
    d. They summarize elements of the Course-Level Expectations (CLEs) for the course.

2. Which of these statements about standard setting is TRUE?
    a. Panelists should use their best judgment to make their recommendations but should rely more on various empirical data to be provided during the sessions.
    b. While the MO EOC Assessments are given statewide, panelists should make recommendations based on the unique characteristics of their districts since other panelists will focus on other district types.
    c. A panelist who concludes that the "proper" cut score for Proficient is 24 should make a final recommendation of 22 or 23 to account for errors in any assessment.
    d. Panelists must consider both the stem and answer options in selected-response items in deciding what percentage of students should answer correctly.

3. Panelist John Doe decided that about 50% of the typical Proficient students in Missouri taking the MO EOC Assessment should answer item 32 correctly. He coded 50% under Proficient on his rating sheet. What error did he make?
    a. He should have coded 45% since some percentage of special-needs students will take the assessment.
    b. He should have considered minimally Proficient, not typically Proficient, students.
    c. He should reconsider his judgment since 50% correct could not possibly be considered Proficient.
    d. He made no error. This was the correct procedure.

4. Panelist Jane Doe thought that a particular item on the MO EOC Assessment was clear and measured very important content. She also thought that students should answer this correctly if they were Proficient. Which percentage should she most likely enter for Proficient on her rating sheet?
    a. 90%—because almost all students whose course achievement is Proficient should answer correctly
    b. 65%—because this is the approximate percentage that corresponds to "pass" in the school's grading system
    c. 50%—because many students taking this test will be learning-disabled or disadvantaged or will not take the assessment seriously
    d. 35%—because large percentages of students taking this test are not receiving instruction following the state's content standards

5. Which of these sets of Modified Angoff judgments for a selected-response item appears to be improper and why?

	Cut Score		
	Below Basic/ Basic	**Basic/ Proficient**	**Proficient/ Advanced**
A	25%	35%	40%
B	80%	90%	100%
C	50%	50%	55%
D	40%	75%	95%

   a. A, because these are unrealistically low expectations for a selected-response item
   b. B, because it is unreasonable to expect students to score this well on a selected-response item
   c. C, because the panelist does not expect higher-achieving students to perform any better on the item than lower-achieving students
   d. D, because the increase in percentages across the three groups is unrealistically large

The pre-survey as seen by panelists in the online content management system:

QUESTAR ASSESSMENT, INC. Questar Workshop Tool

Sample - 2015 - Standard Setting

Pre-Survey

Content Area: **Sample**
Panelist ID: **00208**

Why are achievement level descriptors (ALDs) such an integral part of the standard setting process?

- They provide an anchor that gives concrete meaning to the terms Basic, Proficient, and Advanced.
- They describe critical knowledge and skills that all students at a given achievement level should possess.
- They define all of the items in the MO EOC Assessments.
- They summarize elements of the Course-Level Expectations (CLEs) for the course.

Which of these statements about standard setting is TRUE?

- Panelists should use their best judgment to make their recommendations but should rely more on various empirical data to be provided during the sessions.
- While the MO EOC Assessments are given statewide, panelists should make recommendations based on the unique characteristics of their districts since other panelists will focus on other district types.
- A panelist who concludes that the "proper" cut score for Proficient is 24 should make a final recommendation of 22 or 23 to account for errors in any assessment.
- Panelists must consider both the stem and answer options in selected-response items in deciding what percentage of students should answer correctly.

Panelist John Doe decided that about 50% of the typical Proficient students in Missouri taking the MO EOC Assessment should answer Item 32 correctly. He coded 50% under Proficient on his rating sheet. What error did he make?

- He should have coded 45% since some percentage of special needs students will take the assessment.
- He should have considered minimally Proficient, not typically Proficient, students.
- He should reconsider his judgment since 50% correct could not possibly be considered Proficient.
- He made no error. This was the correct procedure.

Panelist Jane Doe thought that a particular item on the MO EOC Assessment was clear and measured very important content. She also thought that students should answer this correctly if they were Proficient. Which percentage should she most likely enter for Proficient on her rating sheet?

- 90%—because almost all students whose course achievement is Proficient should answer correctly
- 65%—because this is the approximate percentage that corresponds to "pass" in the school's grading system
- 50%—because many students taking this test will be learning-disabled or disadvantaged or will not take the assessment seriously
- 35%—because large percentages of students taking this test are not receiving instruction following the state's content standards

Which of these sets of Modified Angoff judgments for a selected-response item appears to be improper and why?

	Cut Score		
	Below Basic/ Basic	Basic/ Proficient	Proficient/ Advanced
A	25%	35%	40%
B	80%	90%	100%
C	50%	50%	55%
D	40%	75%	95%

- A, because these are unrealistically low expectations for a selected-response item
- B, because it is unreasonable to expect students to score this well on a selected-response item
- C, because the panelist does not expect higher-achieving students to perform any better on the item than lower-achieving students
- D, because the increase in percentages across the three groups is unrealistically large

Submit

Appendix F: Readiness Form

The readiness form as seen by panelists in the online content management system:

QUESTAR ASSESSMENT, INC. **Questar Workshop Tool**

Sample - 2015 - Standard Setting

Content Area: **Sample**
Panelist ID: **00208**

Round 1

By clicking "Begin Round 1" I am indicating that I understand my task for Round 1 and am ready to begin Round 1. If you have concerns before Round 1 begins, please raise your hand and the facilitator will chat with you and address them.

Begin Round 1

QUESTAR ASSESSMENT, INC. **Questar Workshop Tool**

Sample - 2015 - Standard Setting

Content Area: **Sample**
Panelist ID: **00208**

Round 2

By clicking "Begin Round 2" I am indicating that I understand my task for Round 2 and am ready to begin Round 2. If you have concerns before Round 2 begins, please raise your hand and the facilitator will chat with you and address them.

Begin Round 2

QUESTAR ASSESSMENT, INC. **Questar Workshop Tool**

Sample - 2015 - Standard Setting

Content Area: **Sample**
Panelist ID: **00208**

Round 3

By clicking "Begin Round 3" I am indicating that I understand my task for Round 3 and am ready to begin Round 3. If you have concerns before Round 3 begins, please raise your hand and the facilitator will chat with you and address them.

Begin Round 3

Appendix G: Borderline Student Definitions

Basic

1. Explain terms (versus a below basic would only be able to define terms)
2. Describe, distinguish between, compare and contrast various concepts (versus a below basic who can classify, group, etc.)
3. Explain the difference between Kinetic energy and temperature
4. Measure and analyze speed and velocity (versus a below basic would only be able to describe)
5. Distinguish between balanced and unbalanced forces (versus a below basic will only be able to identify the forces)

Proficient

1. Apply a piece of conceptual knowledge or apply a model
2. Using a kinetic theory model, explain how energy is absorbed or released during a phase change
3. Understand the structure of the periodic table
4. Calculate the numbers of protons, neutrons, and electrons using atomic and mass numbers
5. Measure and analyze acceleration in terms of velocity (versus a basic would only be able to measure and calculate speed)
6. Analyze a basic force diagram

Advanced

1. Apply models to make predictions
2. Can infer and make connections among areas of knowledge
3. Predict the effect of changing pressure, temperature and volume
4. Graphically analyze an object's motion
5. Describe the number of valence electrons and how they are used to form bonds
6. Describe electromagnetic energy in terms of wave length and frequency

Appendix H: Evaluation Survey

Panelist ID (optional): _____

Please complete the following survey. Your responses will be anonymous and will be analyzed in conjunction with those of the other standard setting panelists.

Please indicate your agreement level with the following statements.

1. The opening session provided adequate background information about the MO EOC Assessments.

   ☐ Strongly Agree
   ☐ Agree
   ☐ Neutral
   ☐ Disagree
   ☐ Strongly Disagree

2. After discussions of the ALDs, my understanding of the Advanced, Proficient, Basic, and Below Basic levels was very well formed or confirmed.

   ☐ Strongly Agree
   ☐ Agree
   ☐ Neutral
   ☐ Disagree
   ☐ Strongly Disagree

3. The information presented during the introduction to Modified Angoff was very clear and understandable.

   ☐ Strongly Agree
   ☐ Agree
   ☐ Neutral
   ☐ Disagree
   ☐ Strongly Disagree

4. After the introduction to Modified Angoff, I felt confident in my ability to use the method during standard setting to establish the recommended cut scores.

   ☐ Strongly Agree
   ☐ Agree
   ☐ Neutral
   ☐ Disagree
   ☐ Strongly Disagree

5. I understood the tasks I needed to accomplish for each round.

   ☐ Strongly Agree
   ☐ Agree
   ☐ Neutral
   ☐ Disagree
   ☐ Strongly Disagree

6. I had the right amount of time to complete the tasks during each round.

   ☐ Strongly Agree
   ☐ Agree
   ☐ Neutral
   ☐ Disagree
   ☐ Strongly Disagree

7. This standard setting provided me an opportunity to use my best judgment in selecting and revising estimates for a recommended standard of Proficient performance.

   ☐ Strongly Agree
   ☐ Agree
   ☐ Neutral
   ☐ Disagree
   ☐ Strongly Disagree

8. This standard setting provided me an opportunity to use my best judgment in selecting and revising estimates for a recommended standard of Basic performance.

   ☐ Strongly Agree
   ☐ Agree
   ☐ Neutral
   ☐ Disagree
   ☐ Strongly Disagree

9. This standard setting provided me an opportunity to use my best judgment in selecting and revising estimates for a recommended standard of Advanced performance.

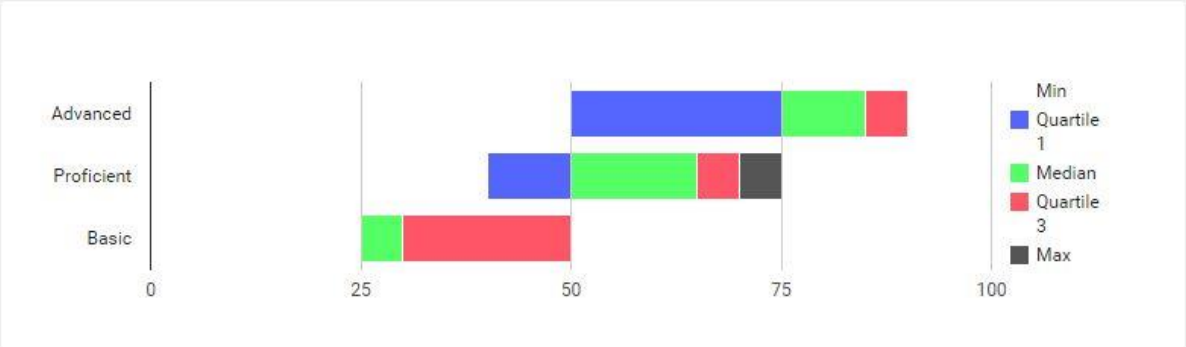
   ☐ Strongly Agree
   ☐ Agree
   ☐ Neutral
   ☐ Disagree
   ☐ Strongly Disagree

10. Any additional comments about the standard setting workshop? Please use the back for additional space if needed.

Appendix I: Feedback After Round 1

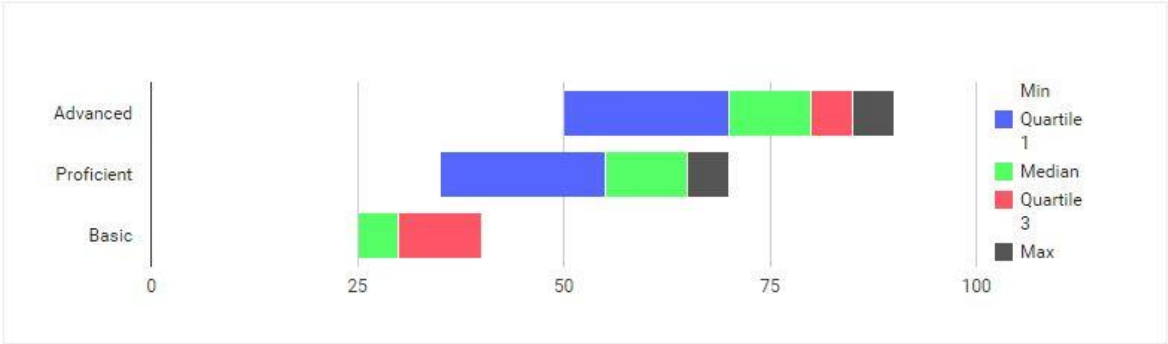
Part 1

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	90	85	90	85	50	85	75	50	75	85	90	90	14.14
Proficient	70	75	50	65	40	65	55	40	50	65	70	75	12.25
Basic	30	50	25	45	25	50	30	25	25	30	50	50	11.44



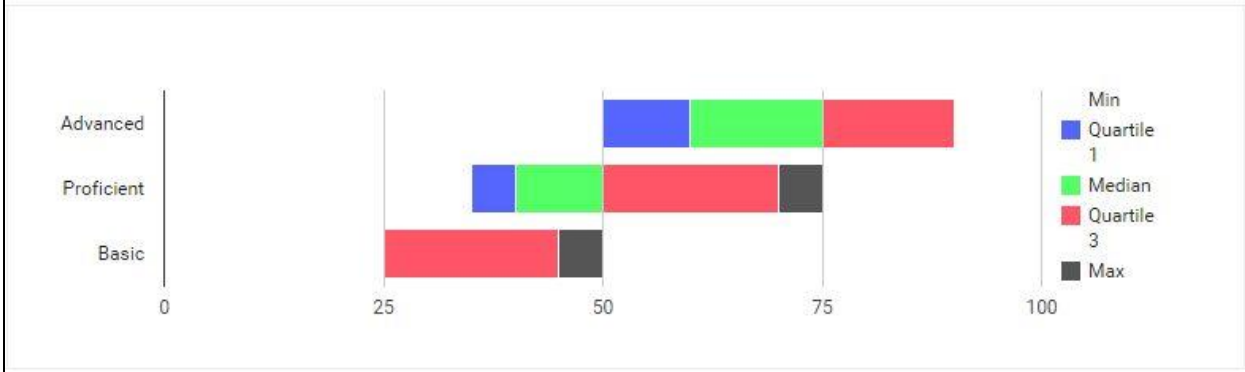
< Previous 1 2 3 4 5 ... 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	90	50	70	75	80	80	85	50	70	80	85	90	13.05
Proficient	70	35	55	65	55	65	65	35	55	65	65	70	11.80
Basic	25	25	35	40	30	30	40	25	25	30	40	40	6.36



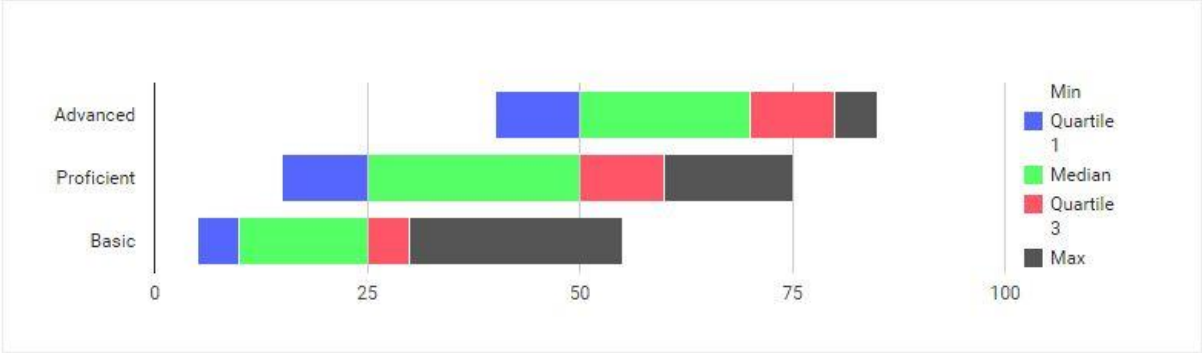
< Previous 1 2 3 4 5 ... 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	90	85	50	90	75	60	75	50	60	75	90	90	15.28
Proficient	70	70	40	75	50	35	50	35	40	50	70	75	15.92
Basic	30	45	25	50	25	25	25	25	25	25	45	50	10.75



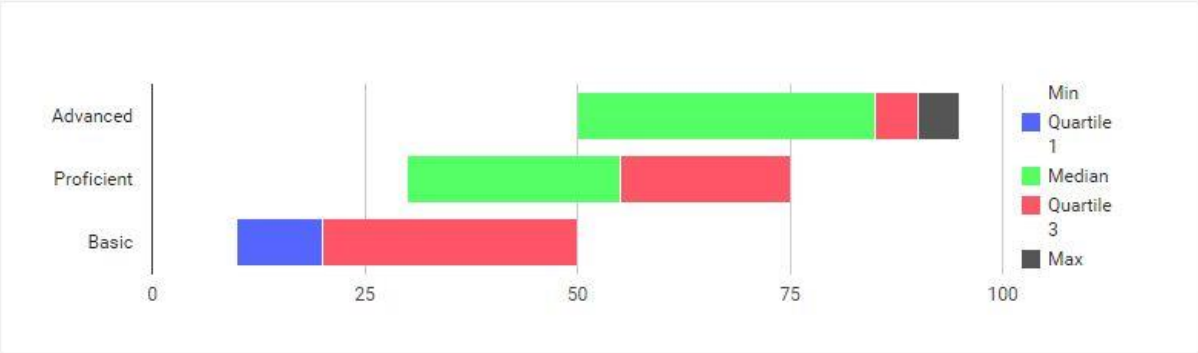
< Previous 1 2 3 4 5 ... 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	50	40	85	60	75	70	80	40	50	70	80	85	16.44
Proficient	25	15	75	50	50	40	60	15	25	50	60	75	20.41
Basic	10	5	55	30	25	15	30	5	10	25	30	55	16.69



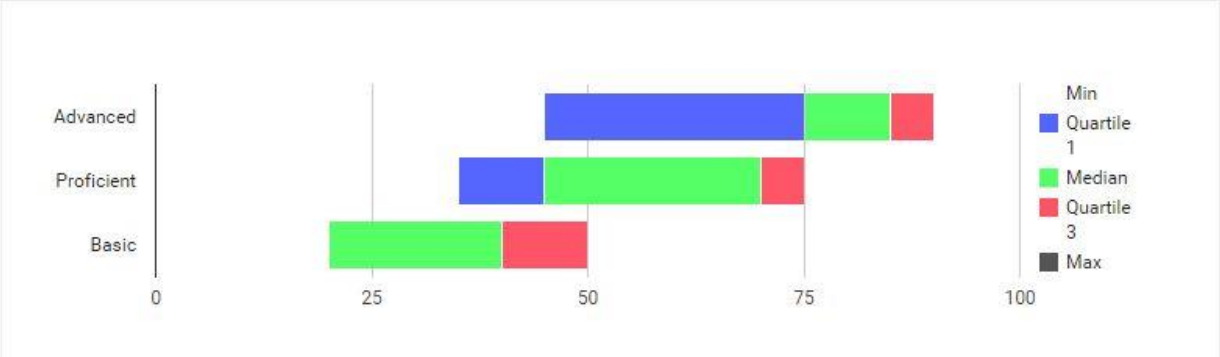
< Previous 1 2 3 4 5 ... 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	85	70	50	95	85	50	90	50	50	85	90	95	18.71
Proficient	55	40	30	75	75	30	65	30	30	55	75	75	19.76
Basic	20	20	20	40	50	10	50	10	20	20	50	50	16.33



< Previous | 1 | 2 | 3 | 4 | 5 | ... | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	85	45	90	90	80	90	75	45	75	85	90	90	16.18
Proficient	65	35	70	75	70	75	45	35	45	70	75	75	15.77
Basic	25	20	40	50	40	50	20	20	20	40	50	50	13.23



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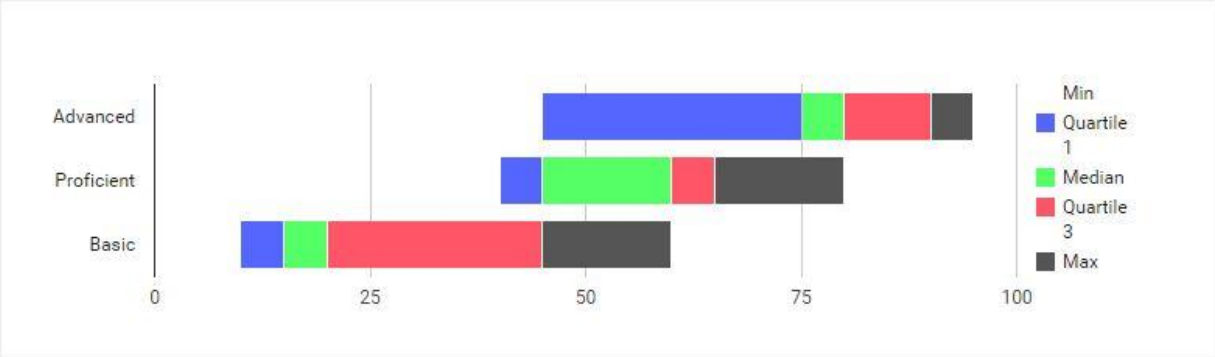
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	75	85	45	80	95	90	80	45	75	80	90	95	16.26
Proficient	45	65	40	60	80	65	55	40	45	60	65	80	13.45
Basic	15	20	20	35	60	45	10	10	15	20	45	60	18.13



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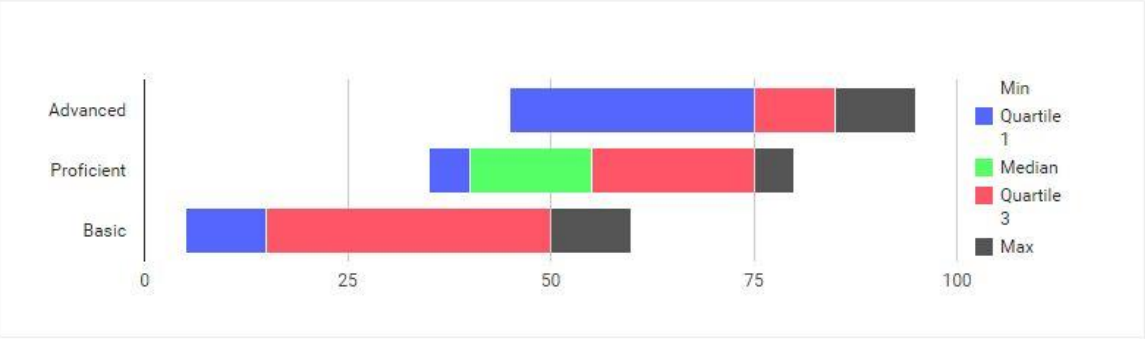
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	75	75	45	85	80	95	75	45	75	75	85	95	15.39
Proficient	40	55	35	75	60	80	45	35	40	55	75	80	17.18
Basic	15	15	15	50	20	60	5	5	15	15	50	60	20.70



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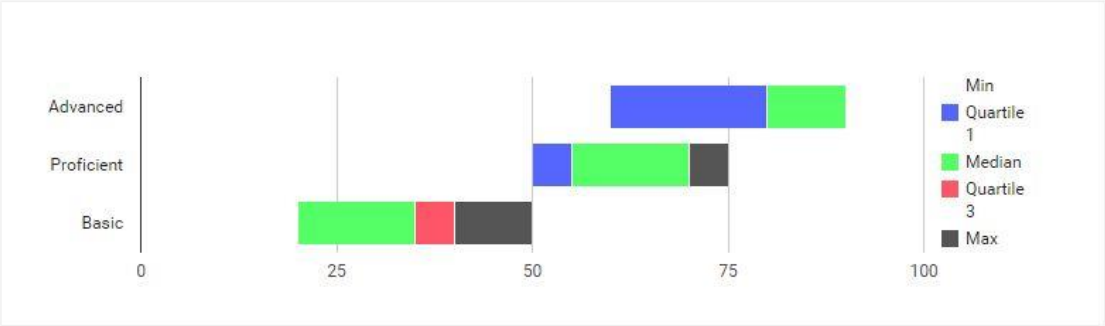
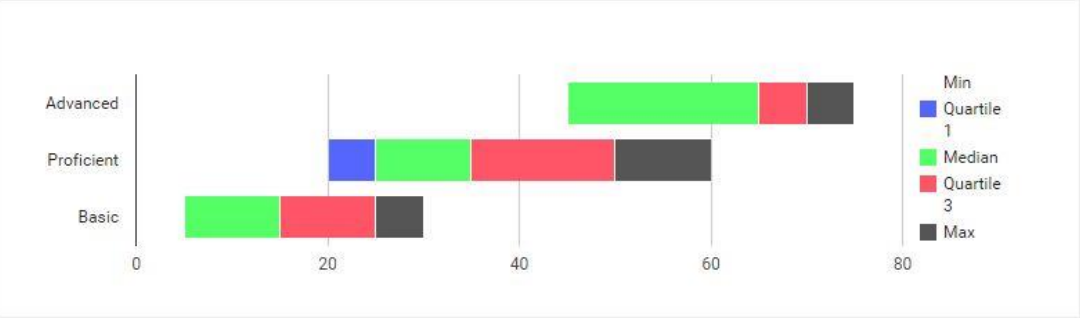
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	80	90	60	85	90	90	90	60	80	90	90	90	11.07
Proficient	55	65	50	70	75	70	70	50	55	70	70	75	9.13
Basic	20	20	35	35	50	40	30	20	20	35	40	50	10.75



< Previous | 1 | 2 | 3 | 4 | 5 | ... | 7 | 8 | 9 | 10 | 11 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	75	65	65	45	70	50	45	45	45	65	70	75	12.39
Proficient	60	35	50	25	40	30	20	20	25	35	50	60	14.10
Basic	10	5	30	15	25	25	5	5	5	15	25	30	10.29



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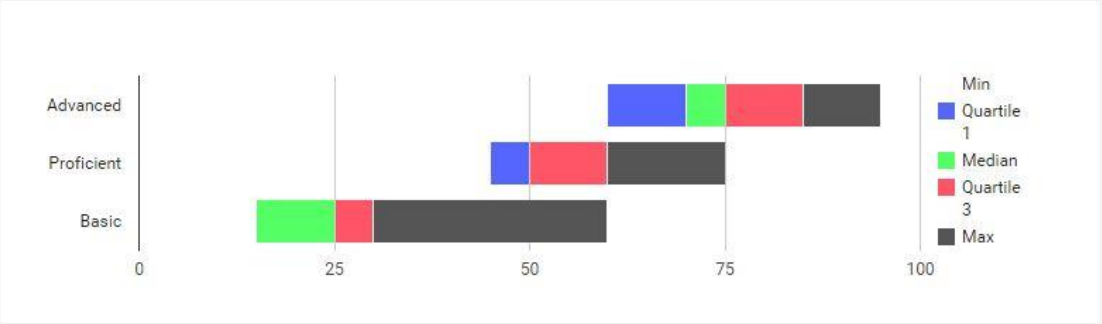
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	70	85	95	60	75	85	70	60	70	75	85	95	11.85
Proficient	50	55	75	45	50	60	50	45	50	50	60	75	10.00
Basic	25	15	60	15	25	30	25	15	15	25	30	60	15.24



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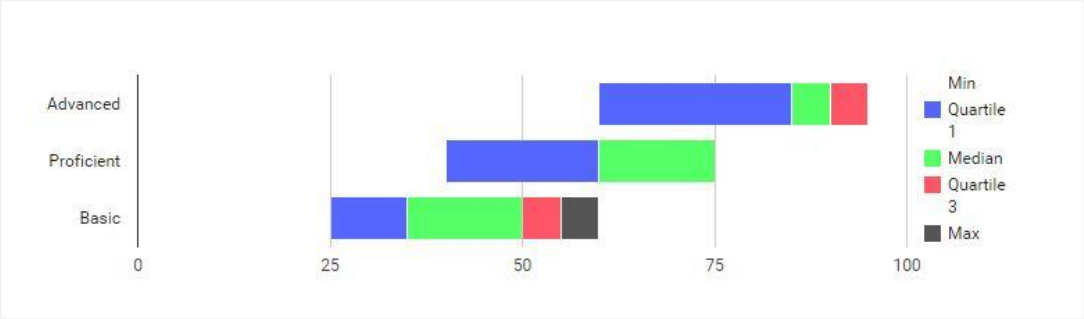
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	90	95	90	60	90	95	85	60	85	90	95	95	12.15
Proficient	60	75	75	40	70	75	75	40	60	75	75	75	13.18
Basic	35	50	55	25	50	60	50	25	35	50	55	60	12.15



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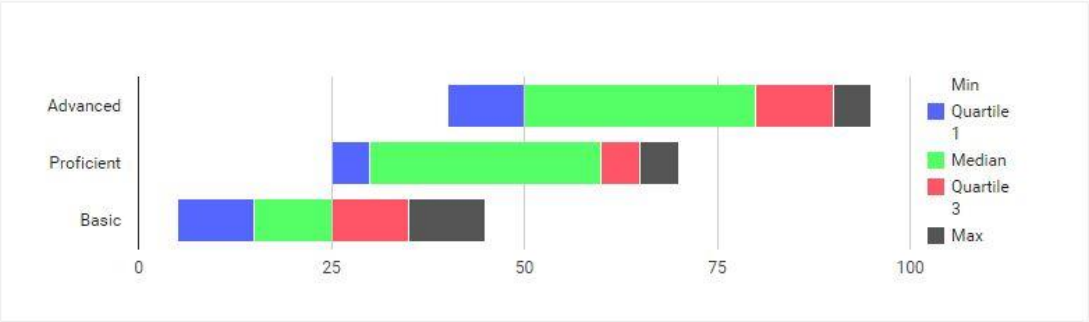
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	85	95	80	40	90	50	80	40	50	80	90	95	20.90
Proficient	50	70	65	30	65	25	60	25	30	60	65	70	17.99
Basic	15	45	35	15	25	5	25	5	15	25	35	45	13.45



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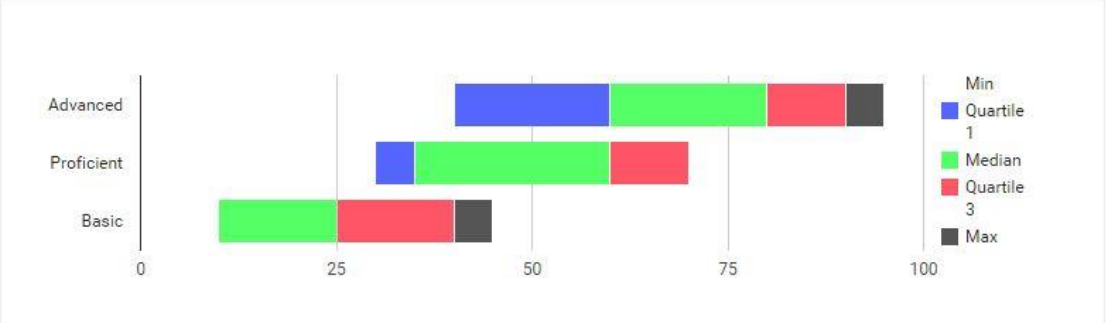
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	85	95	40	80	90	75	60	40	60	80	90	95	19.15
Proficient	65	70	30	60	70	50	35	30	35	60	70	70	16.44
Basic	40	25	10	35	45	10	10	10	10	25	40	45	15.28



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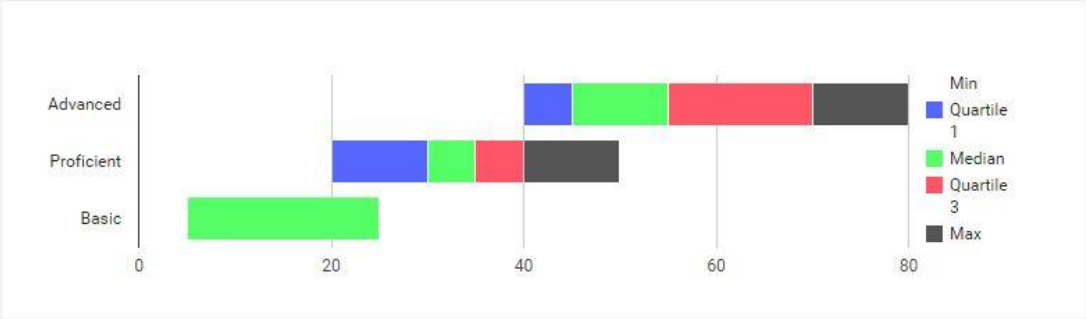
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	80	55	45	60	70	50	40	40	45	55	70	80	14.10
Proficient	50	30	35	40	40	35	20	20	30	35	40	50	9.32
Basic	25	5	25	25	25	20	5	5	5	25	25	25	9.45



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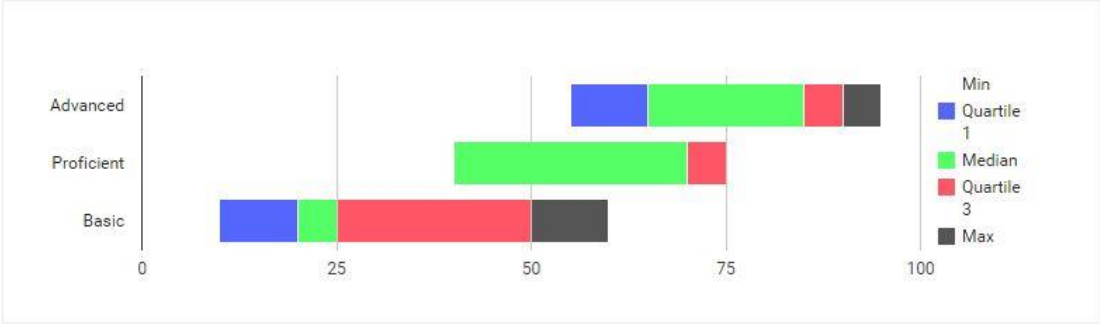
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	85	65	55	90	95	90	70	55	65	85	90	95	15.20
Proficient	70	40	40	75	75	75	40	40	40	70	75	75	18.13
Basic	25	25	20	50	60	50	10	10	20	25	50	60	18.80



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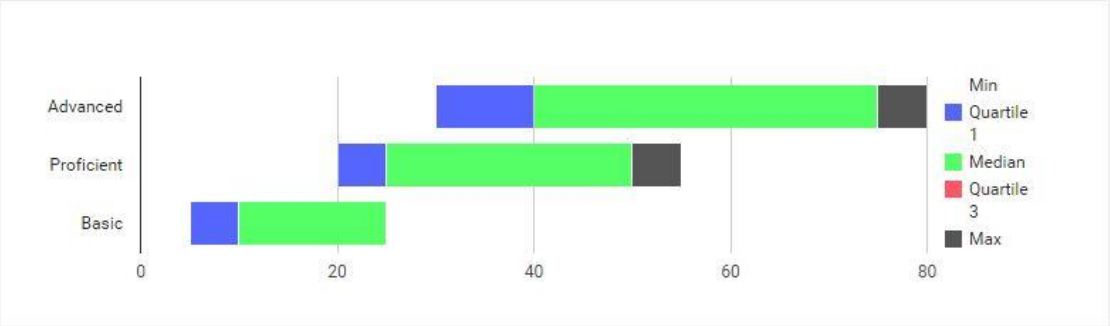
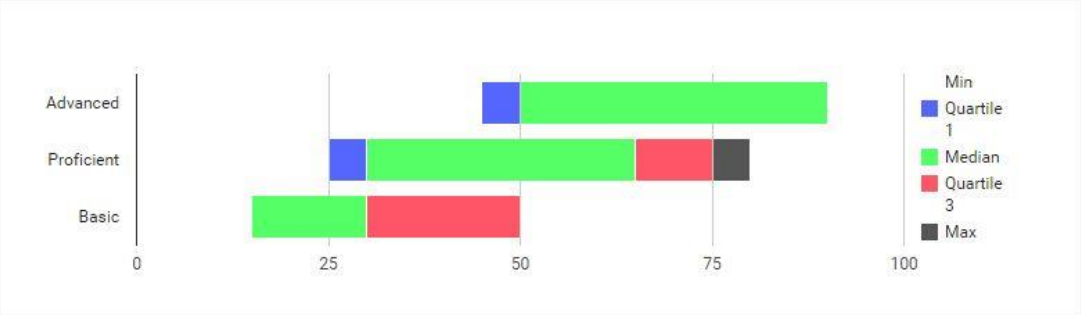
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	80	75	40	75	75	50	30	30	40	75	75	80	20.30
Proficient	55	50	25	50	50	30	20	20	25	50	50	55	14.43
Basic	25	25	10	25	25	10	5	5	10	25	25	25	9.06



< Previous 1 2 3 4 5 ... 15 16 **17** 18 19 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	90	90	45	90	85	90	50	45	50	90	90	90	20.38
Proficient	70	65	30	80	65	75	25	25	30	65	75	80	21.93
Basic	30	30	15	50	25	50	15	15	15	30	50	50	14.56



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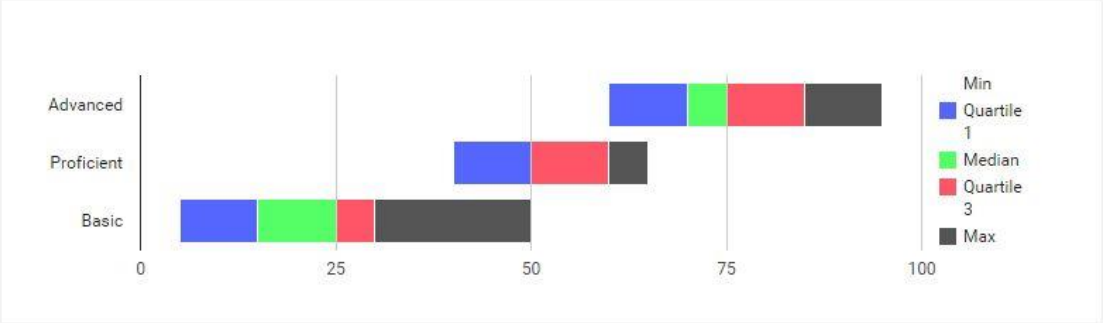
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	85	70	60	75	95	75	75	60	70	75	85	95	11.07
Proficient	60	50	40	50	65	50	50	40	50	50	60	65	8.09
Basic	30	25	5	25	50	25	15	5	15	25	30	50	13.84



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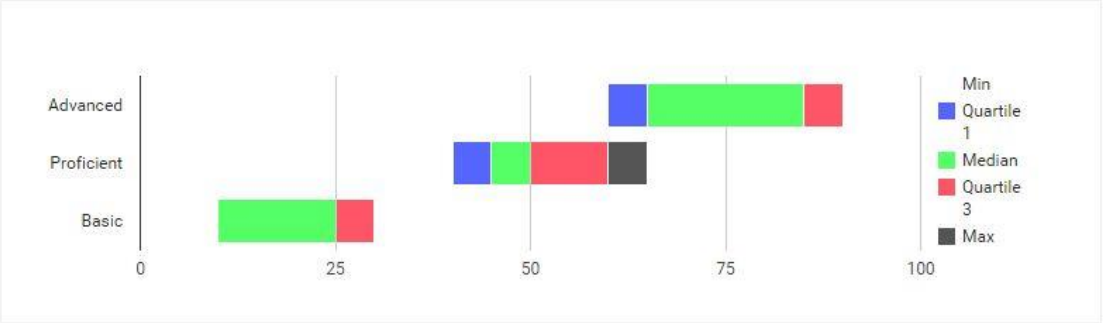
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	90	85	60	70	85	90	65	60	65	85	90	90	12.54
Proficient	65	50	40	50	50	60	45	40	45	50	60	65	8.52
Basic	30	25	10	25	15	30	10	10	10	25	30	30	8.86



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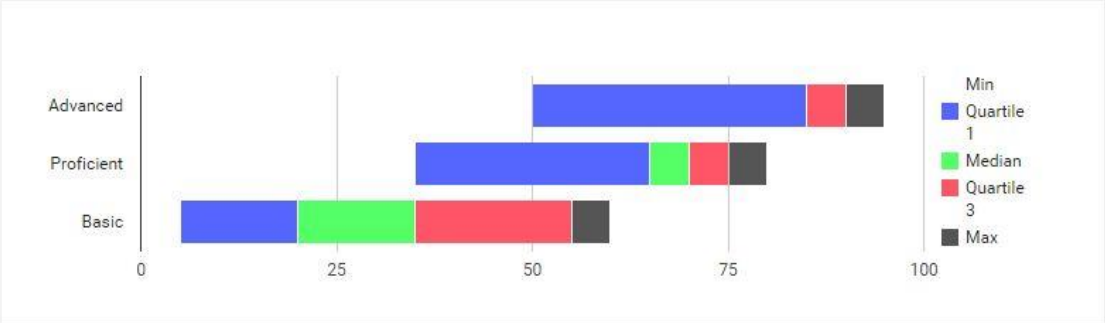
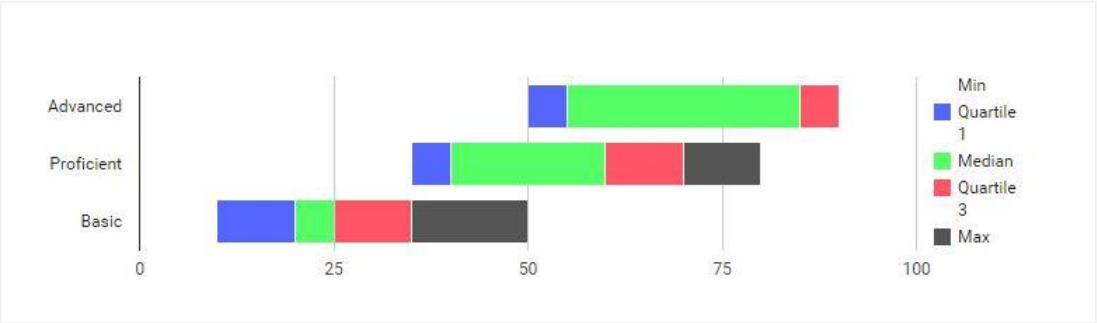
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	85	90	50	85	95	90	85	50	85	85	90	95	14.96
Proficient	70	75	35	70	75	80	65	35	65	70	75	80	14.96
Basic	35	50	5	30	55	60	20	5	20	35	55	60	19.94



< Previous | 1 | 2 | 3 | 4 | 5 | ... | 19 | 20 | 21 | 22 | 23 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	85	90	50	85	85	90	55	50	55	85	90	90	17.04
Proficient	60	70	40	70	50	80	35	35	40	60	70	80	16.80
Basic	35	25	20	35	25	50	10	10	20	25	35	50	12.82



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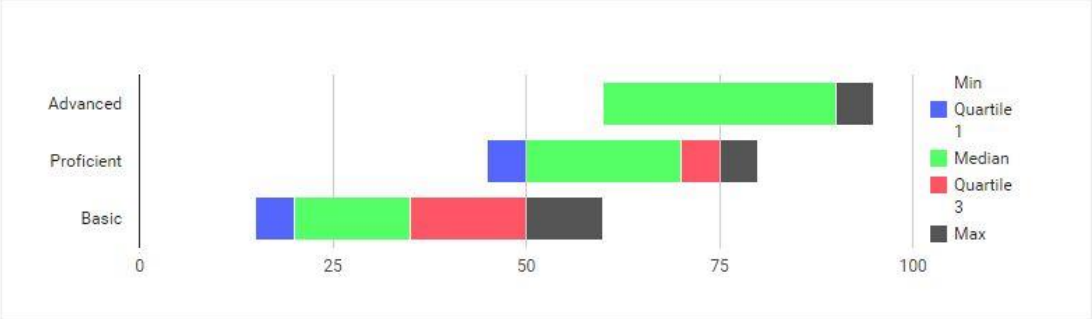
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	90	90	60	90	90	95	60	60	60	90	90	95	15.24
Proficient	70	70	45	75	65	80	50	45	50	70	75	80	12.91
Basic	35	35	15	50	45	60	20	15	20	35	50	60	16.04



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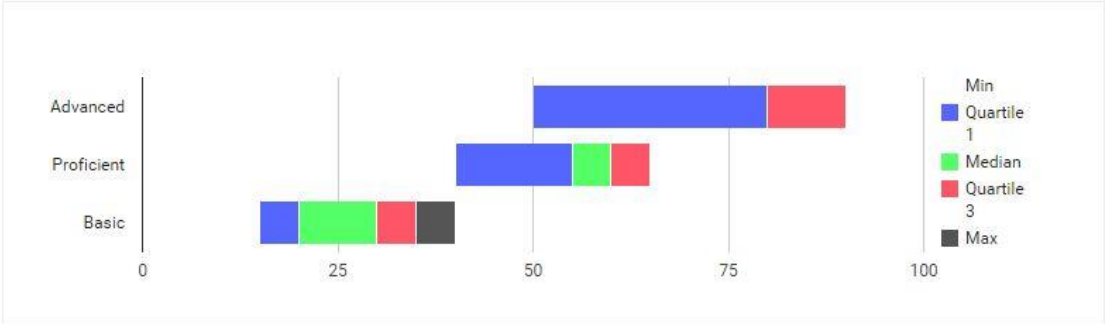
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	90	90	50	80	85	80	80	50	80	80	90	90	13.67
Proficient	60	65	40	65	55	60	60	40	55	60	65	65	8.59
Basic	35	30	15	25	30	40	20	15	20	30	35	40	8.59



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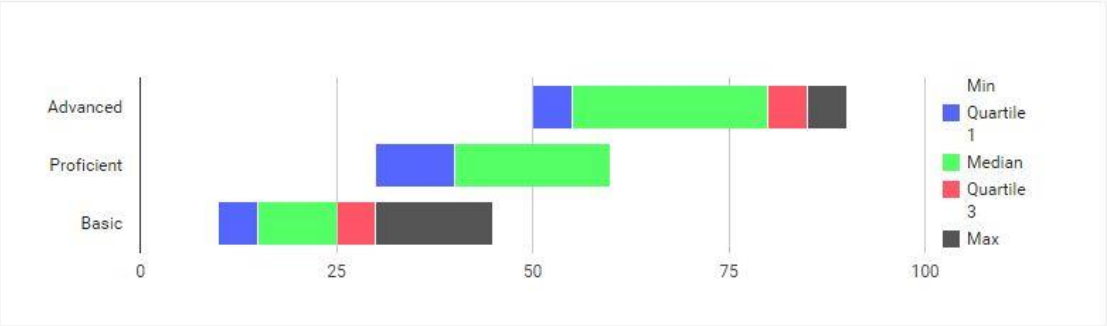
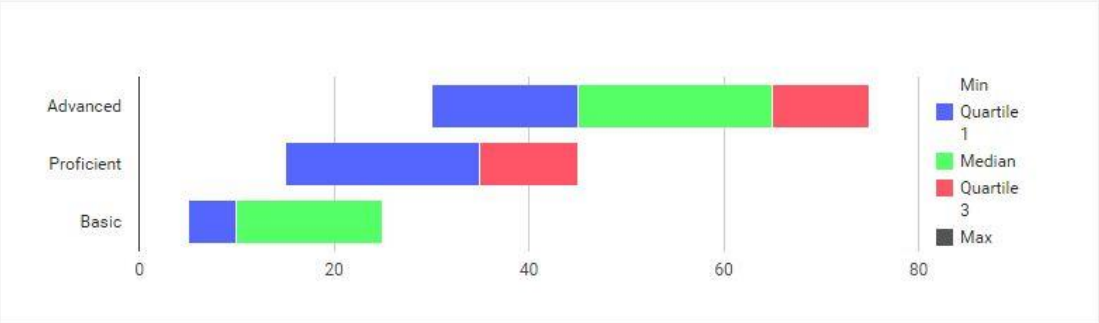
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	85	90	50	75	80	80	55	50	55	80	85	90	15.20
Proficient	60	60	40	50	60	60	30	30	40	60	60	60	12.15
Basic	30	25	15	25	25	45	10	10	15	25	30	45	11.18



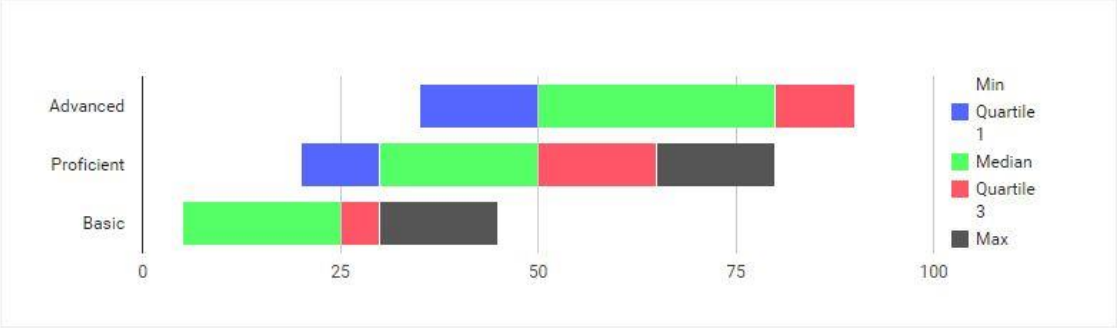
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 23 | 24 | **25** | 26 | 27 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	50	65	45	75	65	75	30	30	45	65	75	75	16.80
Proficient	35	40	35	45	45	35	15	15	35	35	45	45	10.18
Basic	25	25	10	25	25	10	5	5	10	25	25	25	9.06



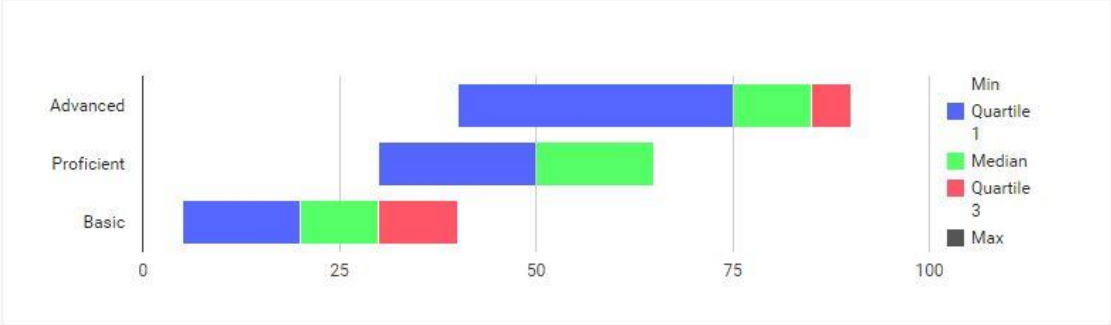
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 24 | 25 | **26** | 27 | 28 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	85	90	50	90	50	80	35	35	50	80	90	90	22.86
Proficient	60	65	40	80	30	50	20	20	30	50	65	80	20.90
Basic	30	25	10	45	5	25	5	5	5	25	30	45	14.84



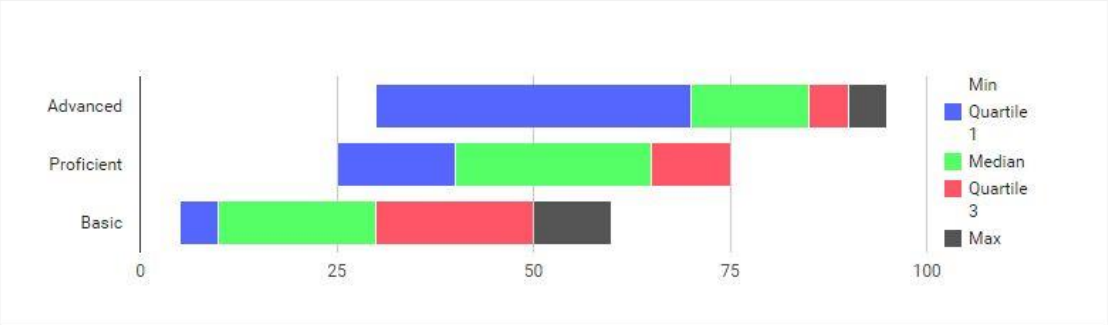
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 25 | 26 | 27 | 28 | 29 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	85	90	40	85	75	90	85	40	75	85	90	90	17.73
Proficient	55	65	30	65	50	65	65	30	50	65	65	65	13.14
Basic	30	30	5	40	25	40	20	5	20	30	40	40	12.20



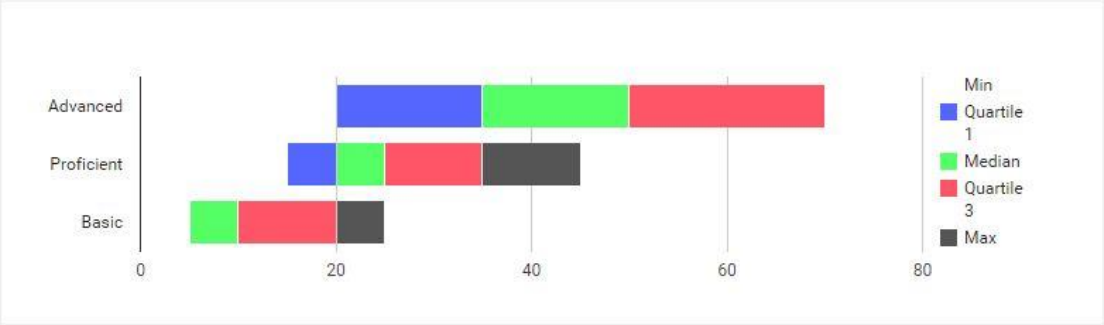
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 26 | 27 | 28 | 29 | 30 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	85	85	30	95	80	90	70	30	70	85	90	95	21.93
Proficient	50	65	25	75	70	75	40	25	40	65	75	75	19.33
Basic	30	25	5	50	50	60	10	5	10	30	50	60	21.19



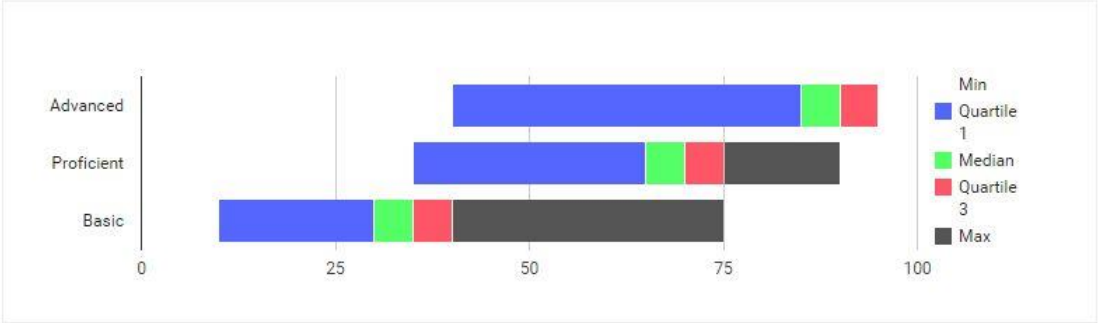
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 27 | 28 | **29** | 30 | 31 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	70	70	35	50	40	70	20	20	35	50	70	70	20.09
Proficient	35	45	20	25	20	35	15	15	20	25	35	45	10.75
Basic	15	25	5	5	10	20	5	5	5	10	20	25	8.09



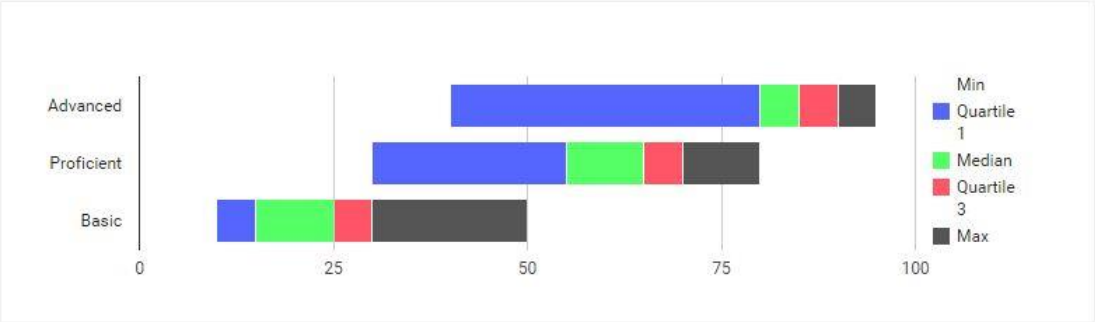
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 28 | 29 | **30** | 31 | 32 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	90	95	40	85	95	95	90	40	85	90	95	95	19.88
Proficient	70	70	35	65	90	75	70	35	65	70	75	90	16.55
Basic	30	35	10	40	75	40	30	10	30	35	40	75	19.55



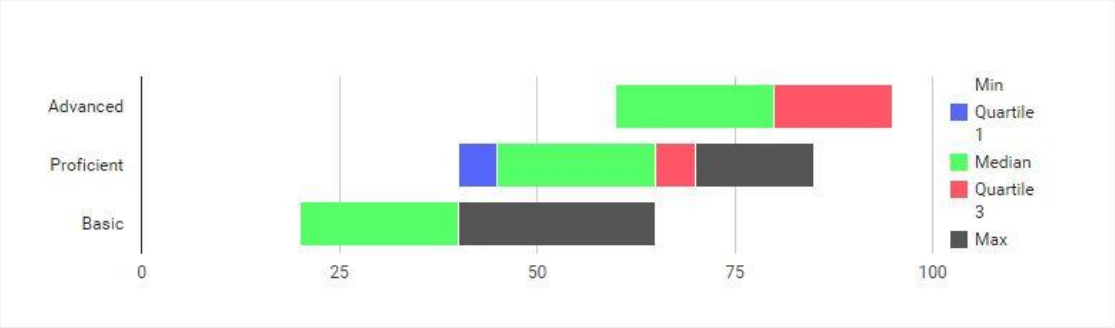
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 29 | 30 | 31 | 32 | 33 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	85	95	40	85	90	80	80	40	80	85	90	95	18.13
Proficient	65	70	30	65	80	60	55	30	55	65	70	80	15.66
Basic	30	25	10	25	50	25	15	10	15	25	30	50	12.72



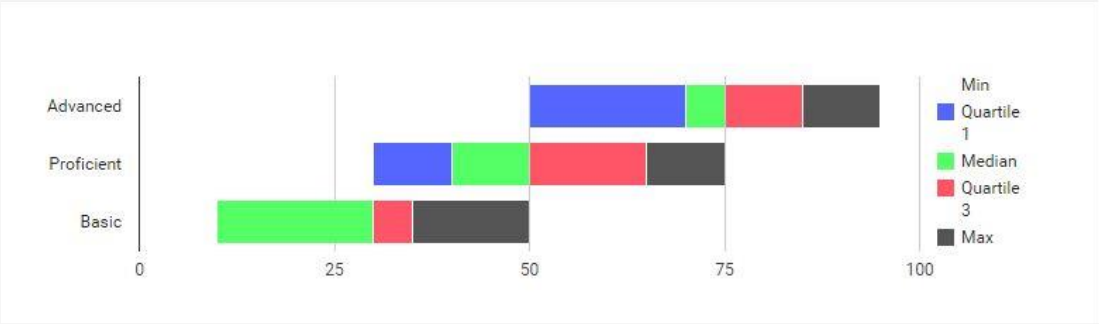
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 30 | 31 | 32 | 33 | 34 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	95	85	60	95	80	80	60	60	60	80	95	95	14.56
Proficient	60	65	40	85	70	65	45	40	45	65	70	85	15.20
Basic	40	25	20	65	40	40	20	20	20	40	40	65	15.92



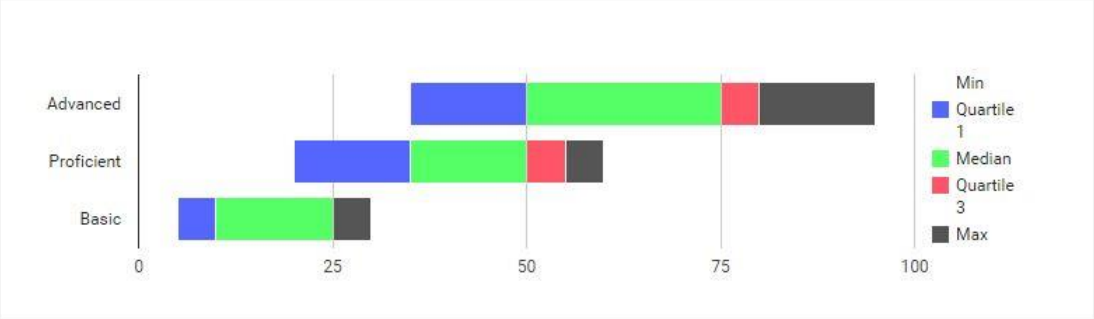
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 31 | 32 | **33** | 34 | 35 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	85	85	50	95	70	75	70	50	70	75	85	95	14.56
Proficient	65	65	40	75	50	50	30	30	40	50	65	75	15.74
Basic	35	35	10	50	30	25	10	10	10	30	35	50	14.39



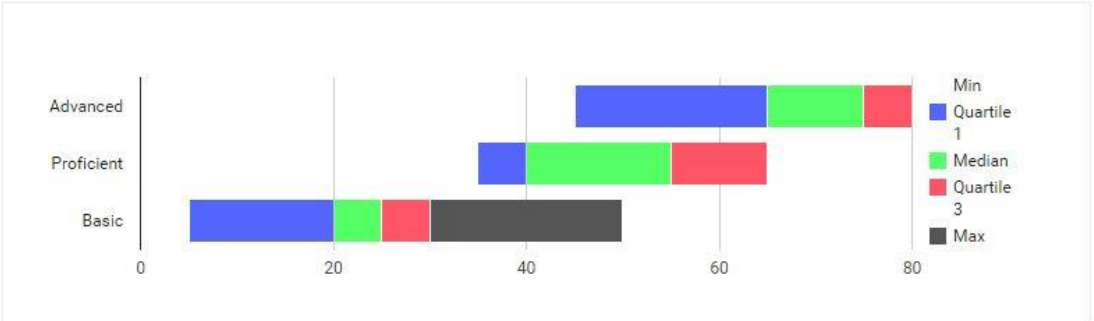
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 32 | 33 | **34** | 35 | 36 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	75	75	50	95	70	80	35	35	50	75	80	95	19.94
Proficient	35	50	40	60	55	50	20	20	35	50	55	60	13.67
Basic	10	25	10	30	25	25	5	5	10	25	25	30	9.88



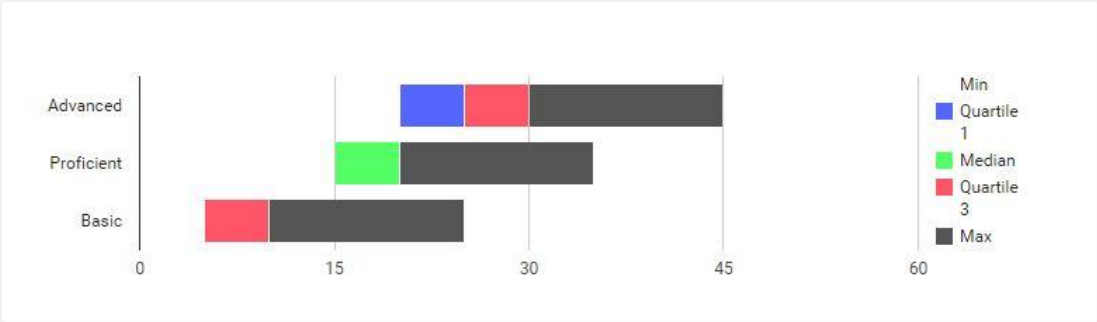
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 33 | 34 | **35** | 36 | 37 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	80	65	75	70	75	80	45	45	65	75	80	80	12.25
Proficient	55	40	65	50	55	65	35	35	40	55	65	65	11.50
Basic	20	25	30	25	30	50	5	5	20	25	30	50	13.45



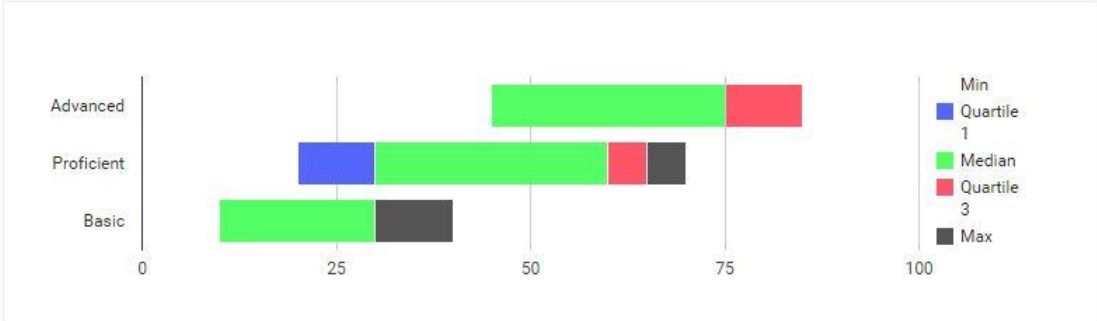
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 34 | 35 | **36** | 37 | 38 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	25	45	25	25	20	30	30	20	25	25	30	45	8.02
Proficient	20	35	20	15	15	20	15	15	15	20	20	35	7.07
Basic	5	25	5	5	10	5	5	5	5	5	10	25	7.48



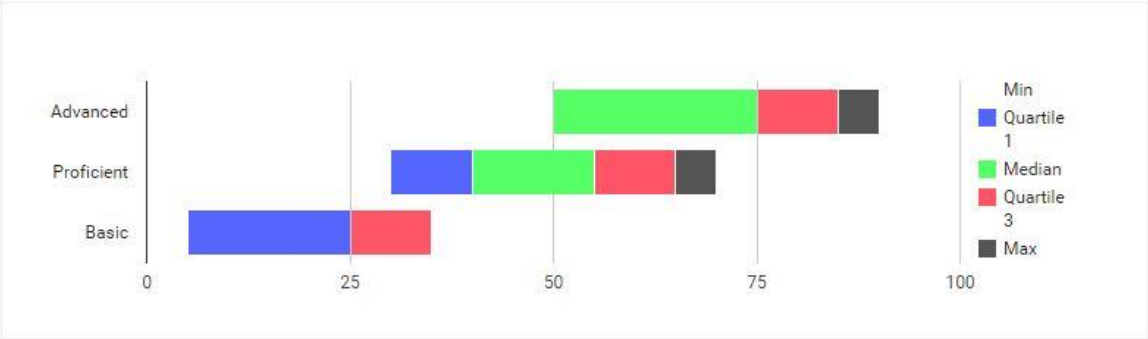
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 35 | 36 | 37 | 38 | 39 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	85	75	45	85	75	85	45	45	45	75	85	85	18.13
Proficient	60	50	30	70	65	65	20	20	30	60	65	70	19.30
Basic	30	15	10	40	30	30	10	10	10	30	30	40	11.80



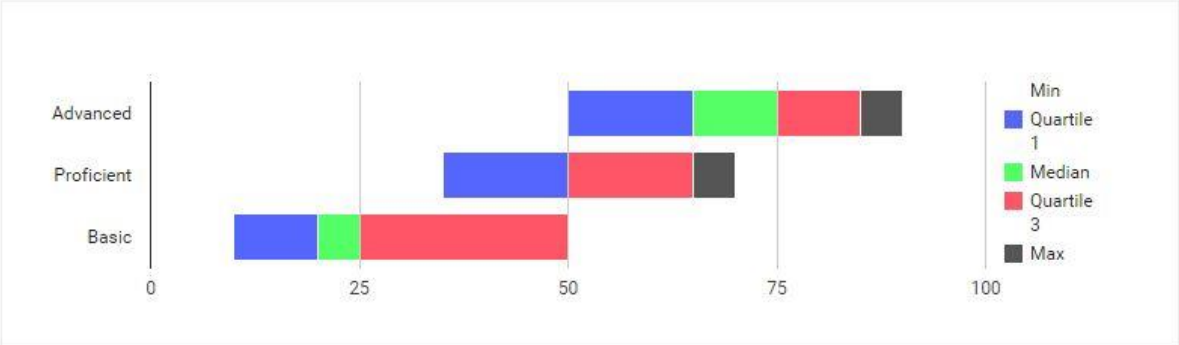
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	75	90	50	70	85	80	50	50	50	75	85	90	16.00
Proficient	55	65	40	55	70	60	30	30	40	55	65	70	14.06
Basic	25	25	25	25	35	35	5	5	25	25	35	35	10.00



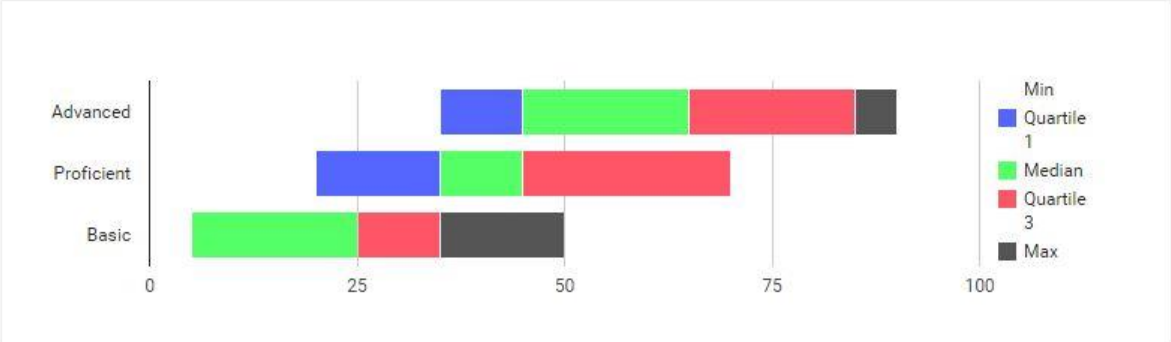
< Previous 1 2 3 4 5 ... 37 38 **39** 40 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	85	50	90	75	65	80	65	50	65	75	85	90	13.80
Proficient	65	35	70	50	50	65	50	35	50	50	65	70	12.25
Basic	30	10	50	25	25	50	20	10	20	25	50	50	15.00



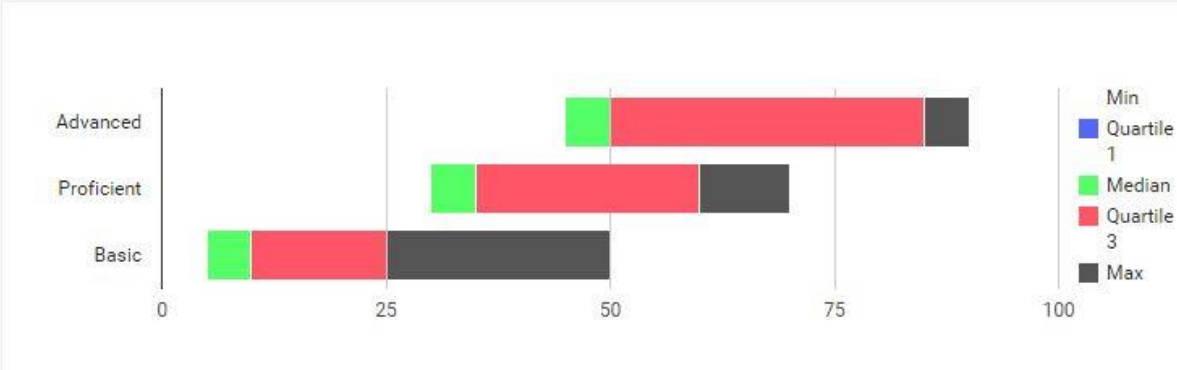
< Previous 1 2 3 4 5 ... 38 39 **40** 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	60	35	65	45	85	90	65	35	45	65	85	90	19.73
Proficient	35	20	50	35	70	70	45	20	35	45	70	70	18.64
Basic	5	5	35	25	30	50	15	5	5	25	35	50	16.51



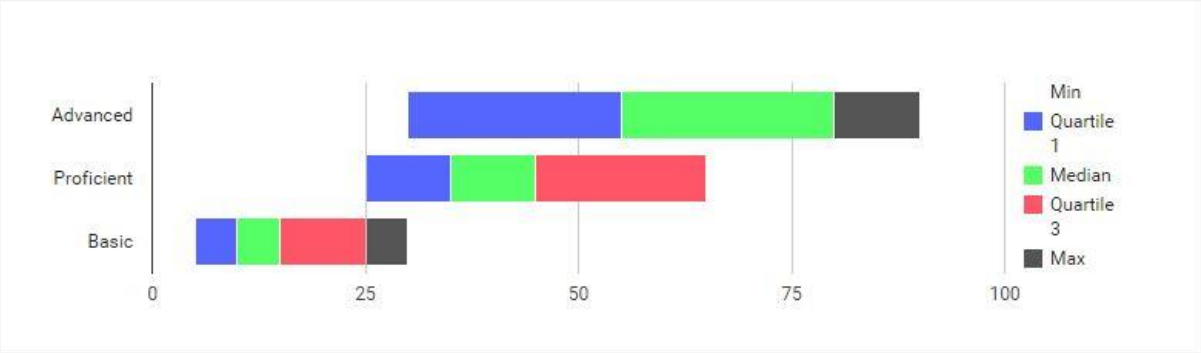
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 39 | 40 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	60	45	50	45	90	85	50	45	45	50	85	90	19.02
Proficient	30	35	30	35	70	60	35	30	30	35	60	70	16.04
Basic	5	10	10	25	50	25	5	5	5	10	25	50	16.26



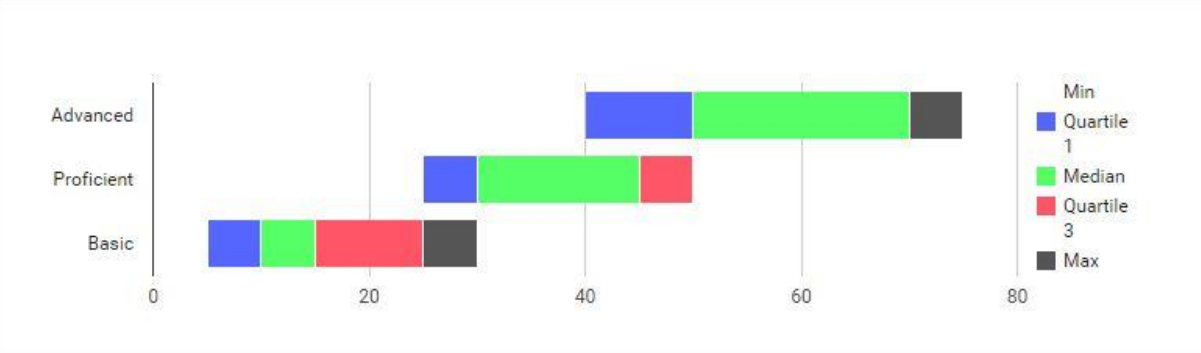
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 40 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	80	30	55	90	80	75	80	30	55	80	80	90	20.62
Proficient	40	25	35	65	65	45	60	25	35	45	65	65	15.77
Basic	15	5	10	25	30	15	20	5	10	15	25	30	8.59



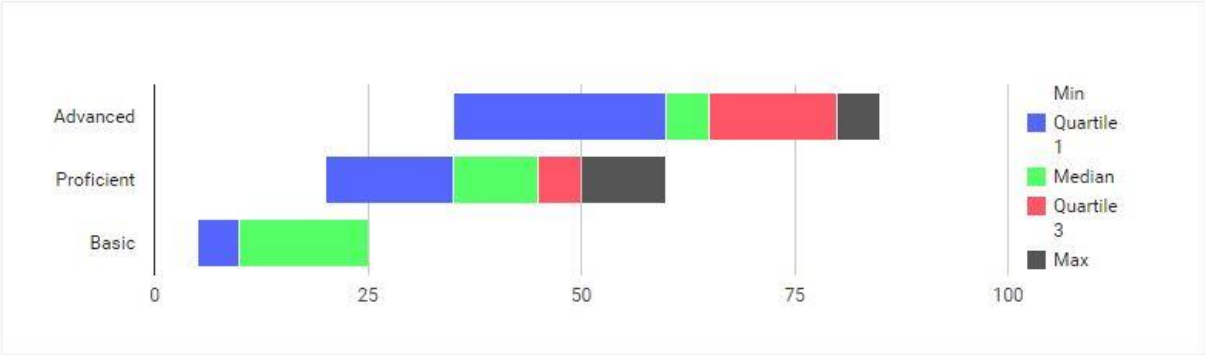
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 41 | 42 | **43** | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	70	40	50	75	65	70	70	40	50	70	70	75	12.86
Proficient	30	30	25	50	50	50	45	25	30	45	50	50	11.18
Basic	15	10	5	25	30	15	10	5	10	15	25	30	8.86



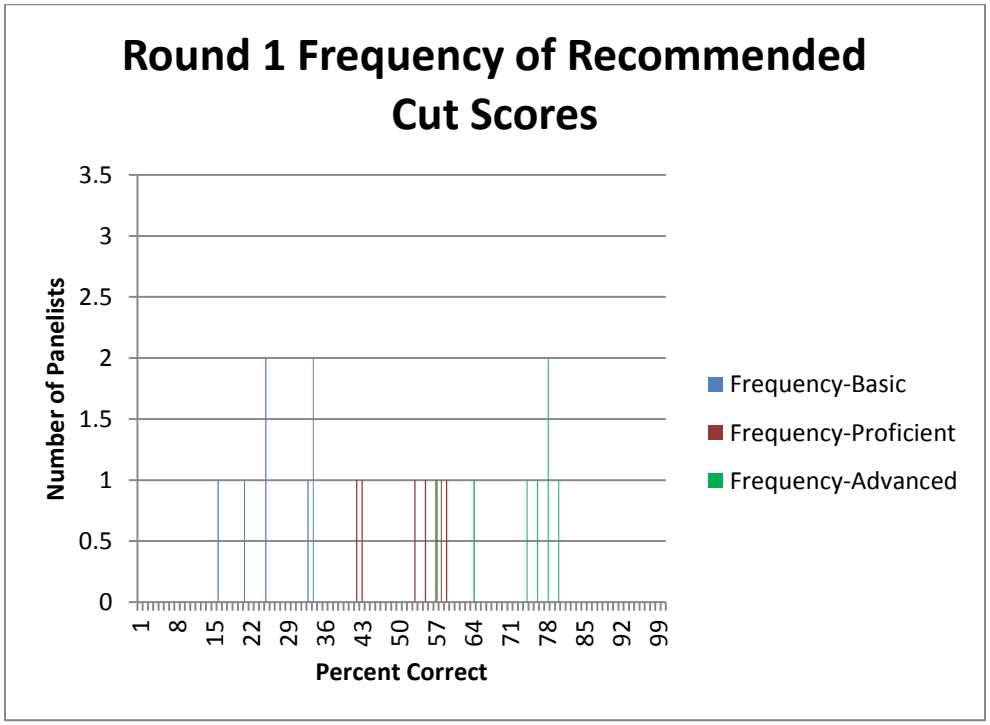
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 42 | 43 | **44** | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	80	65	60	85	65	70	35	35	60	65	80	85	16.18
Proficient	50	50	40	60	45	35	20	20	35	45	50	60	12.86
Basic	20	25	25	25	25	10	5	5	10	25	25	25	8.38



< Previous 1 2 3 4 5 ... 43 44 45 Next >

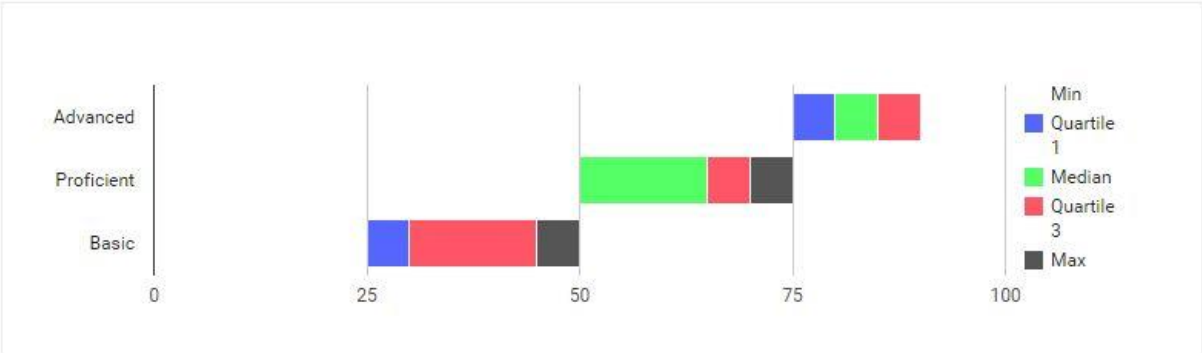
Part 2



Appendix J: Feedback After Round 2

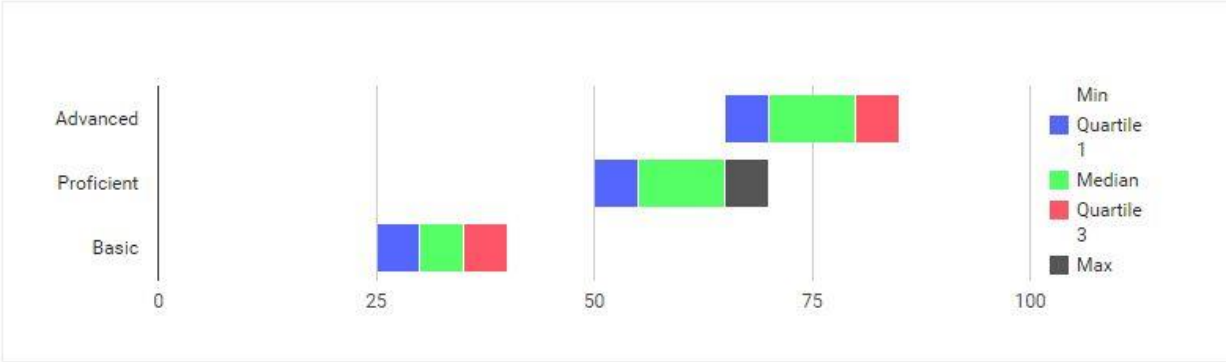
Part 1

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	80	85	90	85	85	90	75	75	80	85	90	90	5.35
Proficient	50	75	50	65	65	70	55	50	50	65	70	75	9.88
Basic	25	50	30	45	45	30	30	25	30	30	45	50	9.88



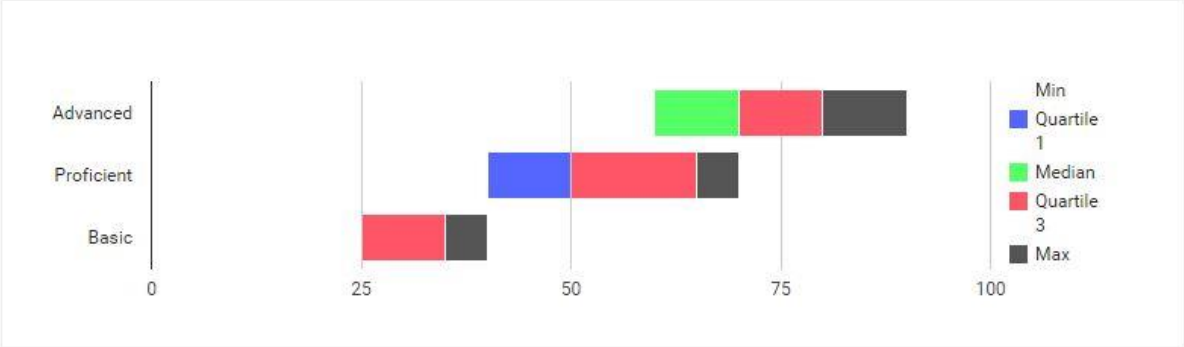
< Previous 1 2 3 4 5 ... 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	75	65	85	70	80	85	80	65	70	80	85	85	7.56
Proficient	65	50	65	55	65	70	55	50	55	65	65	70	7.32
Basic	40	35	40	35	30	25	30	25	30	35	40	40	5.56



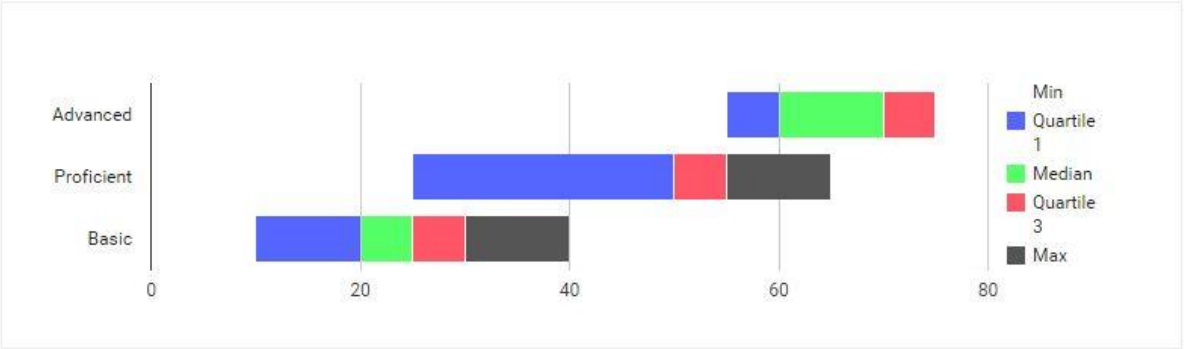
< Previous 1 2 3 4 5 ... 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	70	75	60	70	60	90	80	60	60	70	80	90	10.75
Proficient	40	50	50	50	50	70	65	40	50	50	65	70	10.29
Basic	25	25	25	35	25	30	40	25	25	25	35	40	6.07



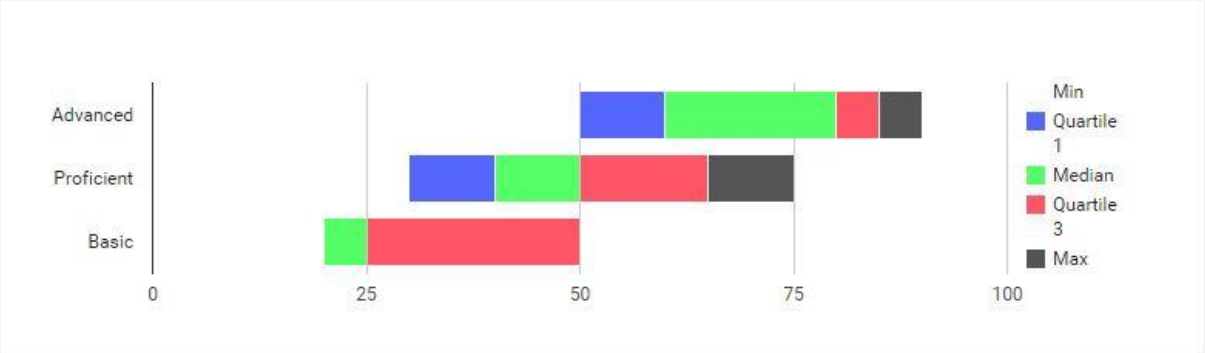
< Previous 1 2 3 4 5 ... 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	60	75	70	65	75	55	75	55	60	70	75	75	8.09
Proficient	50	50	50	55	50	25	65	25	50	50	55	65	12.05
Basic	30	25	20	25	20	10	40	10	20	25	30	40	9.32



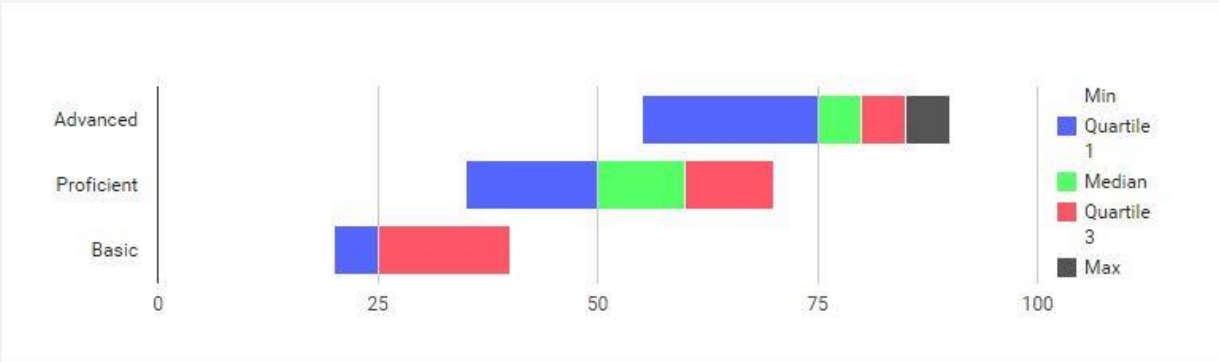
< Previous 1 2 3 4 5 ... 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	50	85	60	65	90	80	85	50	60	80	85	90	15.20
Proficient	30	75	40	40	65	50	65	30	40	50	65	75	16.55
Basic	20	50	20	25	50	20	40	20	20	25	50	50	14.10



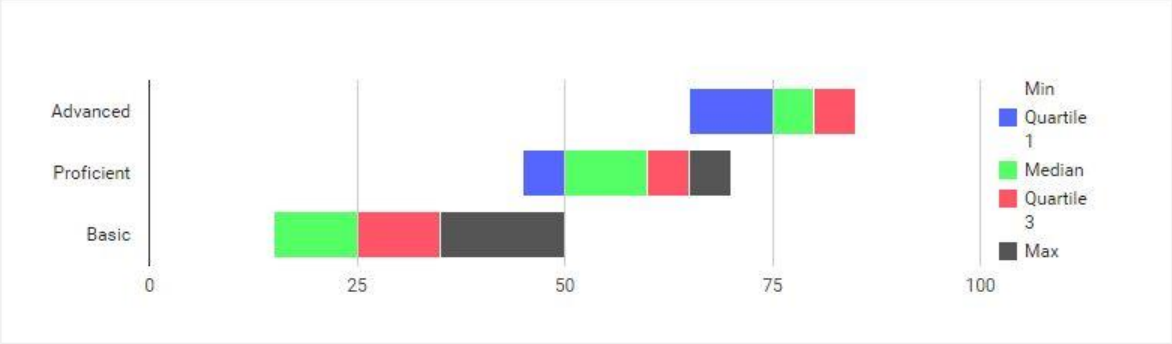
< Previous 1 2 3 4 5 ... 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	55	75	75	90	85	85	80	55	75	80	85	90	11.50
Proficient	35	50	50	70	65	60	70	35	50	60	70	70	12.86
Basic	20	25	25	40	35	25	40	20	25	25	40	40	8.16



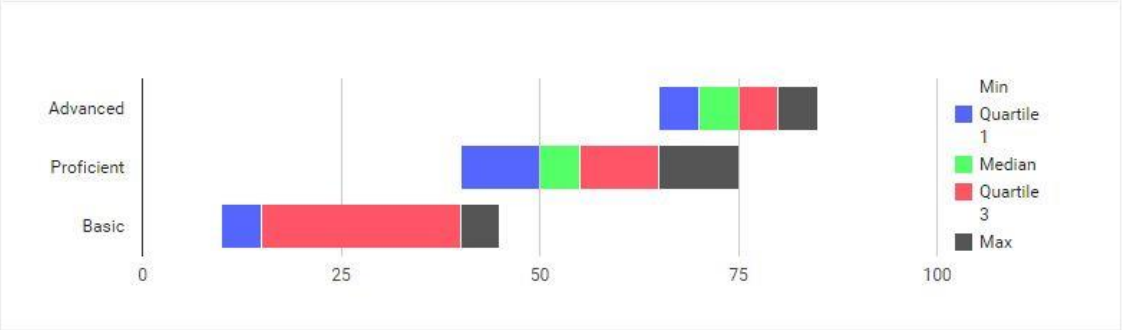
< Previous 1 2 3 4 5 ... 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	65	80	80	85	85	75	85	65	75	80	85	85	7.32
Proficient	50	60	60	65	65	45	70	45	50	60	65	70	8.86
Basic	20	35	15	25	30	15	50	15	15	25	35	50	12.54



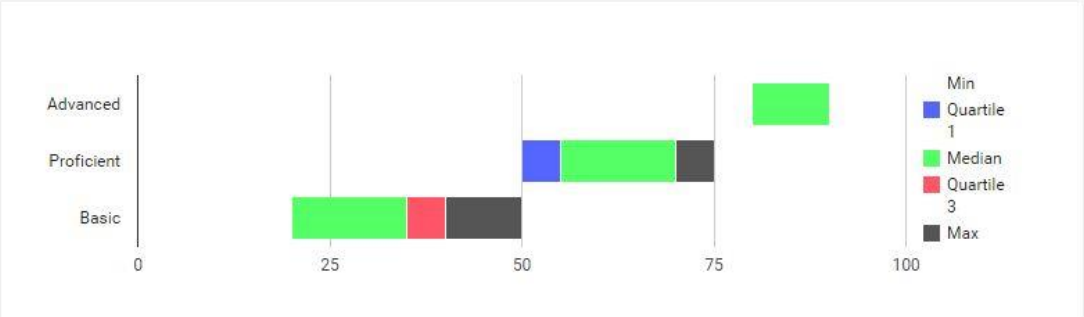
< Previous | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	65	80	75	75	85	70	75	65	70	75	80	85	6.45
Proficient	50	60	55	55	75	40	65	40	50	55	65	75	11.13
Basic	15	25	10	15	45	15	40	10	15	15	40	45	13.76



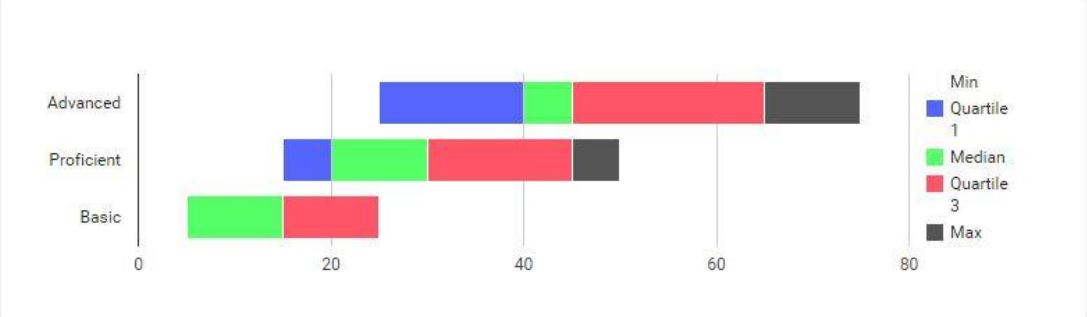
< Previous | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	80	90	90	90	90	80	85	80	80	90	90	90	4.76
Proficient	50	75	70	65	70	55	70	50	55	70	70	75	9.13
Basic	35	50	30	20	40	20	35	20	20	35	40	50	10.75



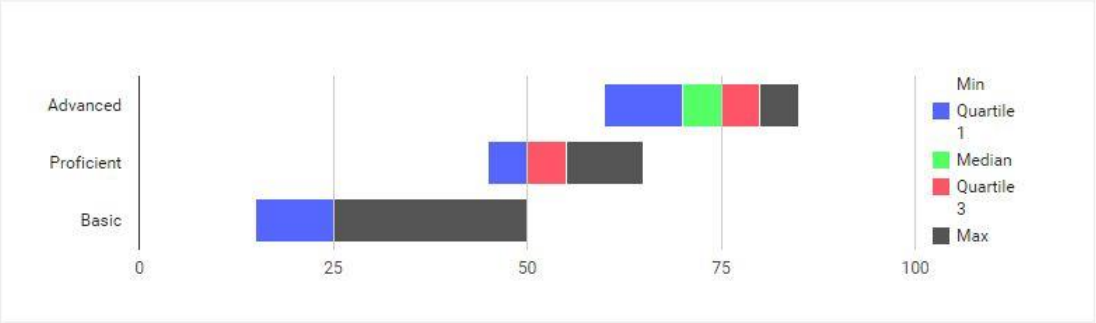
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 7 | 8 | 9 | 10 | 11 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	45	25	45	40	65	75	60	25	40	45	65	75	16.94
Proficient	25	15	20	30	35	50	45	15	20	30	45	50	12.82
Basic	15	5	5	15	25	10	25	5	5	15	25	25	8.38



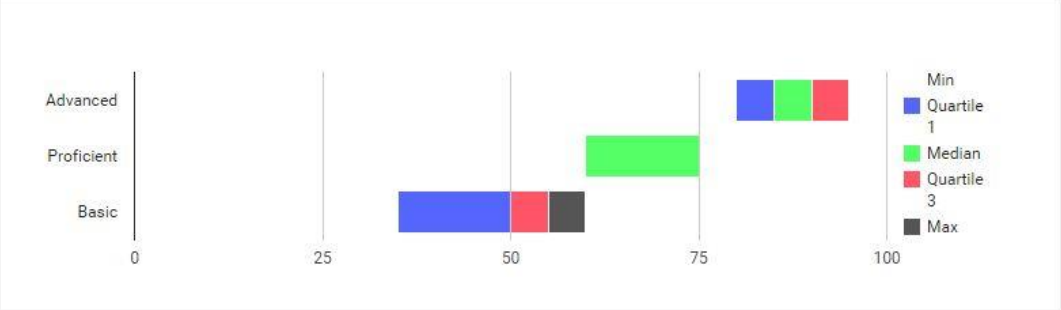
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 8 | 9 | 10 | 11 | 12 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	60	75	80	80	75	70	85	60	70	75	80	85	8.16
Proficient	45	50	55	55	50	50	65	45	50	50	55	65	6.36
Basic	15	25	25	25	25	25	50	15	25	25	25	50	10.75



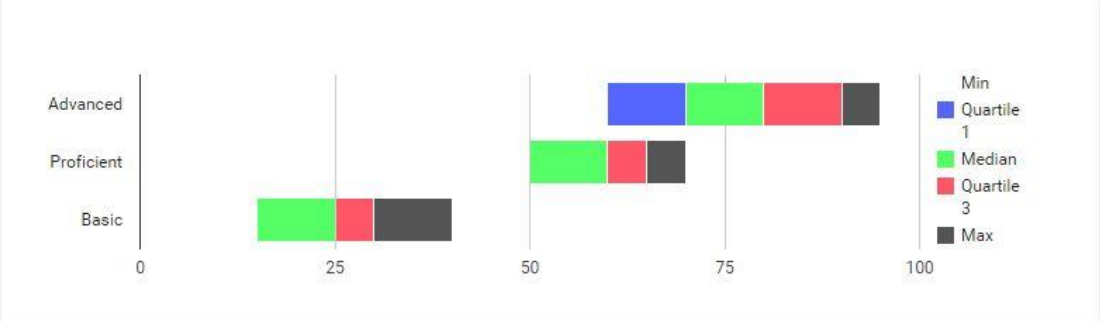
< Previous 1 2 3 4 5 ... 9 10 **11** 12 13 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	80	85	95	95	90	85	90	80	85	90	95	95	5.56
Proficient	60	75	75	75	70	60	75	60	60	75	75	75	7.07
Basic	50	50	60	50	50	35	55	35	50	50	55	60	7.64



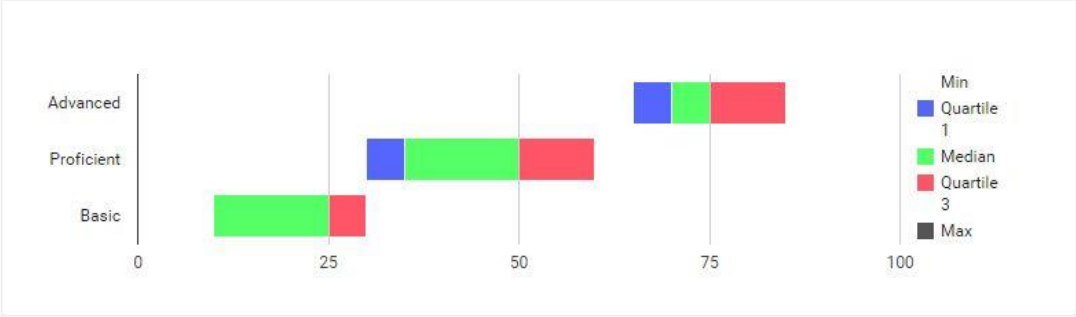
< Previous 1 2 3 4 5 ... 10 11 **12** 13 14 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	60	80	70	95	90	85	80	60	70	80	90	95	11.90
Proficient	50	60	50	70	65	50	65	50	50	60	65	70	8.52
Basic	15	25	25	40	25	15	30	15	15	25	30	40	8.66



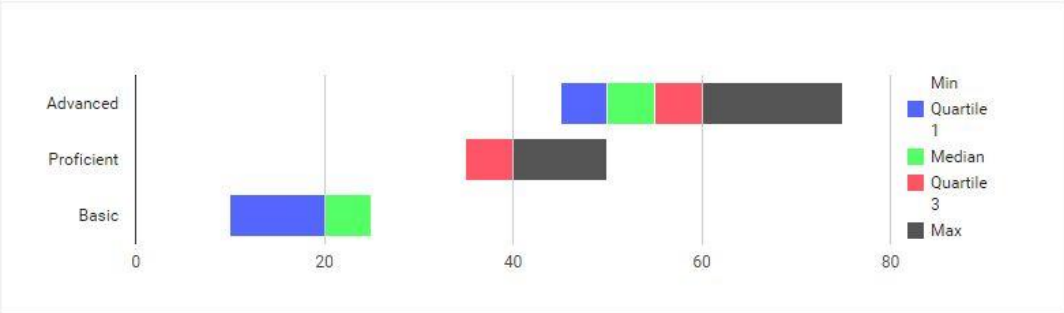
< Previous 1 2 3 4 5 ... 11 12 **13** 14 15 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	70	75	65	85	75	85	80	65	70	75	85	85	7.48
Proficient	30	50	35	55	50	60	60	30	35	50	60	60	11.80
Basic	10	10	10	25	25	30	30	10	10	25	30	30	9.57



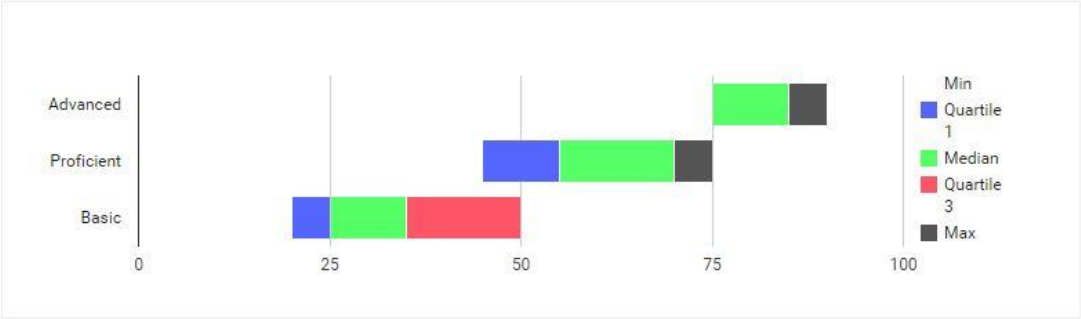
< Previous 1 2 3 4 5 ... 12 13 **14** 15 16 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	45	50	50	55	60	75	60	45	50	55	60	75	9.88
Proficient	35	35	35	35	40	50	40	35	35	35	40	50	5.56
Basic	25	20	10	25	25	20	25	10	20	25	25	25	5.56



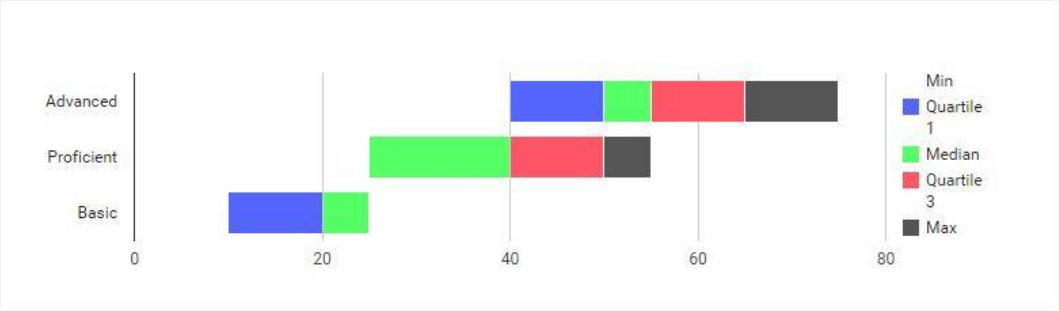
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 13 | 14 | **15** | 16 | 17 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	75	90	80	75	85	85	85	75	75	85	85	90	5.67
Proficient	60	75	45	55	70	70	70	45	55	70	70	75	10.69
Basic	20	50	25	35	50	25	45	20	25	35	50	50	12.72



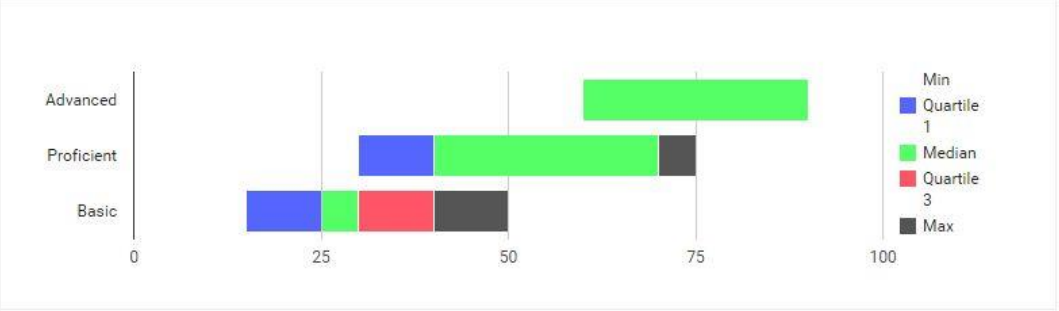
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 14 | 15 | **16** | 17 | 18 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	50	40	50	65	55	75	65	40	50	55	65	75	11.85
Proficient	25	25	40	40	50	55	40	25	25	40	50	55	11.34
Basic	20	10	25	25	25	20	25	10	20	25	25	25	5.56



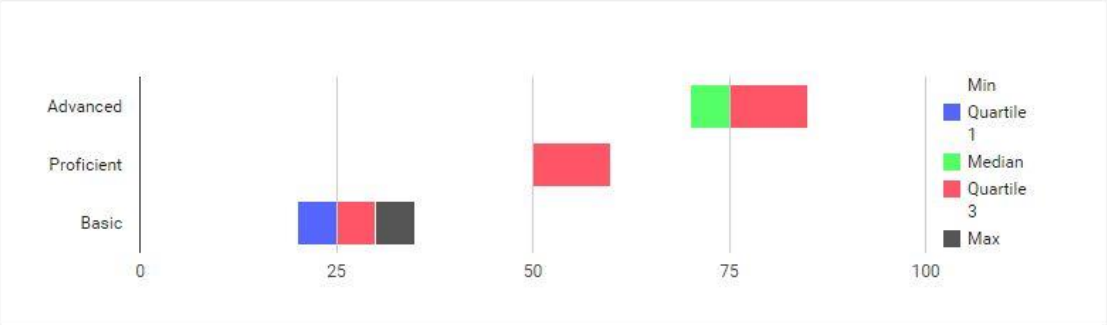
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 15 | 16 | 17 | 18 | 19 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	60	90	60	90	85	90	90	60	60	90	90	90	14.27
Proficient	30	75	40	70	65	70	70	30	40	70	70	75	17.56
Basic	15	50	25	35	25	30	40	15	25	30	40	50	11.44



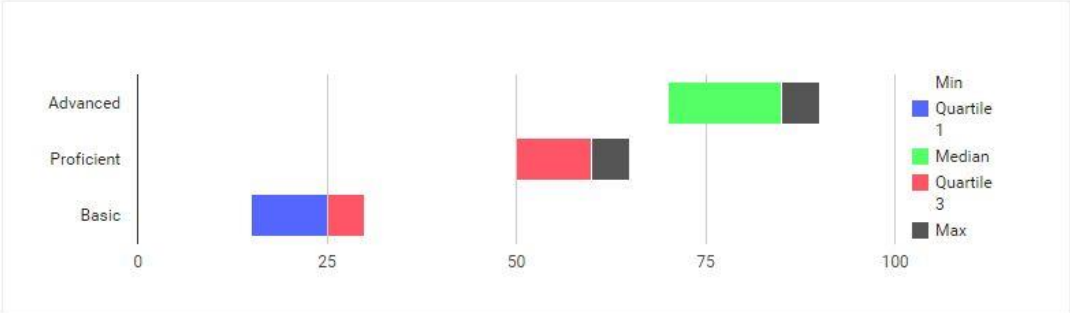
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 16 | 17 | 18 | 19 | 20 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	70	75	75	70	85	85	75	70	70	75	85	85	6.27
Proficient	50	50	50	50	60	60	50	50	50	50	60	60	4.88
Basic	20	25	25	25	35	30	25	20	25	25	30	35	4.76



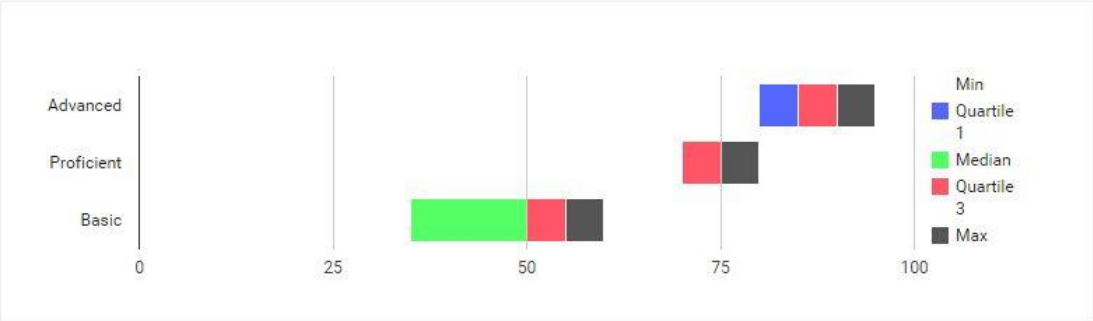
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 17 | 18 | **19** | 20 | 21 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	70	90	75	85	85	85	70	70	70	85	85	90	8.16
Proficient	50	60	50	50	50	65	50	50	50	50	60	65	6.27
Basic	25	30	30	25	15	30	25	15	25	25	30	30	5.35



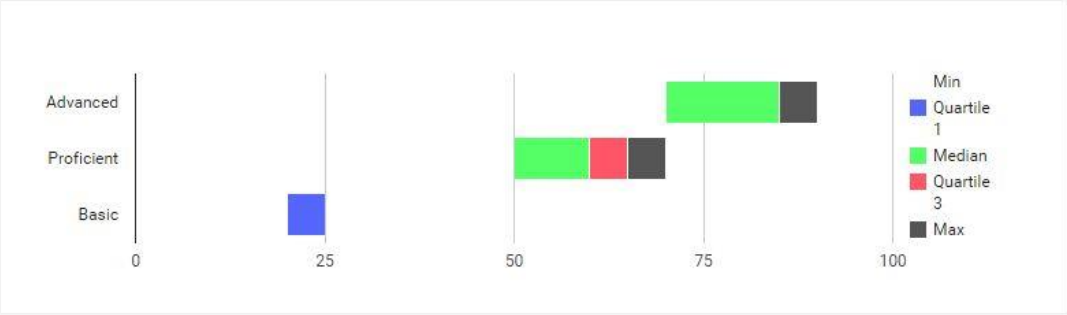
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 18 | 19 | **20** | 21 | 22 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	80	90	85	85	95	85	85	80	85	85	90	95	4.76
Proficient	70	80	70	75	75	70	70	70	70	70	75	80	3.93
Basic	40	60	50	50	55	35	35	35	35	50	55	60	9.88



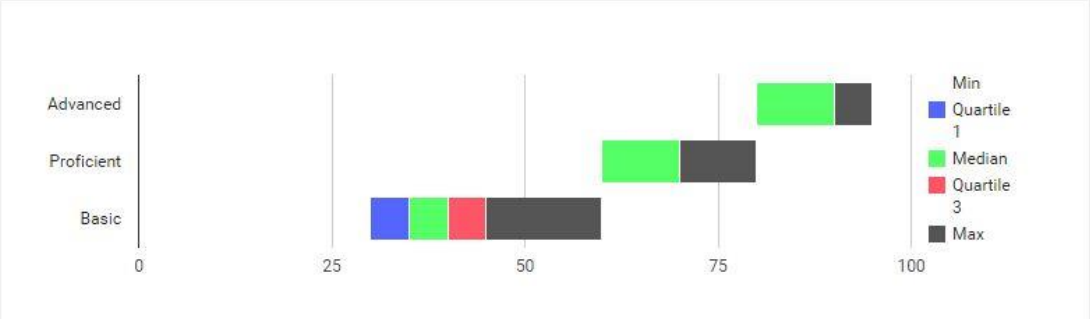
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 19 | 20 | 21 | 22 | 23 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	70	90	70	85	85	85	85	70	70	85	85	90	8.02
Proficient	55	70	50	65	50	60	65	50	50	60	65	70	7.87
Basic	20	25	25	25	25	25	25	20	25	25	25	25	1.89



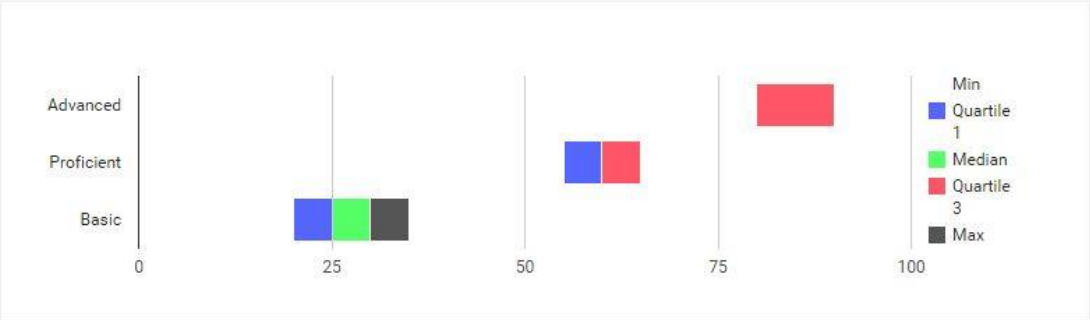
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 20 | 21 | 22 | 23 | 24 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	80	95	80	90	90	90	90	80	80	90	90	95	5.67
Proficient	60	80	60	70	65	70	70	60	60	70	70	80	6.99
Basic	30	60	40	40	45	35	45	30	35	40	45	60	9.51



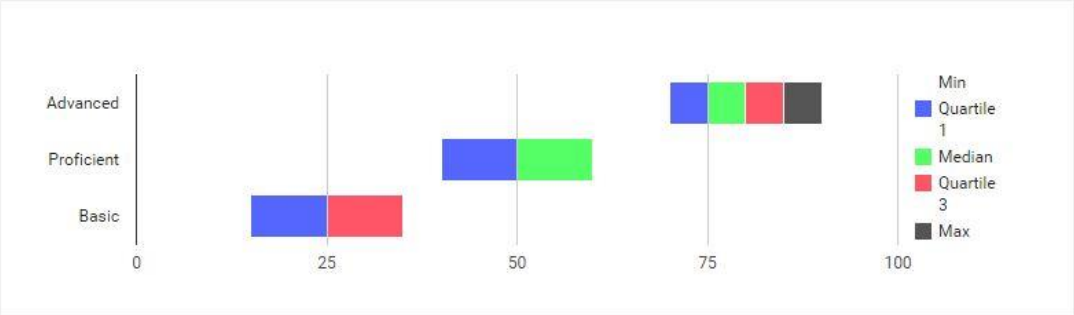
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 21 | 22 | **23** | 24 | 25 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	80	80	80	90	85	90	80	80	80	80	90	90	4.76
Proficient	60	60	60	65	55	60	65	55	60	60	65	65	3.45
Basic	30	30	20	30	30	35	25	20	25	30	30	35	4.76



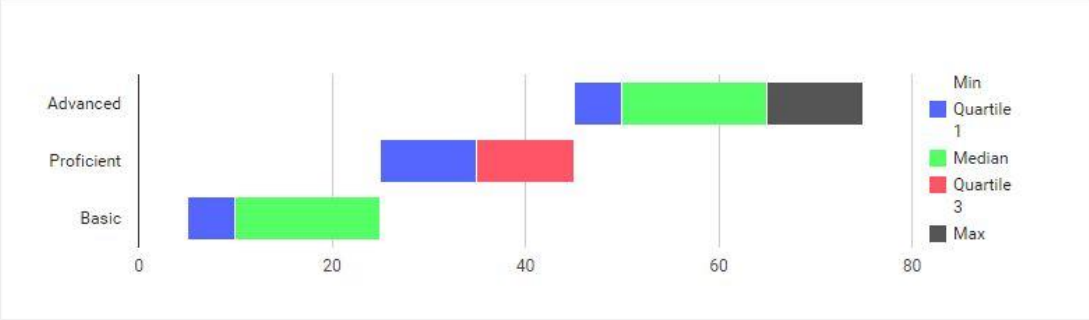
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 22 | 23 | **24** | 25 | 26 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	70	80	75	90	80	85	75	70	75	80	85	90	6.73
Proficient	50	60	40	60	60	60	50	40	50	60	60	60	7.87
Basic	15	25	25	25	35	35	25	15	25	25	35	35	6.90



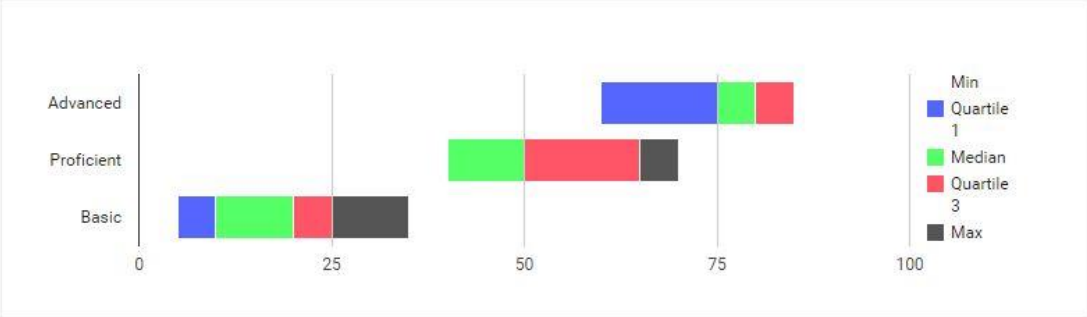
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 23 | 24 | 25 | 26 | 27 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	45	65	50	65	75	55	65	45	50	65	65	75	10.41
Proficient	35	45	25	40	35	35	45	25	35	35	45	45	6.99
Basic	10	25	5	25	10	25	25	5	10	25	25	25	9.06



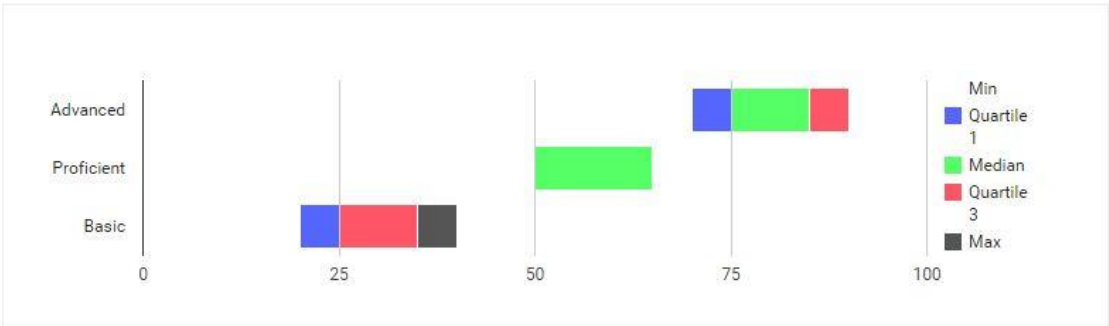
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 24 | 25 | 26 | 27 | 28 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	80	75	60	85	80	85	80	60	75	80	85	85	8.59
Proficient	40	45	40	65	50	55	70	40	40	50	65	70	11.85
Basic	10	5	10	25	25	20	35	5	10	20	25	35	10.69



< Previous | 1 | 2 | 3 | 4 | 5 | ... | 25 | 26 | **27** | 28 | 29 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	70	75	85	90	90	85	85	70	75	85	90	90	7.56
Proficient	50	50	65	65	65	55	65	50	50	65	65	65	7.32
Basic	20	25	25	30	40	25	35	20	25	25	35	40	6.90



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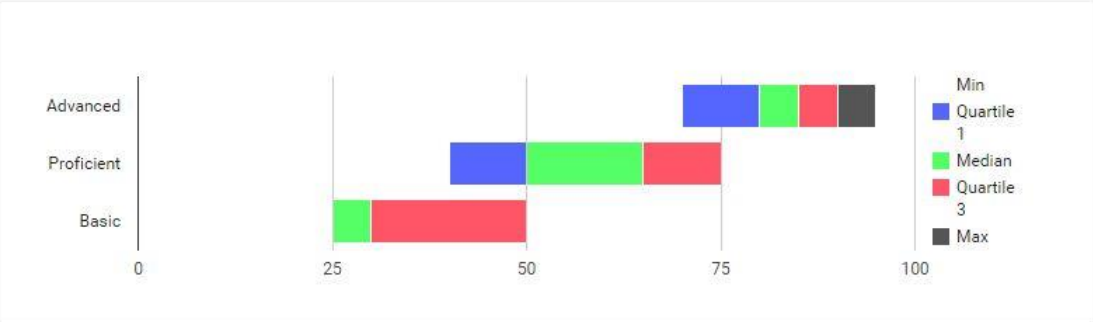
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	70	95	80	85	90	85	80	70	80	85	90	95	8.02
Proficient	40	75	55	65	75	50	70	40	50	65	75	75	13.45
Basic	30	50	25	30	50	25	50	25	25	30	50	50	12.20



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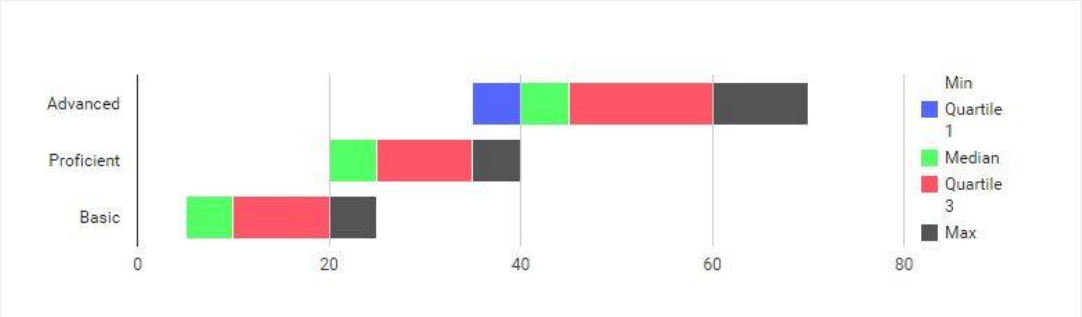
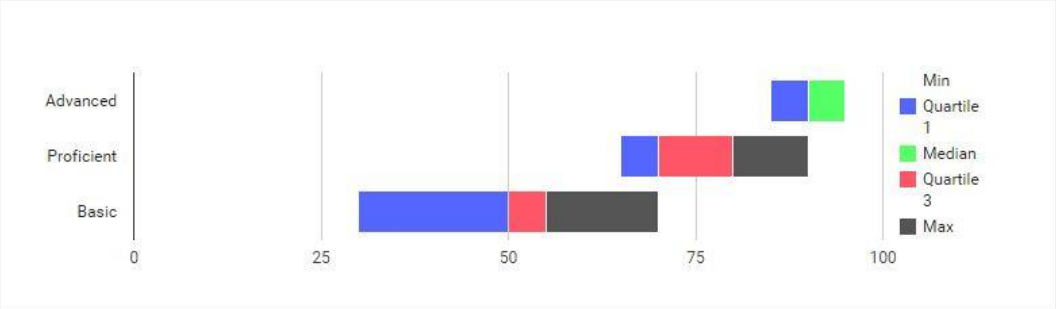
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	35	45	40	60	45	70	40	35	40	45	60	70	12.54
Proficient	20	25	25	40	35	35	20	20	20	25	35	40	8.02
Basic	5	5	5	25	20	15	10	5	5	10	20	25	8.09



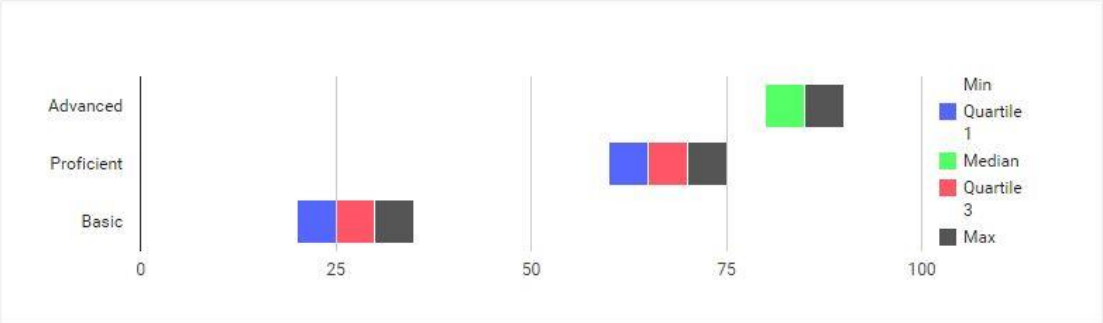
< Previous 1 2 3 4 5 ... 28 29 30 31 32 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	85	95	90	95	95	90	95	85	90	95	95	95	3.93
Proficient	70	65	70	70	80	70	90	65	70	70	80	90	8.52
Basic	50	50	50	50	55	30	70	30	50	50	55	70	11.70



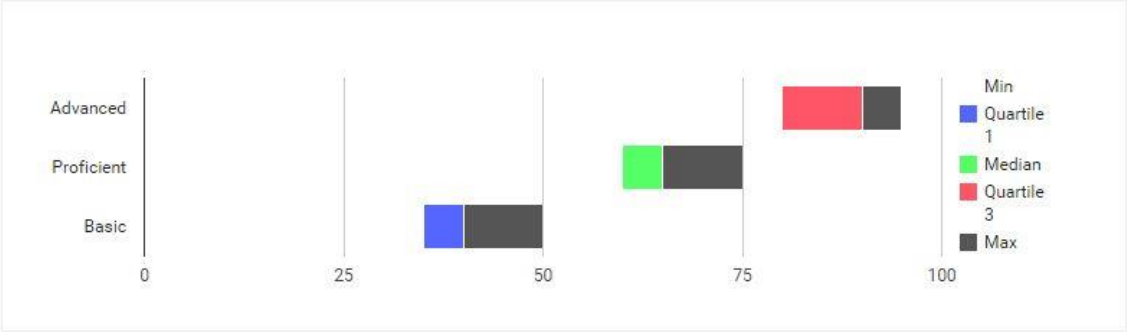
< Previous 1 2 3 4 5 ... 29 30 31 32 33 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	80	85	85	90	80	85	85	80	80	85	85	90	3.45
Proficient	70	65	65	70	60	65	75	60	65	65	70	75	4.88
Basic	20	25	25	25	25	30	35	20	25	25	30	35	4.76



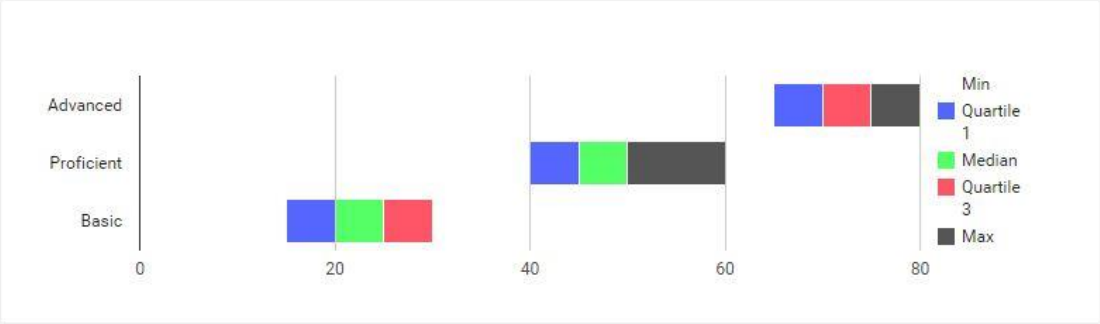
< Previous 1 2 3 4 5 ... 30 31 32 33 34 41 42 43 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	80	95	80	85	80	90	80	80	80	80	90	95	6.07
Proficient	60	75	60	65	65	60	65	60	60	65	65	75	5.35
Basic	40	50	40	35	40	40	40	35	40	40	40	50	4.50



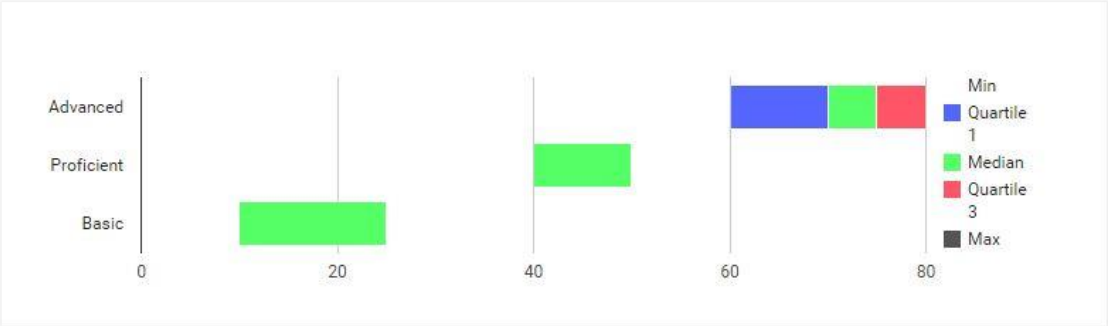
< Previous | 1 | 2 | 3 | 4 | 5 | ... | 31 | 32 | **33** | 34 | 35 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	70	75	70	65	75	80	70	65	70	70	75	80	4.88
Proficient	40	50	45	50	50	60	50	40	45	50	50	60	6.07
Basic	20	25	15	25	25	30	30	15	20	25	30	30	5.35



< Previous | 1 | 2 | 3 | 4 | 5 | ... | 32 | 33 | **34** | 35 | 36 | 41 | 42 | 43 | 44 | 45 | Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	70	80	60	75	80	80	70	60	70	75	80	80	7.48
Proficient	40	50	40	50	50	45	50	40	40	50	50	50	4.76
Basic	20	25	10	25	25	10	25	10	10	25	25	25	7.07



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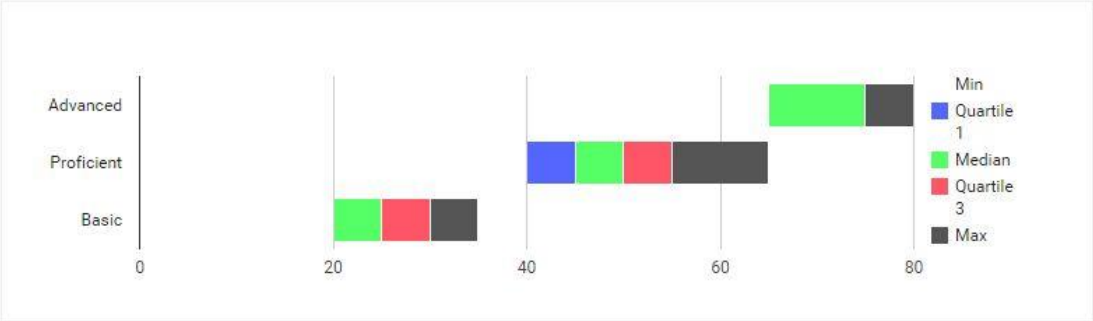
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	75	65	75	65	75	80	75	65	65	75	75	80	5.67
Proficient	65	45	45	40	50	55	55	40	45	50	55	65	8.38
Basic	30	25	20	25	35	20	25	20	20	25	30	35	5.35



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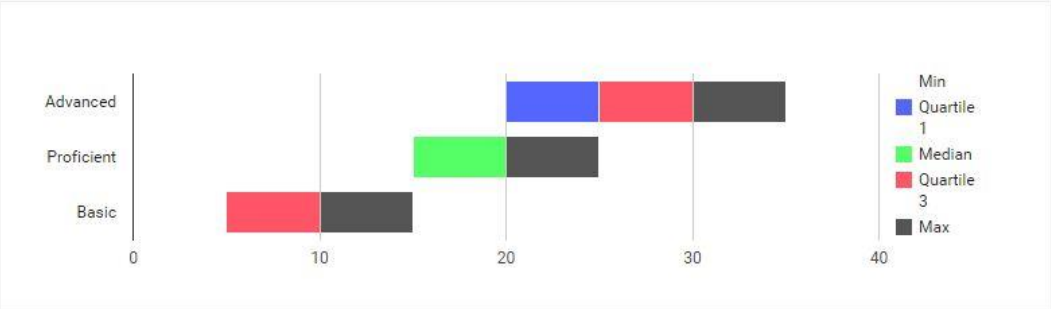
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	25	25	30	35	30	25	20	20	25	25	30	35	4.88
Proficient	20	15	15	25	20	20	15	15	15	20	20	25	3.78
Basic	5	5	5	15	5	5	10	5	5	5	10	15	3.93



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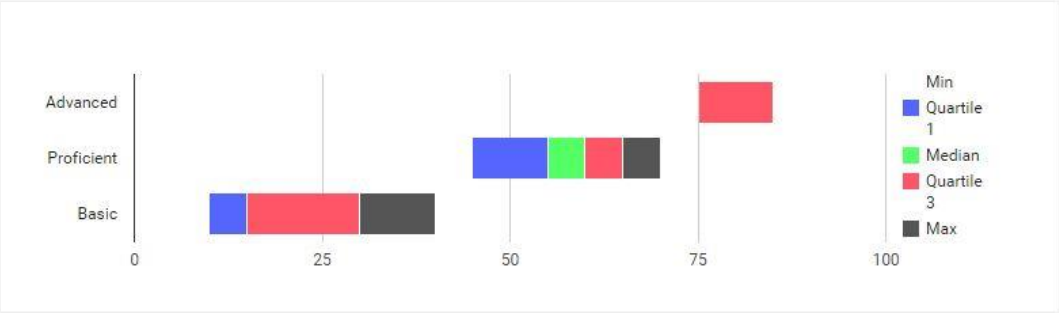
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	75	85	75	75	75	85	75	75	75	75	85	85	4.88
Proficient	60	70	45	60	55	60	65	45	55	60	65	70	7.87
Basic	10	40	15	15	15	30	25	10	15	15	30	40	10.69



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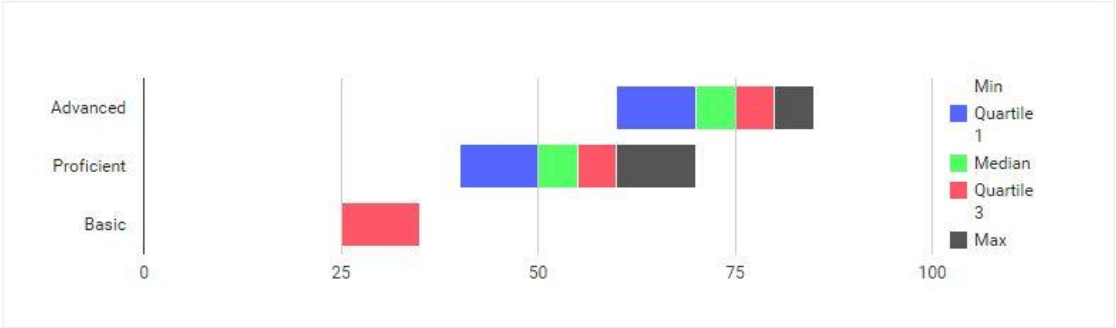
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	70	70	60	80	80	75	85	60	70	75	80	85	8.38
Proficient	50	55	40	50	60	55	70	40	50	55	60	70	9.32
Basic	25	25	25	25	35	25	35	25	25	25	35	35	4.88



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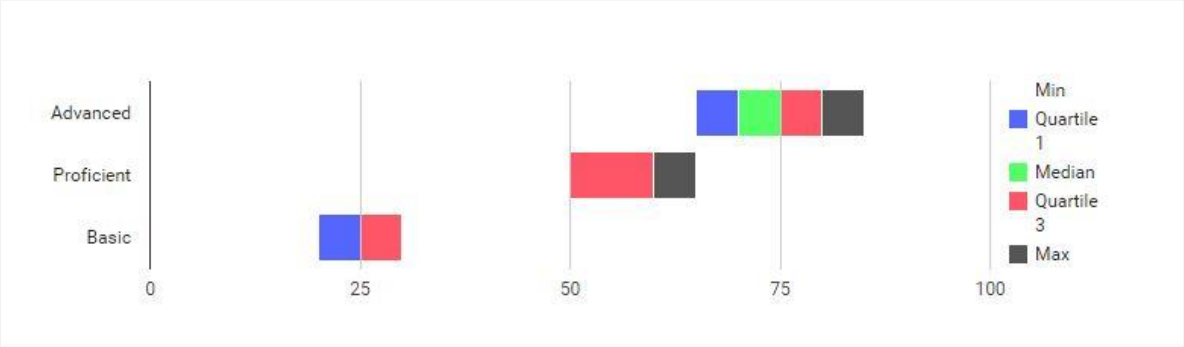
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	70	80	75	75	80	85	65	65	70	75	80	85	6.73
Proficient	50	50	50	50	60	65	50	50	50	50	60	65	6.27
Basic	30	25	20	25	25	30	25	20	25	25	30	30	3.45



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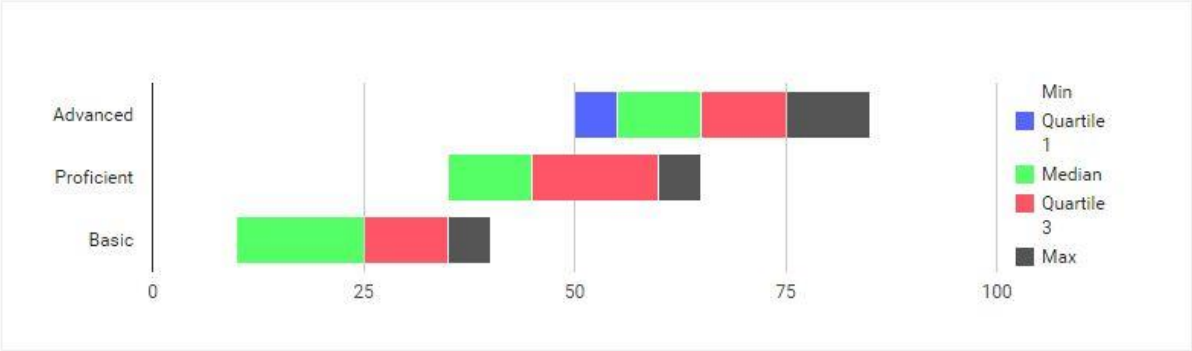
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	50	65	65	55	85	60	75	50	55	65	75	85	11.90
Proficient	40	50	45	35	65	35	60	35	35	45	60	65	11.85
Basic	10	35	15	25	40	10	30	10	10	25	35	40	12.15



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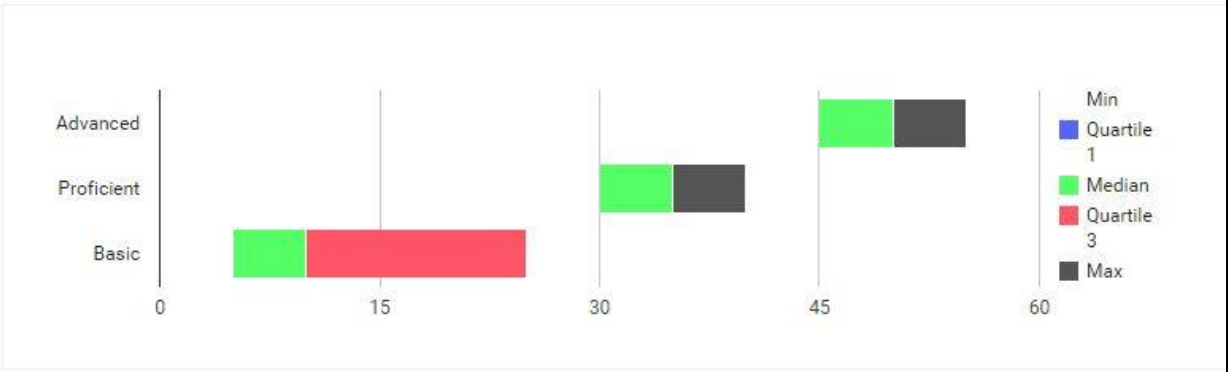
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	45	50	50	45	50	55	50	45	45	50	50	55	3.45
Proficient	35	30	35	35	40	30	35	30	30	35	35	40	3.45
Basic	10	10	5	25	25	5	25	5	5	10	25	25	9.57



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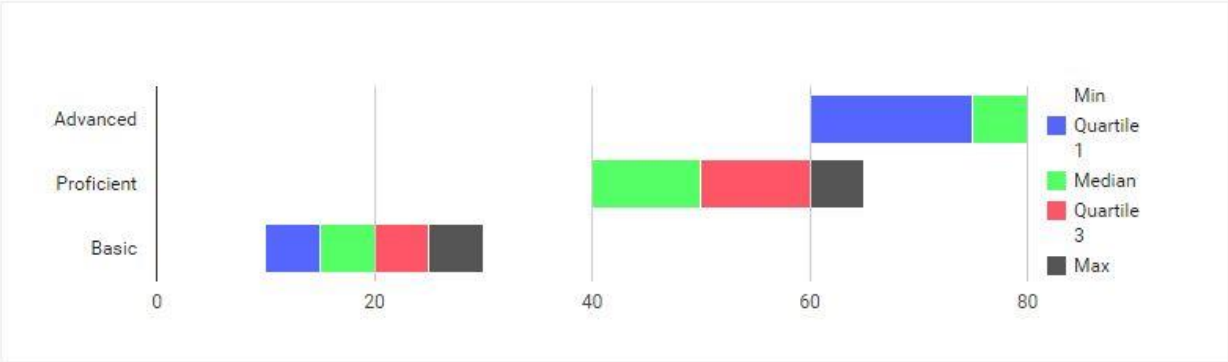
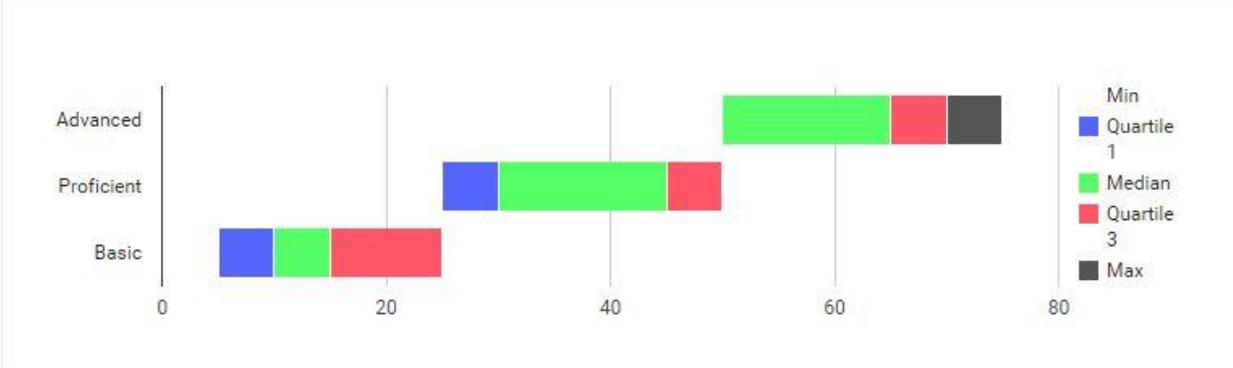
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	80	60	80	80	75	80	75	60	75	80	80	80	7.32
Proficient	50	40	60	65	45	40	60	40	40	50	60	65	10.29
Basic	20	10	20	25	15	15	30	10	15	20	25	30	6.73



< Previous 1 2 3 4 5 ... 41 42 **43** 44 45 Next >

	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	65	50	70	75	50	65	65	50	50	65	70	75	9.51
Proficient	50	25	45	50	35	30	45	25	30	45	50	50	10.00
Basic	10	5	10	25	15	15	25	5	10	15	25	25	7.64



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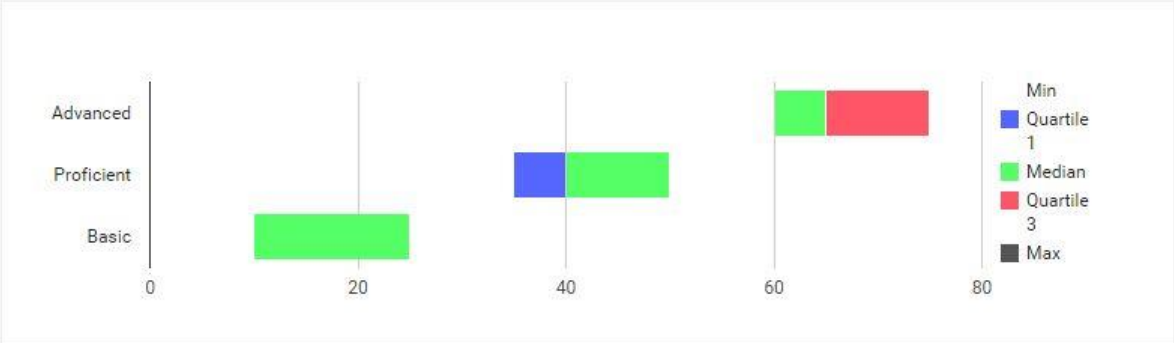
	J1	J2	J3	J4	J5	J6	J7	Min	Quartile 1	Median	Quartile 3	Max	SD
Advanced	65	60	75	75	60	75	65	60	60	65	75	75	6.99
Proficient	50	40	50	50	35	50	45	35	40	50	50	50	6.07
Basic	25	25	10	25	10	20	25	10	10	25	25	25	7.07



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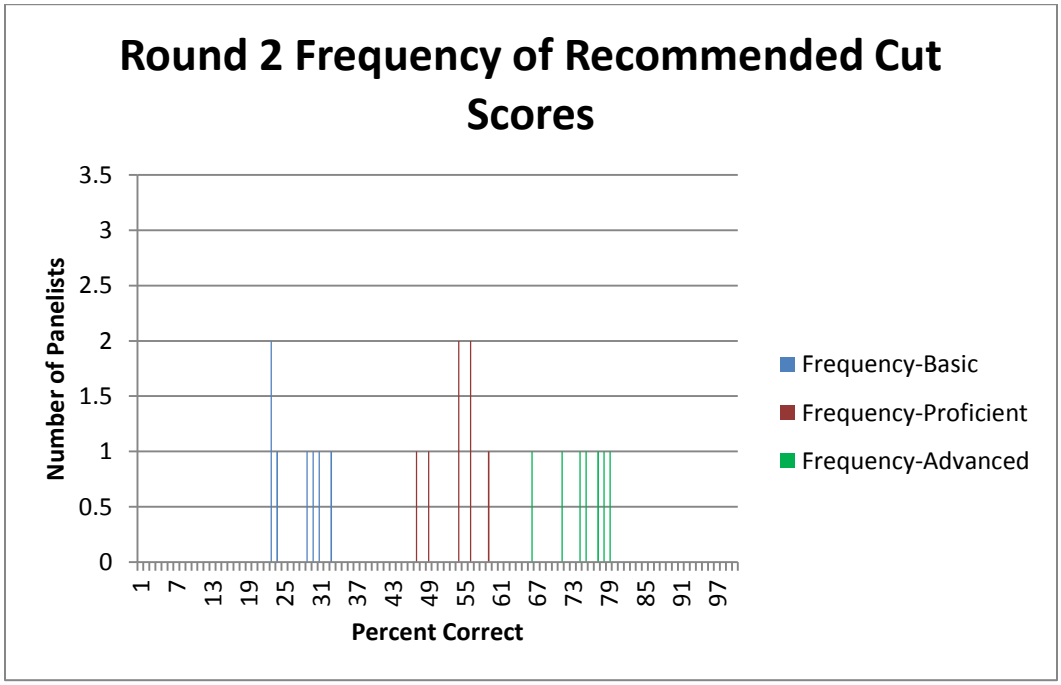
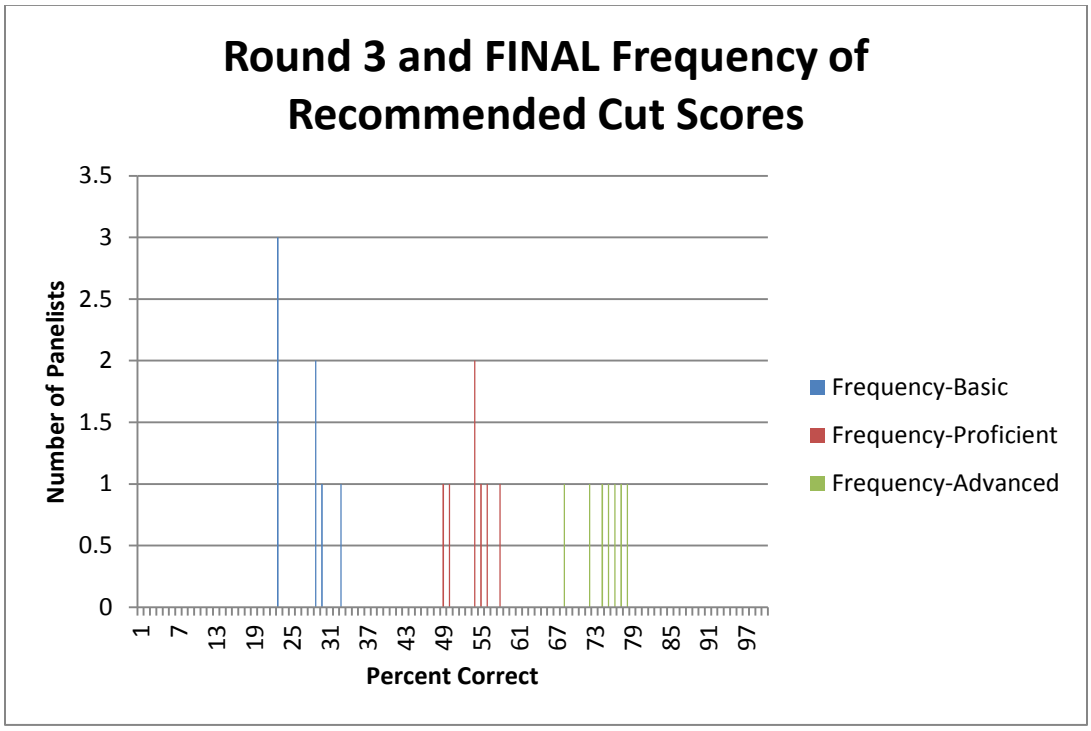
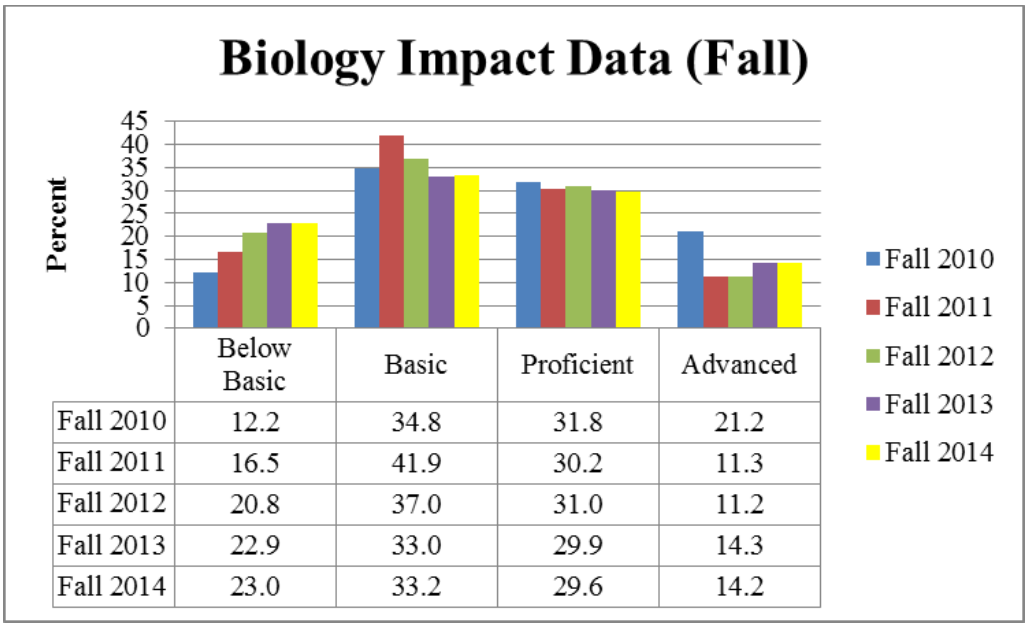
Part 2



Appendix K: Final Frequency Summary for Round 3



Appendix L: Impact Data for Biology



	Below Basic	Basic	Proficient	Advanced
Fall 2010	12.2	34.8	31.8	21.2
Fall 2011	16.5	41.9	30.2	11.3
Fall 2012	20.8	37.0	31.0	11.2
Fall 2013	22.9	33.0	29.9	14.3
Fall 2014	23.0	33.2	29.6	14.2

2015 Cutpoint Validation Report for the English I, English II, Algebra I, Algebra II, and Geometry Missouri End-of-Course (MO EOC) Assessments

Presented by
Questar Assessment, Inc.

April 2015

5550 Upper 147th Street West
Apple Valley, MN 55124
(952) 997-2700
www.questarAI.com

1. Introduction

1.1. Overview of the Document

This document presents the results of the two-day cutpoint validation meeting conducted by Questar Assessment, Inc. (Questar) for the English I, English II, Algebra I, Algebra II, and Geometry Missouri End-of-Course (MO EOC) Assessments. During the workshop, two panels of Missouri educators and professionals reviewed the existing cut scores for each content area to determine if the cut scores are still appropriate.

- Cutpoint Validation Panel 1: English I, English II
- Cutpoint Validation Panel 2: Algebra I, Algebra II, Geometry

The two-day cutpoint validation workshop was conducted in Columbia, Missouri, from Feb. 17–18, 2015. Achievement level descriptors (ALDs) for each content area were also reviewed and updated.

1.2. Overview of the MO EOC Assessments

There are currently nine MO EOC Assessments: English I, English II, Algebra I, Algebra II, Geometry, Biology, Physical Science, Government, and American History. The MO EOC Assessments were first administered in 2008–2009 for English II, Algebra I, and Biology and in 2009–2010 for English I, Algebra II, Geometry, Government, and American History. The Physical Science Assessment was administered for the first time in Fall 2014.

Prior to 2014–2015, all MO EOC Assessments were required. However, beginning in Fall 2014, five MO EOC Assessments are required (English II, Algebra I, Algebra II[1], Biology, and Government) and four MO EOC Assessments are optional (English I, Geometry, Physical Science, and American History).

The MO EOC Assessments are aligned to the Missouri Learning Standards, which includes English Language Arts and Mathematics (English I, English II, Algebra I, Algebra II, and Geometry). Course-level expectations (CLEs) provide clear objectives for each course, or content area. Each MO EOC Assessment is tailored to a specific content area and is administered when a student has completed the content defined for that course. Districts can offer EOC course content in any grade and in a variety of configurations. Although many districts offer EOC course content within a course bearing the same name, EOC course content can also be embedded within a course or across several courses.

English I, English II, Algebra I, and Biology contain both selected-response (SR) items and performance events/writing prompts (PE/WPs), whereas Algebra II, Geometry, Government, American History, and Physical Science contain only SR items. These assessments are administered in approximately one testing period and are not strictly timed. They are administered online with Paper/Pencil, Braille, or Large Print forms available for students requiring accommodations.

[1] For students who complete the Algebra I EOC Assessment prior to high school, Algebra II is the required high school Mathematics assessment for accountability purposes. (http://dese.mo.gov/college-career-readiness/assessment/end-course)

1.3. Reasons for Cutpoint Validation

The Fall 2014 administration reflected various changes in English I, English II, Algebra I, Algebra II, and Geometry. Specifically, starting in Fall 2014, the following changes occurred for these content areas:

- Revised test blueprints
- New test forms
- Alignment of existing items in English Language Arts and Mathematics to the Missouri Learning Standards
- New scoring rubrics for PEs and change of PE scores
- Change of test length and total score points
- Addition of PEs to English I
- Updated ALDs

Table 1 presents the total raw score points for Spring 2014 and Fall 2014 to illustrate these changes. Although the raw score points remained the same for some of the assessments from Spring 2014 to Fall 2014, the raw scores were not directly comparable because the forms had changed.

Table 1. Total Raw Score Points for Spring 2014 and Fall 2014 Forms

Content Area	Spring 2014	Fall 2014
English I	40	45
English II	39	45
Algebra I	39	50
Algebra II	40	40
Geometry	40	40

In consultation with Missouri's Department of Elementary and Secondary Education (DESE), it was determined that these changes were not enough to conduct a full standard setting for these content areas. This is mainly because the adjustments were relatively minor and the new forms still measured highly similar content to forms prior to Fall 2014. Therefore, cutpoint validation was conducted for English I, English II, Algebra I, Algebra II, and Geometry.

2. Achievement Level Descriptors (ALDs)

The MO EOC Assessments use the same achievement level labels used for the grade-level Missouri Assessment Program (MAP): Below Basic, Basic, Proficient, and Advanced. For each of these levels, the ALDs describe the specific knowledge and skills that a student at that level must be able to demonstrate.

DESE requested that Questar revise the previous ALDs (see Appendix A) to align to the Missouri Learning Standards. Therefore, Questar's Assessment Design and Psychometrics team created draft ALDs for DESE to review. Questar then reviewed the ALDs with DESE and updated them based on DESE's feedback (see Appendix B for these draft ALDs). During cutpoint validation, the draft ALDs were used as guidelines for evaluating student performance and were beneficial to the panelists as they evaluated impact data and reviewed the cut scores.

Panelists also discussed and fine-tuned the draft ALDs during the meeting. At the conclusion of the cutpoint validation, DESE collected the panelist recommendations for ALD revisions for consideration in the final wording of the ALDs (see Appendix C for the final ALDs).

3. Overview of the 2015 Cutpoint Validation

A cutpoint validation workshop was conducted from Feb. 17–18, 2015, to validate existing cut scores for English I, English II, Algebra I, Algebra II, and Geometry. The modified Angoff method was used for the initial standard settings held from Nov. 3–5, 2008, for English II and Algebra I and from Nov. 2–5, 2009, for English I, Algebra II, and Geometry. Therefore, the panelists received an overview of this method prior to reviewing the cutpoints in order to understand how the cutpoints were originally set.

Although cutpoint validation and standard setting have similarities, the focus of cutpoint validation is to revisit cutpoints that have been previously established. Therefore, cutpoint validation is not a simple replication of the standard setting process. Unlike standard setting, cutpoint validation focuses on the overall cut scores and student achievement level distribution (presented as impact data) rather than focusing at the item level.

3.1. Staffing

Questar provided staff members experienced in conducting cutpoint validation to facilitate the panelist groups. Most facilitators held doctorates in educational measurement, and all panelists were trained on the method prior to implementation with ample time for any questions to be addressed. Psychometricians and statistical analysts also attended the workshop to oversee quality control, observe the activities, and provide statistical and technical support when needed. A Questar program manager was also present, as well as DESE staff members.

3.2. Security

Because the cutpoint validation was conducted using Questar's secure online content management system, a minimal amount of printed material was needed during the workshop. The computers used secure servers, and usernames and passwords were locked in a secure location when not in use.

3.3. Panels

Nineteen panelists participated in cutpoint validation, as shown in Table 2. Panelists included classroom teachers who taught English Language Arts and Mathematics in Missouri schools; had administered the MO EOC Assessments in their respective content area; and were familiar with the standards.

Table 2. Number of Panelists

Panel	Total # of Panelists
1. English I , English II	7
2. Algebra I, Algebra II, Geometry	12
Total	**19**

Consistent to the previous standard setting conducted for the MO EOC Assessments, the requirements for participation were as follows:

- For classroom teachers: The teacher must have taught the course for which he or she is being nominated to serve as a panelist for a minimum of five years. The teacher should be familiar with the Missouri Learning Standards and the applicable CLEs. Finally, the teacher should be recognized as "outstanding" in professional performance.

- For nonteacher educators and post-secondary educators: The educator may be a nonteacher educational staff member in a building or district central office, or an instructor or administrator at a post-secondary institution. The educator must have familiarity with the course content for which he or she is being nominated to serve as a panelist. He or she should be familiar with the Missouri Learning Standards and applicable CLEs. Finally, the educator must be recognized as "outstanding" in professional performance by the individual making the nomination.

- For business professionals: The business professional must have familiarity with the course content for which he or she is being nominated to serve as a panelist. The individual should either use high school course content for the applicable content area in his or her daily professional work *or* be familiar with the knowledge and skills that high school students completing the applicable courses must possess to have a firm foundation for further coursework or for the workplace. Finally, the business professional must not be a current or former employee of the public school system.

Effort was made to ensure representation of the state's urban, suburban, and rural schools and communities, as well as to include representation from the state's nine Regional Professional Development Center (RPDC) regions. Additionally, as much as possible given the nomination pool, an attempt was made to include panelists with expertise in working with English language learners (ELLs) and students with special needs. By design, panel slots were heavily populated with classroom teachers.

3.3.1. Panel Characteristics

Table 3 summarizes the demographic characteristics for each panel. One English Language Arts panelist and two Mathematics panelists had participated in the previous MO EOC standard setting workshops, and some of the panelists had experience in item development and item writing. Most panelists were female, white, and classroom teachers and had less than 10 years of experience. Most of the panelists were from rural or urban settings, and they came from different areas of Missouri represented by the RPDC regions.

Table 3. Panel Composition

Category		English	Mathematics
Gender	Male	2	3
	Female	5	9
Race	White	6	11
	Black	1	1
Community Size	Rural	3	5
	Suburban	2	3
	Urban	2	4
Position	Classroom Teacher	3	8
	Instructional Coach	--	3
	Curriculum Specialist	3	1
	Administrator	1	--
RPDC* Region	Southeast	1	1
	Kansas City	2	2
	Northeast	1	1
	South Central	--	2
	St. Louis	1	3
	Heart of MO	1	--
	Northwest	1	1
	Southwest	--	2
Years of Experience	0–5 years	1	5
	6–10 years	3	4
	11–14 years	1	1
	15+ years	1	2
	Missing	1	--

*Regional Professional Development Center

4. Cutpoint Validation Process

The main purpose of the cutpoint validation meeting was to validate the existing cut scores for the English I, English II, Algebra I, Algebra II, and Geometry Assessments using Fall 2014 data. Specifically, panelists assessed whether the changes in the MO EOC Assessments (discussed in Section 1.3) had any effect on student performance on the updated MO EOC Assessments. This report presents the final recommended cutpoint validation cut scores for DESE to take under advisement to validate the existing cut scores.

Questar facilitators began the cutpoint validation by explaining the changes in the MO EOC Assessments. Panelists then reviewed both the previous and draft ALDs so that they could evaluate whether changes and adjustments to the Fall 2014 forms were significant enough to have caused changes in the existing cut scores. Panelists could also review items in the Fall 2014 forms using Questar's online content management system.

In addition, impact data using existing cut scores for each content area (English I, English II, Algebra I, Algebra II, and Geometry) based on the Fall 2014 administration was presented to the panelists. Historical Fall impact data from the past five years for each content area was also presented as reference.

4.1. Materials

The following materials were provided during cutpoint validation:

- Previous MO EOC ALDs (Appendix A)
- Draft MO EOC ALDs (Appendix B)
- Agenda (Appendix D)
- PowerPoint presentation (Appendix E)
- Readiness form (Appendix F)
- Evaluation survey (Appendix H)
- Fall 2014 operational test forms
- Missouri Learning Standards
- Course-level expectations (CLEs)
- Test blueprints

4.2. Defining the Borderline Students

Borderline student definitions were used during cutpoint validation to help panelists consider the percentage of students obtaining a correct response or mean score for each achievement level. Therefore, after reviewing and discussing changes between the previous and updated ALDs, panelists determined 3–5 distinguishing characteristics between each adjacent set of achievement levels. These characteristics were used to describe the borderline students, or the students just at the cusp, or threshold, of two achievement levels (see Appendix G for the borderline student definitions). In other words, a borderline student has a test score close to the lower boundary of an achievement level (e.g., a “minimally Advanced” student).

Therefore, three borderline student definitions were established to help panelists as they evaluated the validity of the existing cut scores:

- The <u>Basic borderline student</u>: between Below Basic and Basic (i.e., the “minimally Basic” student)
    - What skills does a low Basic student possess that a high Below Basic student does not?
- The <u>Proficient borderline student</u>: between Basic and Proficient (i.e., the “minimally Proficient” student)
    - What skills does a low Proficient student possess that a high Basic student does not?
- The <u>Advanced borderline student</u>: between Proficient and Advanced (i.e., the “minimally Advanced” student)
    - What skills does a low Advanced student possess that a high Proficient student does not?

4.3. Cutpoint Validation Procedure

4.3.1. Day 1

4.3.1.1. General Process Overview

The cutpoint validation agendas for the English Language Arts courses and the Mathematics courses are located in Appendix D. A PowerPoint presentation (see Appendix E) was used throughout the meeting to guide panelists through the cutpoint validation activities. The first part of the meeting served as a high-level introduction to the general cutpoint validation process, as well as the standard setting process since the standard setting and cutpoint validation panelists received the general process overview at the same time.[2] This introduction included an overview of the MO EOC Assessments and the purpose and intended outcomes of the standard setting and cutpoint validation. It also included an overview of the previous MO EOC standard settings using the modified Angoff method.

Panelists were also provided with a general overview of the previous and draft ALDs. The importance of the ALDs to the cutpoint validation process was explained and emphasized during group discussion. Because the panelists reviewed, edited, and expanded on the draft versions of the ALDs, it was important for panelists to understand the critical role of ALDs in the standard setting and cutpoint validation processes.

4.3.1.2. Reviewing the Operational Assessment

Next, the cutpoint validation and standard setting panelists split up into their respective panels. For each cutpoint validation panel, the facilitator began by reiterating the high-level cutpoint validation process discussed during the opening session. Panelists then reviewed the Fall 2014 operational form for the first assigned content area using Questar's online content management system. For this activity, panelists had access to the test administration procedures, the actual test content, and all relevant scoring materials.

Because these were "live" materials, the facilitator stressed the confidentiality of the items. The primary purpose of this activity was to familiarize panelists with the assessment content prior to cutpoint validation. Panelists then discussed the assessment content such as difficulty, sources of challenges, scoring issues, and general and specific reactions. This exercise provided the panelists with a context concerning the definition of different achievement levels as conveyed by the assessments.

4.3.1.3. Discussing and Fine-Tuning the ALDs

The facilitator provided panelists with draft ALDs, blueprints, and the appropriate CLEs and Missouri Learning Standards so that the panelists could discuss and fine-tune the draft ALDs for the first content area. Using these materials as references and drawing on the expertise of the panelists, the facilitator led the panelists in an extended discussion and exercise to refine and elaborate on each of the ALDs. Once this activity was complete, panelists relied on the resulting ALDs as a reference during the cutpoint validation. Panelists were also allowed to make appropriate, though generally minor, revisions and refinements to the ALDs during and after the cutpoint validation activities.

[2] The standard setting meeting was conducted at the same time as the cutpoint validation meeting from Feb. 17–18, 2015, for the Physical Science Assessment. The purpose of the meeting was to establish recommended cut scores for the new assessment. The standard setting summary and results are presented in a separate report.

Panelists began this activity with a review of the draft ALDs (see Appendix B). This review was highly interactive, with panelists suggesting changes and other refinements, both substantive and editorial. The ultimate task was to operationalize specific behaviors indicating performance at the Below Basic, Basic, Proficient, or Advanced levels. Panelist suggestions were discussed until consensus was reached and then recorded on the draft ALDs, a copy of which was given to the panelists. Panelists referred to these pages, along with the original drafts, during the actual cutpoint validation activities. The thoroughness of the ALD refinement activities and the extent to which the panelists internalized the ALDs significantly impacted the soundness of the subsequent cutpoint validation procedures.

Panelists also determined 3–5 distinguishing characteristics between each adjacent set of achievement levels, which were used to describe the borderline students (as described earlier). The borderline definitions are provided in Appendix G. At the conclusion of this session, DESE collected the panelist recommendations for ALD revisions for consideration in the final wording of the ALDs (see Appendix C). Overall, the changes in the ALDs were minor.

4.3.1.4. Presentation of Impact Data

Impact data based on the Fall 2014 operational administration showed the percentages of students statewide whose performance would likely be labeled Below Basic, Basic, Proficient, or Advanced if the existing cuts scores were adopted. The facilitator provided panelists with these estimated statewide impact data, which was presented for informational purposes and gave the panelists an opportunity for discussions and adjustments during cut score review.

Impact data from the past five years for the Fall administrations was also presented. The historical impact data provided panelists additional information about student performance distribution over an extended period of time since it is desirable to have a consistent pattern of impact data throughout the years within the same content area.

The sample size for the Fall administration is typically much smaller than the sample size for the Spring administration. Given that both item statistics and impact data were based on the Fall 2014 administration, it was possible that large random error would be associated with the item statistics and impact data due to the small sample sizes associated with the Fall student population. Therefore, the facilitator let the panelists know that the statistical information based on the Fall 2014 administration was relevant to, but not essential for, verifying existing cut scores.

Throughout the presentation of impact data, the facilitator reviewed these reports with the panelists to ensure that everyone understood how to interpret the information contained in them. The discussion focused on panelists' judgments of the form, their understanding of the ALDs, and their expectations of how students would perform at a specific achievement level. The facilitator actively engaged all the panelists in the discussion to gauge whether they found the impact data consistent with their expectations, that the reasoning process they followed in making their judgments was consistent with good practice, and that the panelists clearly understood the relationship between the ALDs, students at different achievement levels, and the current cutpoints.

Throughout these discussions, the facilitator focused on the following key elements of the cutpoint validation process:

- Evaluating the threshold (borderline) of each cutpoint
- Projecting the cutpoints for a statewide population of students who took the MO EOC Assessment using historical and current impact data
- Evaluating the average scores for subgroups based on student performance
- Focusing on the particular content area and achievement level of students who took the MO EOC Assessment

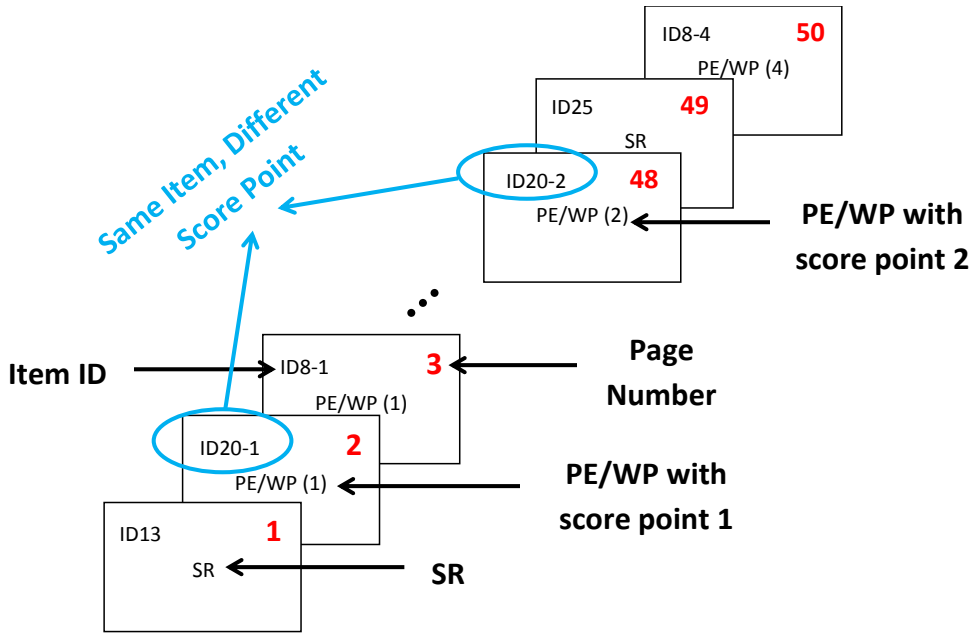
Much like a jury deliberation, these discussions allowed the panelists to hear their peers' comments and rationales for their judgments. The facilitator permitted discussion to continue until they perceived that all panelists were prepared to make their judgments about the existing cutpoints.

4.3.1.5. Presentation of the Ordered Item Booklet (OIB)

To provide context for panelists in evaluating the current cutpoints, the ordered item booklet (OIB) was provided to the panelists for each content area using Questar's online management system. Using the Fall 2014 operational data, the order of items by difficulty was indicated by the items' theta values, which were calculated using the Rasch model. A response probability value of .67 was used to calculate the difficulty ordering. The ordered items were then presented to panelists in the OIBs.

Each selected-response (SR) item appeared in the OIB only once, whereas each performance event/writing prompt (PE/WP) item appeared in the OIB once for each score point (e.g., a 4-point PE/WP item appeared in the OIB four times). This happens because the difficulty to obtain each score point differs. Figure 1 provides an example of what an OIB looks like. In the example, one PE/WP item (ID20) appeared twice in the OIB with score points of 1 and 2.

Figure 1—Hypothetical Illustration of an OIB



4.3.1.6. Validating the Cutpoints

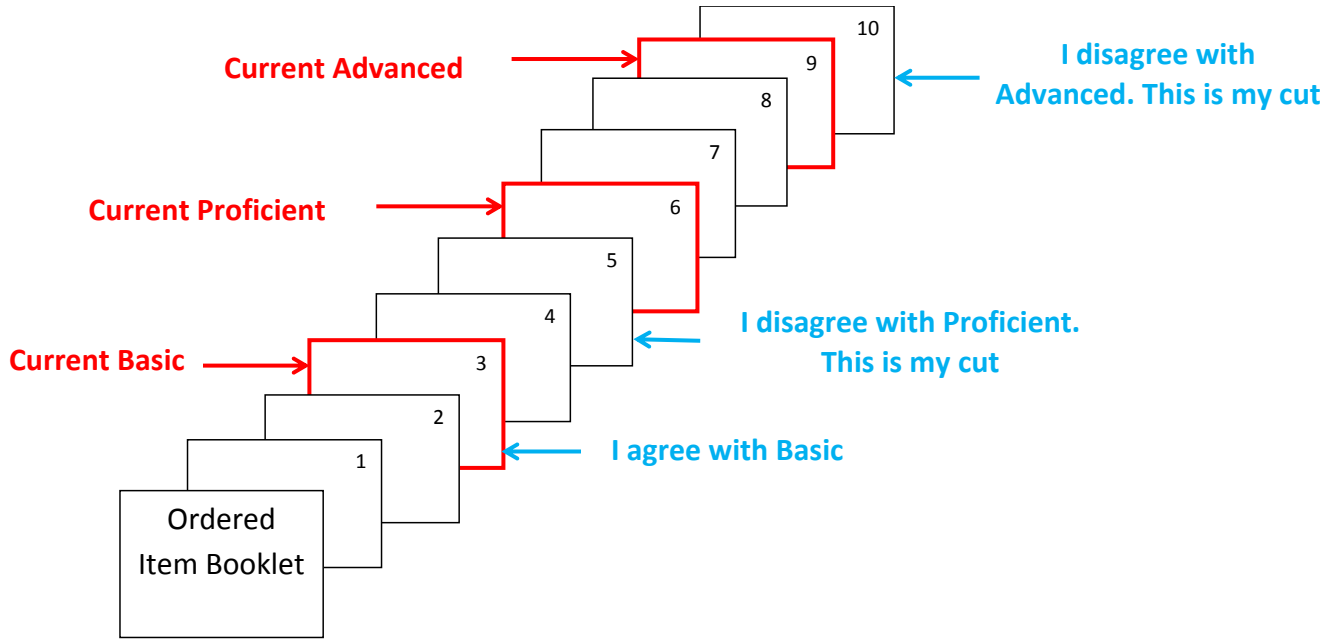
Following the presentation and discussion of the impact data and OIBs, the panelists indicated on a readiness form within Questar's content management system that they understood the information they had received and that they felt prepared to make their judgments about the existing cut scores (see Appendix F).

During cutpoint validation, items associated with current cutpoints were indicated in the OIB. Panelists were asked to consider the following while evaluating the current cutpoints:

- The borderline students (as defined by the 3–5 distinguishing characteristics between each adjacent set of achievement levels)
- Impact data for the past five years (including the Fall 2014 impact data using current cutpoints)
- Focus on the particular content area and achievement level of students who took the MO EOC Assessment

Cutpoint validation was completed anonymously and independently via identification numbers known only to the individual panelist and Questar staff. After reviewing the current cutpoints in the OIBs, panelists determined whether they agreed with the current cutpoints. If not, they provided their recommended new cutpoints using Questar's online content management system by entering the OIB number associated with the item that best represented the borderline students at each achievement level. Figure 2 illustrates the procedure used in validating cutpoints in a hypothetical OIB.

Figure 2—Validating Cutpoints in a Hypothetical OIB



Presenting the OIB using the online content management system is similar to but not exactly the same as a traditional printed OIB in a binder. For example, panelists can flip through the printed OIB binder and review multiple items and pages at the same time, whereas only one item was allowed to be on screen using the online content management system. However, no panelist indicated that being unable to view multiple items simultaneously on screen hindered his or her ability to validating the cutpoints.

The median cut scores for the content area of focus was considered the group-recommended cut scores for the cutpoint validation. Impact data based on the group-recommended cut scores were obtained and presented to the panelists after validation for the content area was complete.

4.3.2. Day 2

The second day began with panelists reviewing the operational form for the second content area, followed by discussing and fine-tuning the ALDs and presentation of impact data and OIBs for this content area. Given the experience and familiarity with Questar's online management system from the previous day, these activities required less time than the first content area. Panelists also had more understanding of the cutpoint validation process and became increasingly more familiar with the process as the day proceeded. After indicating on a readiness form within the online content management system that they understood the information they had received and discussed (see Appendix F), panelists made their recommendation for the second content area.

Similar to the first content area, Questar's psychometricians and statistical analysts obtained the median cut scores based on the cutpoint validation and compared those to the existing cutpoints.

For the third content area for Panel 2, the panelists first reviewed the operational form, followed by discussing and fine-tuning the ALDs and presentation of impact data and OIBs. After indicating on the readiness form that they understood the information they had received and discussed, panelists made their recommendations for the third content area.

Once again, Questar's psychometricians and statistical analysts obtained the median cut scores based on the cutpoint validation and compared those to the existing cutpoints.

Once cutpoint validation for all content areas was complete, the facilitator presented the updated impact data based on the group-recommended cut scores. The facilitator also led a discussion while reviewing the updated impact data. Specifically, panelists discussed their expectations of the impact data, their overall impression of the cutpoint validation process, and their confidence level about the three cutpoints for each content area. Panelists were also given the opportunity to change their final cutpoint one more time if they needed to.

4.3.2.1. Evaluation Survey and Final Review of ALDs

After a thorough discussion of the final impact data based on the group-recommended cutpoints, individual panelists completed an evaluation survey (see Appendix H) that focused on the panelists' understanding of the cutpoint validation process and their confidence in their judgments. The survey also contained an open-ended question for the panelists to provide comments concerning the workshop. Results from the evaluation survey are summarized in Section 5.3.

5. Cutpoint Validation Results

5.1. Cut Score Recommendations

Table 4 presents the previous cut scores based on the Fall 2014 data. Specifically, Table 4 presents the theta cuts (i.e., the ability estimate) and the expected raw score (RS) and scale score (SS) cuts based on the Fall 2014 forms and in the actual OIB ("Fall 2014 in OIB").

- Prior to cutpoint validation, the previous theta cuts were used to obtain the expected raw and scale score cuts based on the Fall 2014 operational forms. After calibration of the Fall 2014 operational data, the theta to raw score conversion was obtained, and scale transformation using existing slope and intercept were applied to the theta scale to obtain the corresponding scale scores. Even though the same theta cuts were used, the corresponding raw and scale cut scores were expected to be different from the previous administrations due to form differences (e.g., number of items, total score points, and form difficulty).
- The "Fall 2014 in OIB" data is presented because it differs from the actual Fall 2014 data. During cutpoint validation, the items corresponding to the cutpoints were identified in the OIB. Due to differences in form difficulty, students' ability distribution, random error, and rounding, some of the raw score points did not exist in the OIB obtained using the Fall 2014 data. In such cases, the closest raw score points that are greater than the actual raw scores were used in the OIB to indicate current cutpoints. Cells shaded gray indicate that those particular raw score points did not exist in the OIB.

Table 5 presents the recommended cut scores from the cutpoint validation workshop. The differences between the cutpoint validation cuts and the Fall 2014 cuts (based on the OIB) are included in this table as well.

These tables show that the changes in cutpoints for English I, English II, and Geometry were relatively small, which suggests that panelists expected student performance to be similar across the forms. The largest change in cutpoints was for the Basic level for Algebra I and Algebra II. Results suggest that panelists expected the Basic cutpoints to be higher for the Algebra I and Algebra II forms based on their understanding of the standards, ALDs, borderline student definitions, and impact data.

Table 4. Previous Cut Scores Based on the Fall 2014 Forms

	Fall 2014									Fall 2014 in OIB								
	Basic			Proficient			Advanced			Basic			Proficient			Advanced		
Content Area	**Theta**	**RS**	**SS**	**Theta**	**RS**	**SS**	**Theta**	**RS**	**SS**	**Theta**	**RS**	**SS**	**Theta**	**RS**	**SS**	**Theta**	**RS**	**SS**
English I	-0.44	18	177	0.58	27	200	1.70	35	225	-0.44	18	177	0.58	27	200	1.70	35	225
English II	-0.71	17	180	0.51	28	200	2.04	38	225	-0.71	17	180	0.51	28	200	2.04	38	225
Algebra I	-0.80	8	177	0.36	17	200	1.61	31	225	-0.80	12	177	0.36	17	200	1.61	31	225
Algebra II	-0.45	10	182	0.46	17	200	1.71	27	225	-0.45	12	182	0.46	18	200	1.71	28	225
Geometry	-0.36	14	182	0.47	21	200	1.60	30	225	-0.36	15	180	0.47	21	200	1.60	30	225

Table 5. Cutpoint Validation Results—Recommended Cut Scores

	Cutpoint Validation									Difference (Cutpoint Validation — Fall 2014 in OIB)								
	Basic			Proficient			Advanced			Basic			Proficient			Advanced		
Content Area	**Theta**	**RS**	**SS**	**Theta**	**RS**	**SS**	**Theta**	**RS**	**SS**	**Theta**	**RS**	**SS**	**Theta**	**RS**	**SS**	**Theta**	**RS**	**SS**
English I	-0.55	18	175	0.58	27	199	2.01	37	232	-0.11	0	-2	0.00	0	-1	0.31	2	7
English II	-0.69	17	180	0.45	27	198	2.06	38	225	0.02	0	0	-0.06	-1	-2	0.02	0	0
Algebra I	-0.14	13	190	0.46	19	203	1.63	32	226	0.66	1	13	0.10	2	3	0.02	1	1
Algebra II	0.26	16	197	0.85	21	208	1.92	29	228	0.71	4	15	0.39	3	8	0.21	1	3
Geometry	-0.23	16	185	0.38	21	199	1.64	30	225	0.13	1	5	-0.09	0	-1	0.04	0	0

Figures 2–7 show the theta cuts based previous results (Fall 2014) and the cutpoint validation results (CPV).

Figure 3—English I Theta Cuts

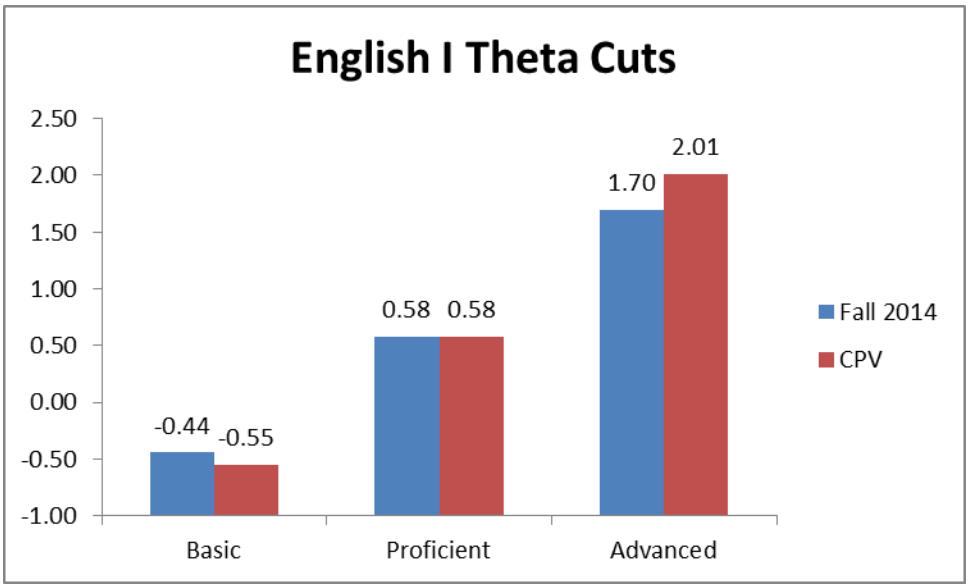


Figure 4—English II Theta Cuts

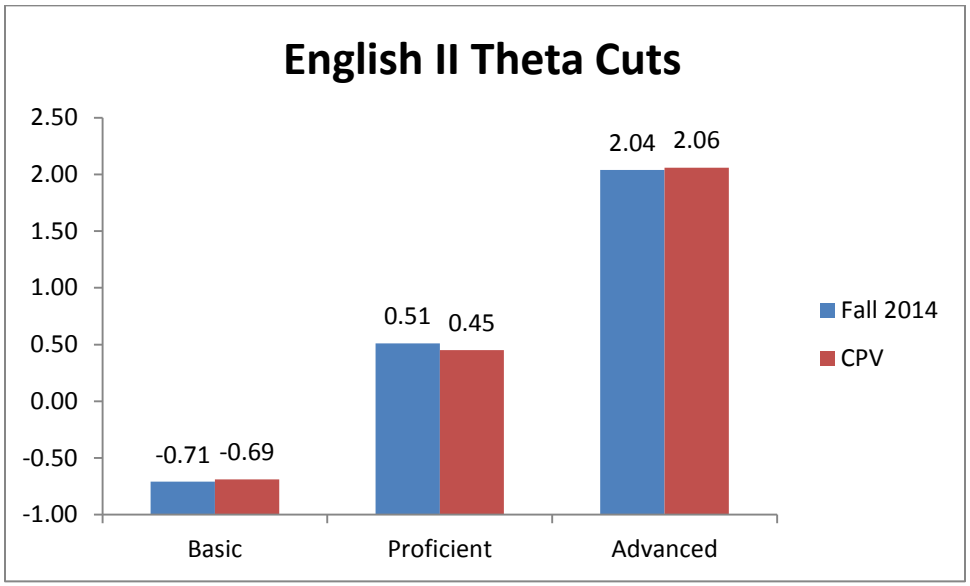


Figure 5—Algebra I Theta Cuts

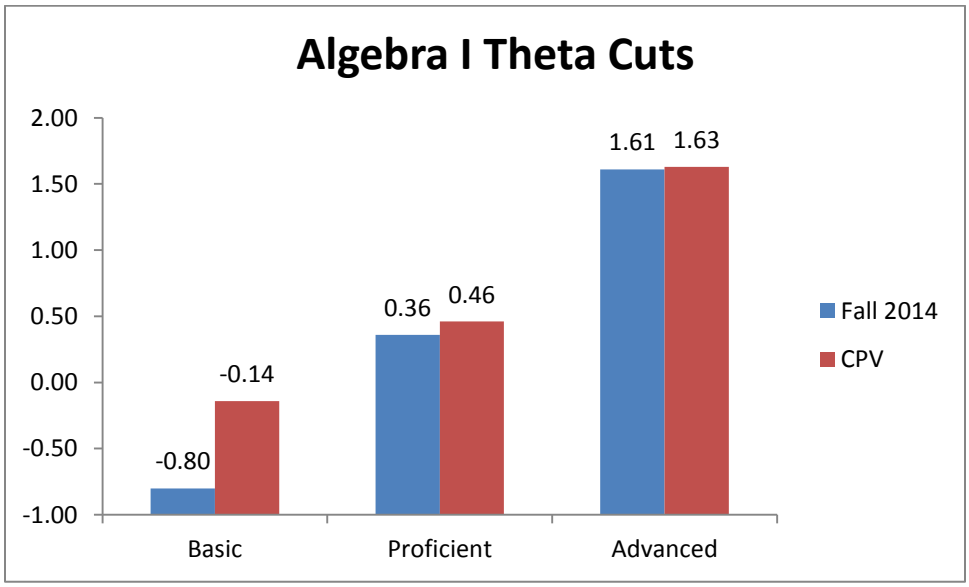


Figure 6—Algebra II Theta Cuts

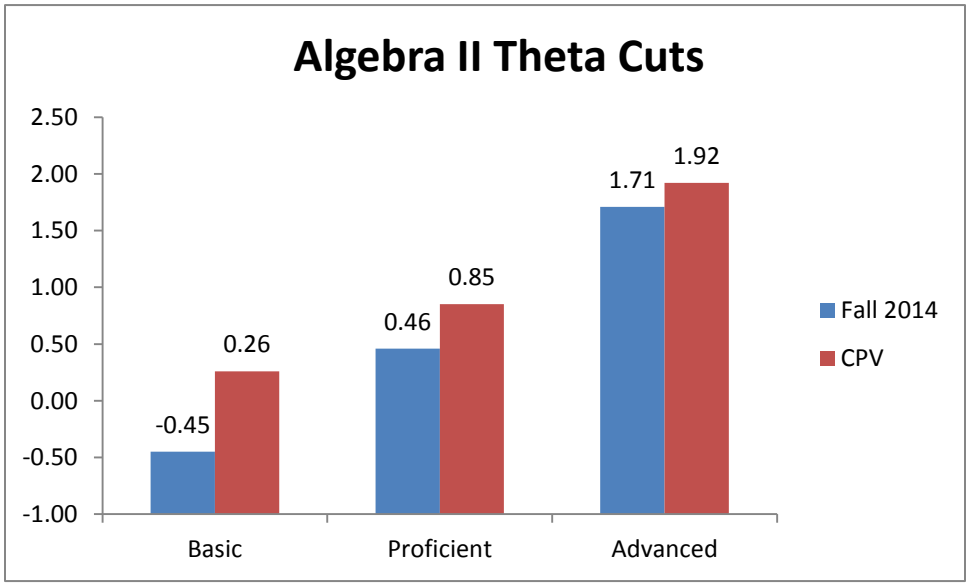
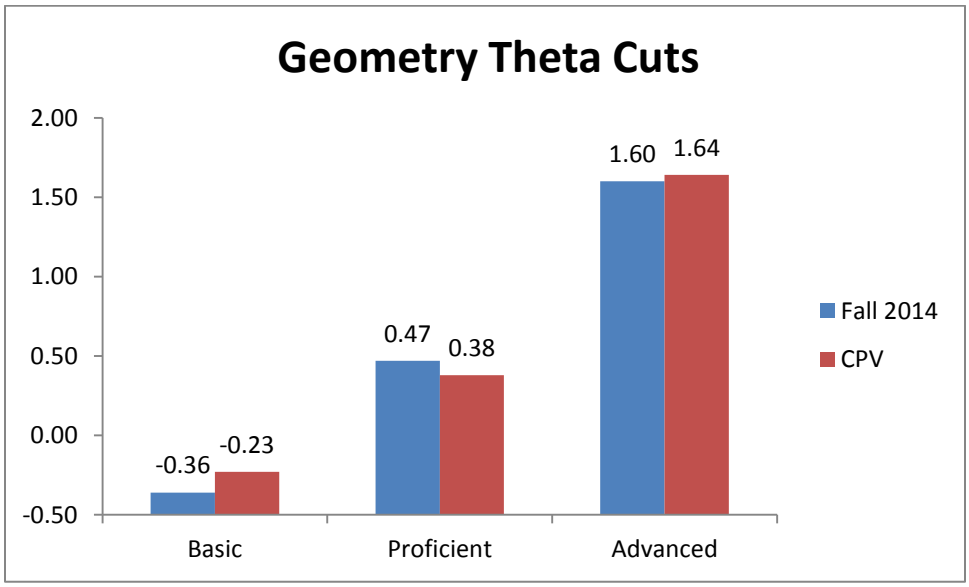


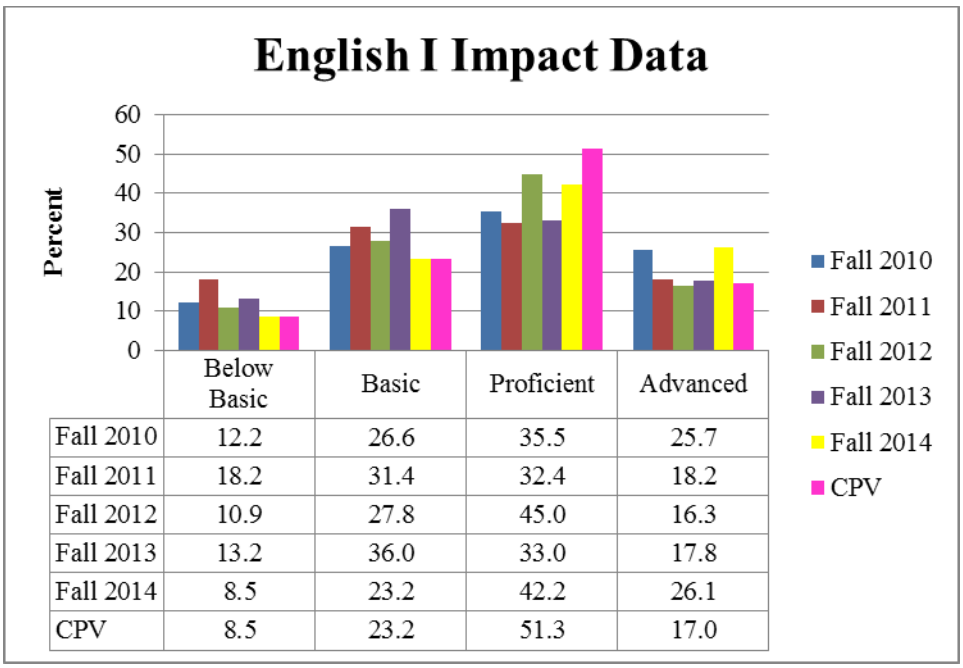
Figure 7—Geometry Theta Cuts



5.2. Impact Data

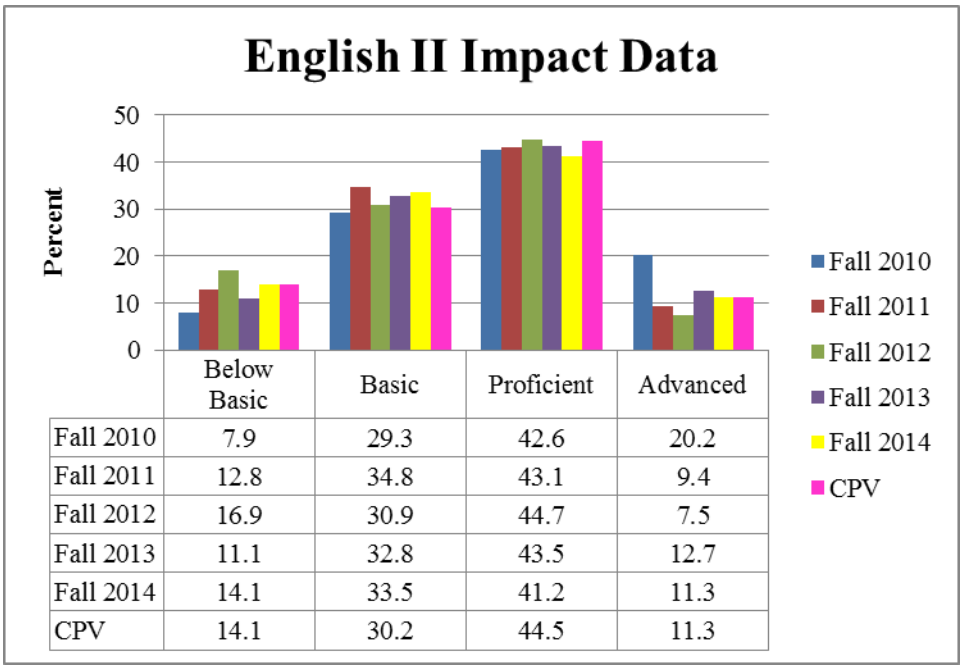
Figures 8–12 show the impact data based on student data from Fall 2010 to Fall 2014, as well as the cutpoint validation (CPV) results. Impact data for English I, English II, and Geometry show a relatively consistent pattern across years. For Algebra I and Algebra II, the percentage of Below Basic students was very small (2.6%) using the existing cuts for Fall 2014. Based on the recommended cuts from the cutpoint validation, the percentage of Below Basic increased slightly.

Figure 8—English I Impact Data



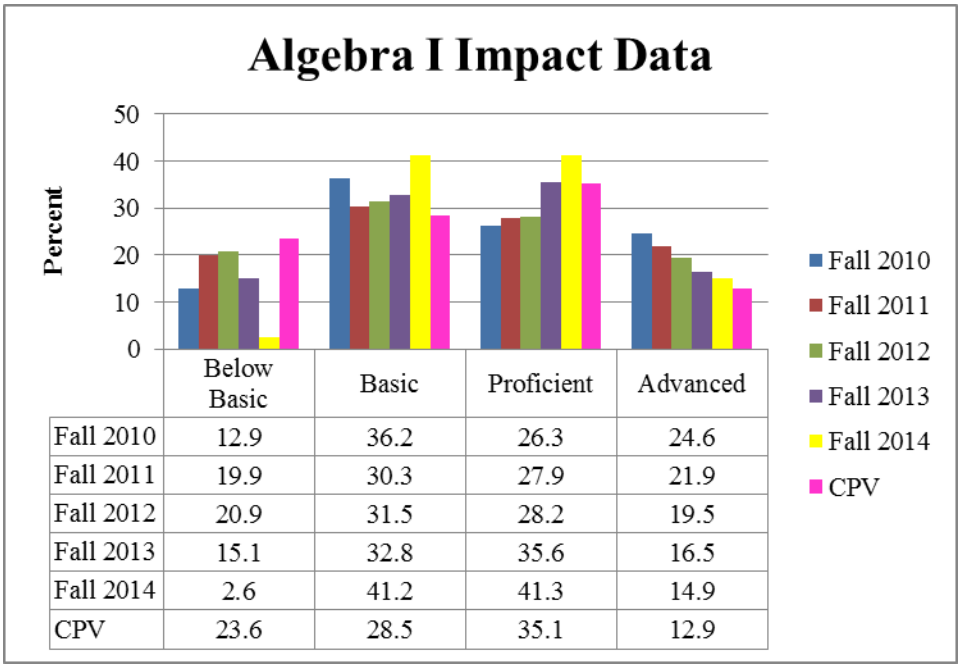
	Below Basic	Basic	Proficient	Advanced
Fall 2010	12.2	26.6	35.5	25.7
Fall 2011	18.2	31.4	32.4	18.2
Fall 2012	10.9	27.8	45.0	16.3
Fall 2013	13.2	36.0	33.0	17.8
Fall 2014	8.5	23.2	42.2	26.1
CPV	8.5	23.2	51.3	17.0

Figure 9—English II Impact Data



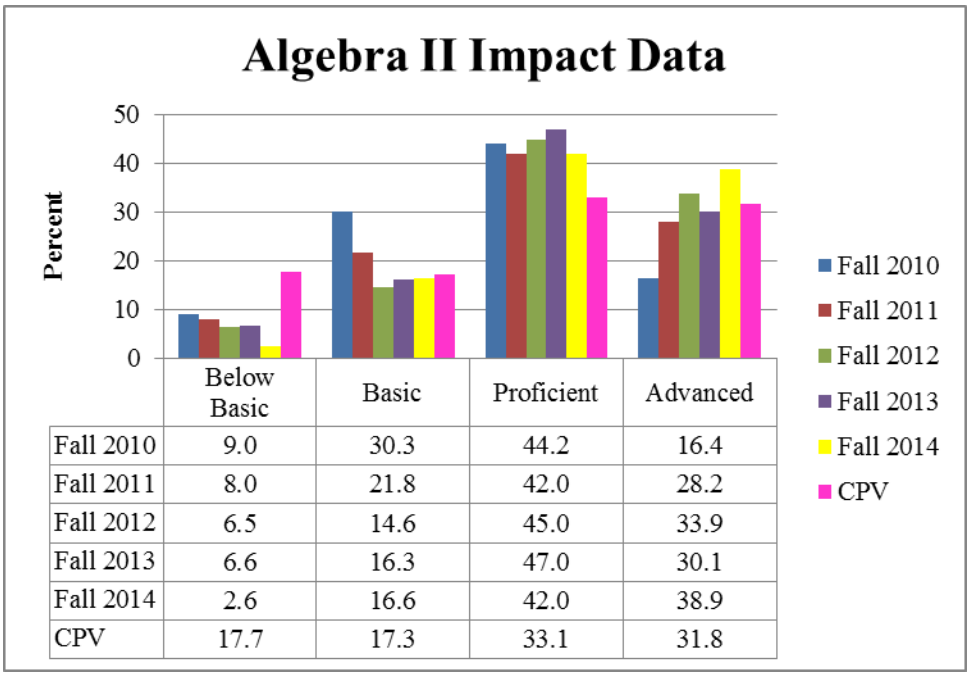
	Below Basic	Basic	Proficient	Advanced
Fall 2010	7.9	29.3	42.6	20.2
Fall 2011	12.8	34.8	43.1	9.4
Fall 2012	16.9	30.9	44.7	7.5
Fall 2013	11.1	32.8	43.5	12.7
Fall 2014	14.1	33.5	41.2	11.3
CPV	14.1	30.2	44.5	11.3

Figure 10—Algebra I Impact Data



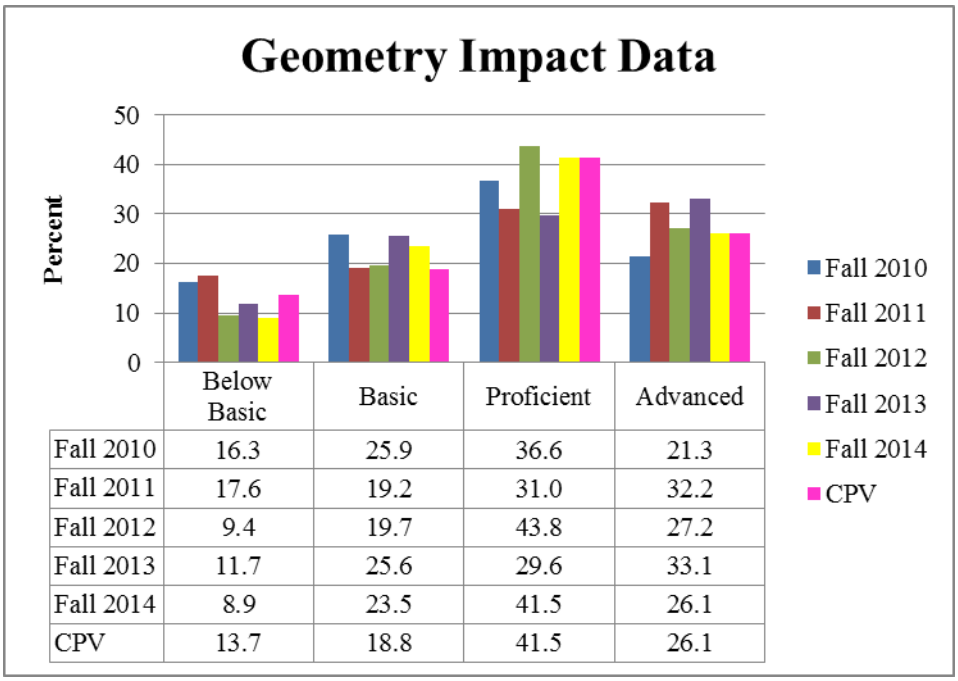
	Below Basic	Basic	Proficient	Advanced
Fall 2010	12.9	36.2	26.3	24.6
Fall 2011	19.9	30.3	27.9	21.9
Fall 2012	20.9	31.5	28.2	19.5
Fall 2013	15.1	32.8	35.6	16.5
Fall 2014	2.6	41.2	41.3	14.9
CPV	23.6	28.5	35.1	12.9

Figure 11—Algebra II Impact Data



	Below Basic	Basic	Proficient	Advanced
Fall 2010	9.0	30.3	44.2	16.4
Fall 2011	8.0	21.8	42.0	28.2
Fall 2012	6.5	14.6	45.0	33.9
Fall 2013	6.6	16.3	47.0	30.1
Fall 2014	2.6	16.6	42.0	38.9
CPV	17.7	17.3	33.1	31.8

Figure 12—Geometry Impact Data



	Below Basic	Basic	Proficient	Advanced
Fall 2010	16.3	25.9	36.6	21.3
Fall 2011	17.6	19.2	31.0	32.2
Fall 2012	9.4	19.7	43.8	27.2
Fall 2013	11.7	25.6	29.6	33.1
Fall 2014	8.9	23.5	41.5	26.1
CPV	13.7	18.8	41.5	26.1

5.3. Evaluation Survey Summary

Table 6 provides a summary of the panelists' responses to the nine multiple-choice questions in the evaluation survey (see Appendix H for the survey questions). Overall, most panelists agreed or strongly agreed with all the statements listed in the survey. Few panelists selected "neutral," and one panelist selected "disagree" to two questions. Overall, most panelists felt that they understood the cutpoint validation process and were comfortable with their recommendations.

Table 6. Summary of Evaluation Survey Responses

Question	1	2	3	4	5	6	7	8	9
Strongly Agree	8	6	9	5	8	12	11	11	11
Agree	9	9	10	13	9	6	8	7	8
Neutral	2	3	0	1	2	0	0	1	0
Disagree	0	1	0	0	0	1	0	0	0
Strongly Disagree	0	0	0	0	0	0	0	0	0

Appendix I provides the panelists' comments and suggestions collected from the open-ended question. Most comments were positive (e.g., valuable experience and professional growth). Some panelists provided their feedback on alignment, the ALDs, the desire to change the group cut scores, and the cutpoint validation procedures (e.g., whether the median is a good statistic to be used to obtain group-recommended cutpoints). Overall, it was clear that the panelists thought about the MO EOC Assessment thoroughly and made great effort to understand the process and achieve the goals of the cutpoint validation workshop.

In addition, some panelists indicated that Questar's online content management system worked very well. Throughout the cutpoint validation workshop, the content management system was well received by both panelists and facilitators. The use of the content management system greatly reduced the need for printed materials, and it was a very smooth and positive experience for the panelists. Panelists also perceived the facilitators to be very effective and helpful in guiding them throughout the cutpoint validation process.

Results from the evaluation survey indicate overall satisfactory and positive feedback regarding the procedure, the cutpoints, and the content management system. This provides validity evidence of the overall cutpoint validation process used for the MO EOC Assessments.

Appendix A: Previous MO EOC ALDs

English I Achievement Descriptors

Advanced Scale Score: 225–250
Reading — In both fiction and nonfiction, a student can

- ✓ Determine vocabulary meaning
- ✓ Analyze the main idea and evaluate supporting details
- ✓ Make sophisticated connections — compare, contrast, evaluate
- ✓ Evaluate text features
- ✓ Analyze complex figurative language and literary techniques
- ✓ Draw insightful conclusions
- ✓ Summarize and paraphrase complex ideas and information
- ✓ Analyze literary elements
- ✓ Analyze reasoning, inferences, and sources
- ✓ Analyze proposed solutions
- ✓ Analyze accuracy and adequacy of evidence
- ✓ Analyze organizational patterns
- ✓ Analyze the author's point of view, viewpoint/perspective, and purpose
- ✓ Analyze the author's style and word choice

Proficient Scale Score: 200–224
Reading — In both fiction and nonfiction, a student can

- ✓ Determine vocabulary meaning
- ✓ Identify the main idea and supporting details
- ✓ Make connections — compare, contrast, analyze
- ✓ Analyze text features
- ✓ Analyze figurative language and literary techniques
- ✓ Draw accurate conclusions
- ✓ Summarize and paraphrase ideas and information
- ✓ Explain literary elements
- ✓ Explain reasoning, inferences, and sources
- ✓ Explain proposed solutions
- ✓ Explain evidence and use of information
- ✓ Explain organizational patterns
- ✓ Explain the author's point of view, viewpoint/perspective, and purpose
- ✓ Explain the author's style and word choice

Basic Scale Score: To Be Determined
Reading — In fiction and nonfiction, a student can

- ✓ Determine vocabulary meaning
- ✓ Identify the main idea and major details
- ✓ Make simple connections — compare, contrast
- ✓ Identify text features
- ✓ Identify figurative language and literary techniques
- ✓ Draw conclusions
- ✓ Summarize and paraphrase basic ideas and information

- ✓ Identify basic literary elements
- ✓ Make simple inferences
- ✓ Identify proposed solutions
- ✓ Determine reliability of information
- ✓ Identify organizational patterns
- ✓ Identify author's purpose and point of view
- ✓ Identify the author's style and word choice

Below Basic Scale Score: To Be Determined
Reading — In fiction and nonfiction, a student can

- ✓ Determine vocabulary meaning
- ✓ Identify the main idea and some details
- ✓ Make simple connections
- ✓ Identify simple text features
- ✓ Identify figurative language
- ✓ Identify characters, plot, and setting
- ✓ Determine literal meaning
- ✓ Identify point of view

English II Achievement Descriptors

Advanced Scale Score Cut: 225–250
Reading — In both fiction and nonfiction, a student can

- ✓ Determine vocabulary meaning
- ✓ Analyze the main idea and evaluate supporting details
- ✓ Make sophisticated connections — compare, contrast, evaluate
- ✓ Evaluate text features
- ✓ Analyze complex figurative language and literary techniques
- ✓ Draw insightful conclusions
- ✓ Summarize and paraphrase complex ideas and information
- ✓ Analyze literary elements
- ✓ Evaluate reasoning, inferences, and sources
- ✓ Evaluate proposed solutions
- ✓ Evaluate accuracy and adequacy of evidence
- ✓ Evaluate organizational patterns
- ✓ Evaluate the author's point of view, viewpoint/perspective, and purpose
- ✓ Evaluate the author's tone

Writing — A student is able to write across genres a paper that

- ✓ Contains a strong controlling idea, along with an effective beginning, middle, and end
- ✓ Uses paragraphing effectively
- ✓ Progresses in a logical order and uses cohesive devices effectively
- ✓ Addresses the topic clearly and provides specific and relevant details, reasons, and examples
- ✓ Uses precise, vivid language in sentences that are clear and varied in structure
- ✓ Effectively uses writing techniques
- ✓ Shows complexity, freshness of thought, and individual perspective
- ✓ Shows a clear awareness of audience and purpose
- ✓ Contains few errors in Standard English and spelling

A student is able to consistently and correctly apply the conventions of capitalization, punctuation, and standard usage.

Proficient Scale Score Cut: 200–224

Reading — In both fiction and nonfiction, a student can

- ✓ Determine vocabulary meaning
- ✓ Identify the main idea and supporting details
- ✓ Make connections — compare, contrast, analyze
- ✓ Analyze text features
- ✓ Analyze figurative language and literary techniques
- ✓ Draw accurate conclusions
- ✓ Summarize and paraphrase ideas and information
- ✓ Analyze literary elements
- ✓ Analyze reasoning, inferences, and sources
- ✓ Analyze proposed solutions
- ✓ Analyze evidence and use of information
- ✓ Analyze organizational patterns
- ✓ Analyze the author's point of view, viewpoint/perspective, and purpose
- ✓ Analyze the author's tone

Writing — A student is able to write across genres a paper that

- ✓ Contains a controlling idea, along with a clear beginning, middle, and end
- ✓ Uses paragraphing appropriately
- ✓ Progresses in a generally logical order and uses cohesive devices
- ✓ Addresses the topic and provides details, reasons, and examples
- ✓ Uses precise language in sentences that are clear and show some variety in structure
- ✓ Uses writing techniques
- ✓ Shows some complexity, freshness of thought, and/or individual perspective
- ✓ Shows awareness of audience and purpose
- ✓ Contains some errors in Standard English and spelling

A student is able to apply the conventions of capitalization, punctuation, and standard usage correctly.

Basic Scale Score Cut: 180–199

Reading — In fiction and nonfiction, a student can

- ✓ Determine vocabulary meaning
- ✓ Identify the main idea and major details
- ✓ Make simple connections — compare, contrast
- ✓ Identify text features
- ✓ Identify figurative language and literary techniques
- ✓ Draw basic/simple conclusions
- ✓ Summarize and paraphrase basic ideas and information
- ✓ Identify basic literary elements
- ✓ Make simple inferences
- ✓ Identify proposed solutions
- ✓ Determine reliability of information

- ✓ Identify organizational patterns
- ✓ Identify author's purpose and point of view
- ✓ Identify author's tone

Writing — A student is able to write across genres a paper that

- ✓ Contains an idea, though it may lack focus, along with a beginning, middle, and end
- ✓ Shows evidence of paragraphing
- ✓ Progresses generally in a somewhat logical order and may use cohesive devices
- ✓ Addresses the topic but relies on generalities rather than specifics
- ✓ May use imprecise language in sentences that are generally clear in structure
- ✓ May lack writing techniques
- ✓ May lack complexity, freshness of thought, and individual perspective
- ✓ Shows some awareness of audience and purpose
- ✓ Contains errors in Standard English and spelling that may be distracting

A student inconsistently applies the conventions of capitalization, punctuation, and standard usage.

Below Basic Scale Score Cut: 100–179

Reading — In fiction and nonfiction, a student can

- ✓ Determine vocabulary meaning
- ✓ Identify the main idea and some details
- ✓ Make simple connections
- ✓ Identify simple text features
- ✓ Identify figurative language
- ✓ Identify characters, plot, and setting
- ✓ Determine literal meaning
- ✓ Identify point of view

Writing — A student is able to write across genres a paper that

- ✓ May contain an unfocused idea and may lack a beginning, middle, and/or end
- ✓ May lack evidence of paragraphing
- ✓ Does not progress in a logical order and lacks cohesion
- ✓ May address the topic but lacks details
- ✓ May use imprecise language in sentences that may be unclear in structure
- ✓ Shows little evidence of writing techniques
- ✓ Lacks complexity, freshness of thought, and individual perspective
- ✓ Shows little or no awareness of audience or purpose
- ✓ Contains repeated errors in Standard English and spelling that are distracting

A student incorrectly applies the conventions of capitalization, punctuation, and standard usage.

Algebra I Achievement Descriptors

Advanced Scale Score Cut: 225–250

Algebraic Relationships — Using algebraic relationships, a student can

- ✓ Generalize patterns using explicitly or recursively defined functions
- ✓ Describe the effects of parameter changes on exponential growth/decay and quadratic functions, including intercepts
- ✓ Use symbolic algebra to represent and solve problems that involve quadratic relationships, including equations and inequalities
- ✓ Describe and use algebraic manipulations, including factoring, and apply properties of exponents to simplify expressions
- ✓ Use and solve equivalent forms of quadratic and absolute value equations
- ✓ Identify quantitative relationships and determine type(s) of functions that might model the situation to solve a problem, including quadratic and exponential growth/decay
- ✓ Use and solve systems of linear inequalities with two variables
- ✓ Analyze quadratic functions by investigating rates of change, intercepts, and zeros

Proficient Scale Score Cut: 200–224

Number and Operations — Using numbers and operations, a student can

- ✓ Compare and order rational and irrational numbers, including finding their approximate locations on a number line
- ✓ Use real numbers and various models, drawings, etc. to solve problems

Algebraic Relationships — Using algebraic relationships, a student can

- ✓ Generalize patterns using explicitly or recursively defined linear functions
- ✓ Compare and contrast various forms of representations of patterns
- ✓ Compare and contrast the properties of linear and nonlinear functions
- ✓ Describe the effects of parameter changes on linear functions, including intercepts
- ✓ Use symbolic algebra to represent problems that involve linear relationships, including equations and inequalities
- ✓ Describe and use algebraic manipulations, including rules of integer exponents, to simplify expressions
- ✓ Use and solve equivalent forms of absolute value and linear equations
- ✓ Use and solve systems of linear equations with two variables
- ✓ Identify quantitative relationships that can be modeled by linear functions to solve a problem
- ✓ Analyze linear functions by investigating rates of change, intercepts, and zeros

Data and Probability — Using data and probability, a student can

- ✓ Use appropriate graphical representations of data
- ✓ Given one-variable quantitative data, display the distribution and describe its shape
- ✓ Apply statistical methods to measures of center to solve problems
- ✓ Given a scatter plot, determine an equation for a line of best fit
- ✓ Make conjectures about possible relationships between two characteristics of a sample on the basis of scatter plots of the data

Basic Scale Score Cut: 177–199

Number and Operations — Using numbers and operations, a student can

- ✓ Compare and order rational numbers, including finding their approximate locations on a number line

Algebraic Relationships — Using algebraic relationships, a student can

- ✓ Generalize patterns using recursively defined single-operation functions
- ✓ Compare the properties of linear functions
- ✓ Use symbolic algebra to solve problems that involve linear relationships, including equations and inequalities
- ✓ Describe and use algebraic manipulations, including order of operations, to simplify expressions
- ✓ Use equivalent forms of linear equations

Data and Probability — Using data and probability, a student can

- ✓ Determine the sample space of an experiment
- ✓ Formulate questions about a characteristic which include sample spaces and distributions

Below Basic Scale Score Cut: 100–176

Number and Operations — Using numbers and operations, a student can

- ✓ Compare and order rational numbers

Algebraic Relationships — Using algebraic relationships, a student can

- ✓ Identify a function as linear or nonlinear
- ✓ Use symbolic algebra to solve problems that involve two-step linear equations

Data and Probability **—** Using data and probability, a student can

- ✓ Identify the sample space of an experiment
- ✓ Select appropriate graphical representations of data
- ✓ Determine measures of center

Algebra II Achievement Descriptors

Advanced Scale Score: 225–250

Algebraic Relationships — Using algebraic relationships, a student can

- ✓ Describe the effect of parameter changes on logarithmic and rational functions
- ✓ Compare and contrast properties of rational functions
- ✓ Use symbolic algebra to represent and solve problems that involve logarithmic relationships
- ✓ Describe and use algebraic manipulations, inverse, or composition of functions
- ✓ Use and solve equivalent forms of logarithmic, radical, and rational equations
- ✓ Use and solve systems of quadratic equations or inequalities with 2 variables
- ✓ Identify quantitative relationships and determine type(s) of functions that might model the situation to solve a problem, including logarithmic and rational functions
- ✓ Analyze logarithmic functions by investigating intercepts, domain and range, and asymptotes

Data and Probability — Using data and probability, a student can

- ✓ Describe the concept of probability distribution
- ✓ Compute the probability of compound events

Proficient Scale Score: 200–224

Algebraic Relationships — Using algebraic relationships, a student can

- ✓ Compare and contrast various forms of representations of patterns
- ✓ Describe the effect of parameter changes on quadratic, cubic, absolute value, and square root functions
- ✓ Compare and contrast the properties of exponential and logarithmic functions
- ✓ Use symbolic algebra to represent and solve problems that involve exponential or quadratic relationships
- ✓ Describe and use algebraic manipulations, including factoring or imaginary numbers, to simplify expressions
- ✓ Use and solve equivalent forms of quadratic and exponential equations
- ✓ Use and solve systems of linear inequalities with two variables
- ✓ Identify quantitative relationships and determine type(s) of functions that might model the situation to solve a problem, including quadratic and exponential growth/decay
- ✓ Analyze exponential functions by investigating rates of change, intercepts, domain and range, and asymptotes

Data and Probability — Using data and probability, a student can

- ✓ Given a scatterplot, determine a type of function that models the data
- ✓ Given one-variable quantitative data, calculate summary statistics
- ✓ Use and describe the concepts of conditional probability

Basic Scale Score: 182–199

Numbers and Operations — Using numbers and operations, a student can

- ✓ Compare and order irrational numbers, including finding their approximate location on a number line
- ✓ Use real numbers and various models, drawings, etc. to solve problems

Algebraic Relationships — Using algebraic relationships, a student can

- ✓ Generalize patterns using explicitly or recursively defined linear or exponential functions
- ✓ Describe the effect of parameter changes on exponential functions
- ✓ Compare and contrast the properties of linear and exponential functions
- ✓ Use symbolic algebra to represent and solve problems that involve linear relationships
- ✓ Describe and use algebraic manipulations, including rules of exponents, to simplify expressions
- ✓ Use and solve equivalent forms of absolute value and linear equations
- ✓ Use and solve systems of linear equations with two variables
- ✓ Identify quantitative relationships that can be modeled by linear functions to solve a problem

Data and Probability — Using data and probability, a student can

- ✓ Given a scatterplot, determine an equation for a line of best fit
- ✓ Given one-variable quantitative data, display the distribution and describe its shape
- ✓ Apply statistical measures of center to solve problems

Below Basic Scale Score: 100–181

Numbers and Operations — Using numbers and operations, a student can

- ✓ Compare and order rational numbers, including finding approximate locations on a number line

Algebraic Relationships — Using algebraic relationships, a student can

- ✓ Generalize patterns using explicitly or recursively defined single operation functions
- ✓ Describe the effects of parameter changes on linear functions
- ✓ Compare the properties of linear functions
- ✓ Describe and use algebraic manipulations, including order of operations, to simplify expressions
- ✓ Use and solve equivalent forms of linear equations

Data and Probability — Using data and probability, a student can

- ✓ Use appropriate graphical representations of data
- ✓ Describe the concept of sample space
- ✓ Determine the probability of two independent events

Geometry Achievement Descriptors

Advanced Scale Score: 225–250

Algebraic Relationships — Using algebraic relationships, a student can

- ✓ Compare and contrast various forms of representations of patterns (exponential)

Geometric and Spatial Relationships — Using geometric and spatial relationships, a student can

- ✓ Use inductive and deductive reasoning to prove theorems and critique arguments made by others
- ✓ Make conjectures involving 2-dimensional objects represented with Cartesian coordinates
- ✓ Apply constructions and the coordinate plane to represent translations, reflections, rotations, and dilations of objects
- ✓ Draw vertex-edge graphs or networks to find optimal solutions
- ✓ Draw representations of 3-dimensional geometric objects from different perspectives

Measurement — Using measurement relationships, a student can

- ✓ Solve problems of angle measure involving polygons

Proficient Scale Score: 200–224

Algebraic Relationships — Using algebraic relationships, a student can

- ✓ Identify quantitative relationships and determine the type(s) of function that might model the situation to solve the problem (exponential)
- ✓ Analyze linear functions by investigating rates of change and intercepts
- ✓ Apply appropriate properties of exponents to solve equations
- ✓ Compare and contrast various forms of representations of patterns (quadratic)

Geometric and Spatial Relationships — Using geometric and spatial relationships, a student can

- ✓ Use inductive and deductive reasoning to establish the validity of geometric conjectures
- ✓ Solve problems involving 2-dimensional objects represented with Cartesian coordinates
- ✓ Use constructions and the coordinate plane to represent translations, reflections, rotations, and dilations of objects

- ✓ Identify types of symmetries of 3-dimensional figures
- ✓ Use vertex-edge graphs or networks to find optimal solutions

Measurement — Using measurement relationships, a student can
- ✓ Solve problems of angle measure involving parallel lines cut by a transversal
- ✓ Determine the surface area of geometric figures, including cylinders, cones, and spheres

Basic Scale Score: 182–199
Algebraic Relationships — Using algebraic relationships, a student can
- ✓ Generalize patterns using explicitly or recursively defined functions
- ✓ Apply appropriate properties of exponents to simplify expressions
- ✓ Identify quantitative relationships and determine the type(s) of function that might model the situation to solve the problem (absolute value and quadratic)
- ✓ Compare and contrast various forms of representations of patterns (linear)

Geometric and Spatial Relationships — Using geometric and spatial relationships, a student can
- ✓ Identify types of symmetries of 2-dimensional figures (rotational)

Measurement — Using measurement relationships, a student can
- ✓ Solve problems of angle measure involving triangles
- ✓ Determine the volume of geometric figures, including cylinders, cones, and spheres

Below Basic Scale Score: 100–181
Algebraic Relationships — Using algebraic relationships, a student can
- ✓ Identify quantitative relationships and determine the type(s) of function that might model the situation to solve the problem (linear)

Geometric and Spatial Relationships — Using geometric and spatial relationships, a student can
- ✓ Identify types of symmetries of 2-dimensional figures (line)

Measurement — Using measurement relationships, a student can
- ✓ Determine the volume of geometric figures (prism and pyramids)

Appendix B: Draft MO EOC ALDs

Missouri End-of-Course Assessment Achievement Level Descriptors (ALDs)

English I

Below Basic	Basic	Proficient	Advanced
Students performing at the Below Basic level on the Missouri English I End-of-Course Assessment demonstrate a minimal command of the skills and processes identified in the Course Level Reading Expectations for English I. They demonstrate these skills inconsistently and/or incorrectly in reading processes and in responding to both narrative and informational texts. Students performing at the Below Basic level use few strategies to comprehend and interpret texts, demonstrate little understanding of literary forms, and apply few strategies for accessing information.	Students performing at the Basic level on the Missouri English I End-of-Course Assessment demonstrate a partial command of the skills and processes identified in the Course Level Reading Expectations for English I. They demonstrate these skills inconsistently in reading processes and in responding to both narrative and informational texts. In addition to understanding and applying the skills at the Below Basic level, students performing at the Basic level use some strategies to comprehend and interpret a variety of texts, demonstrate a partial understanding of literary forms, and inconsistently apply few strategies for accessing and summarizing information.	Students performing at the Proficient level on the Missouri English I End-of-Course Assessment demonstrate solid command of the skills and processes identified in the Course Level Reading Expectations for English I. They understand the organization and structure of various texts, determine main ideas, summarize information, and understand key literary elements such as characterization, plot, and theme. In addition to understanding and applying the skills at the Basic level, students performing at the Proficient level use a range of strategies to comprehend and interpret a variety of texts, demonstrate an understanding of literary forms, and apply strategies for accessing and summarizing information.	Students performing at the Advanced level on the Missouri English I End-of-Course Assessment consistently demonstrate a thorough command of the skills and processes identified in the Course Level Reading Expectations for English I. They comprehend complex narrative and informational text by referring to what is explicitly stated and use reasoning skills to draw inferences, analyze, synthesize, and evaluate text consistent with high school expectations. In addition to understanding and applying the skills at the Proficient level, students performing at the Advanced level use a range of strategies to comprehend and interpret a variety of texts, demonstrate a thorough understanding of literary forms, and consistently apply different strategies for accessing and summarizing information.
Reading			
Students at this level:	**In addition to understanding and applying the skills at the Below Basic level, students at this level:**	**In addition to understanding and applying the skills at the Basic level, students at this level:**	**In addition to understanding and applying the skills at the Proficient level, students at this level:**
• May use context clues to recognize the meaning of words • May understand the organization and purpose of informational materials • May identify explicitly stated main ideas • May identify the main events of the plot • May recognize character traits	• May use limited context clues and pattern of word changes to determine the origin and meaning of unknown words • Inconsistently identify the structure and format of various informational documents • Paraphrase ideas from a single source to demonstrate comprehension	• Use clues and pattern of word changes to analyze the origin and meaning of unknown words • Analyze the structure and format of various informational documents • Synthesize the content from several sources on a single issue • Identify the thesis, evidence, and argument in	• Consistently use context clues and pattern of word changes to analyze the origin and meaning of unfamiliar words • Consistently synthesize the content from several sources on a single issue • Consistently identify the thesis, evidence, and argument in informational texts

Below Basic	Basic	Proficient	Advanced
• May identify literary devices	• May identify main idea or thesis, with limited evidence, in informational and narrative texts • Inconsistently identify purpose and/or audience of a variety of texts • Identify some aspects of an author's argument • May determine characters' traits by what the characters say about themselves • May compare and/or contrast simple themes across works of prose, poetry, and drama • May identify some literary devices	informational texts • Explain an author's argument or defense of a claim • Define the purpose and audience of a variety of communication formats • Determine characters' traits by what the characters say about themselves • Explain the importance of the setting to the mood and meaning of the text • Explain the author's point of view and interpret how it influences the text • Compare and contrast themes across works of prose, poetry, and drama • Explain significant literary devices, including irony and symbolism	• Consistently define the purpose and audience of a variety of texts • Consistently evaluate the author's argument or defense of a claim • Consistently evaluate the importance of the setting to the mood and meaning of the text • Consistently explain the author's point of view and interpret how it influences the text
Writing			
Students at this level:	**In addition to understanding and applying the skills at the Below Basic level, students at this level:**	**In addition to understanding and applying the skills at the Basic level, students at this level:**	**In addition to understanding and applying the skills at the Proficient level, students at this level:**
• May identify a thesis • May lack evidence of paragraphing and order • May develop topic sentence(s) • May identify an appropriate word choice • May link ideas within sentences and between paragraphs • Show little evidence of writing techniques	• Develop a thesis • Identify a position or argument with supporting evidence • Show evidence of paragraphing, but progresses in a somewhat logical order • May use sentence structure and word choice to create clear content • May lack writing techniques	• Develop and support a logical thesis with examples • Defend a position or argument with relevant evidence • Use paragraphing appropriately and progresses in a logical order • Use varied sentence structure and word choices to elaborate ideas clearly, concisely and accurately to express a logical progression of ideas • Use writing techniques	• Develop and support an original, logical thesis • Construct a position or argument with precise and relevant evidence • Use paragraphing appropriately and progresses in a logical order • Use varied and complex sentences, including verbal phrases, vivid and specific vocabulary, and depth of ideas and information • Effectively uses writing techniques

Missouri End-of-Course Assessment Achievement Level Descriptors (ALDs)

English II

Below Basic	Basic	Proficient	Advanced
Students performing at the Below Basic level on the Missouri English II End-of-Course Assessment demonstrate a minimal command of the skills and processes identified in the Course Level Expectations for English II. They demonstrate these skills inconsistently and/or incorrectly in reading processes, in responding to both narrative and informational texts, and in writing. Students performing at the Below Basic level use few strategies to comprehend and interpret texts, demonstrate little understanding of literary forms, and apply few strategies for accessing information. They may not follow a writing process to compose papers and/or incorrectly apply the rules and conventions of Standard English.	Students performing at the Basic level on the Missouri English II End-of-Course Assessment demonstrate a partial command of the skills and processes identified in the Course Level Expectations for English II. They demonstrate these skills inconsistently in reading processes, in responding to both narrative and informational texts, and in writing. They may identify the support an author provides for the main argument. In addition to understanding and applying the skills at the Below Basic level, students performing at the Basic level use some strategies to comprehend and interpret a variety of texts, demonstrate a partial understanding of literary forms, and inconsistently apply few strategies for accessing and summarizing information. They may follow a writing process to compose papers while inconsistently applying the rules and conventions of Standard English.	Students performing at the Proficient level on the Missouri English II End-of-Course Assessment demonstrate a solid command of the skills and processes identified in the Course Level Expectations for English II. They demonstrate these skills in reading processes, in responding to both narrative and informational texts, and in writing effectively. They understand the organization, structure, and purpose of informational text. In addition to understanding and applying the skills at the Basic level, students performing at the Proficient level use a range of strategies to comprehend and interpret a variety of texts, demonstrate an understanding of literary forms, and apply strategies for accessing and summarizing information. They follow a writing process to compose well-developed and organized papers for a variety of audiences and purposes, while correctly applying the rules and conventions of Standard English.	Students performing at the Advanced level on the Missouri English II End-of-Course Assessment consistently demonstrate a thorough command of the skills and processes identified in the Course Level Expectations for English II. They demonstrate higher-level skills in reading processes, in responding to both narrative and informational texts, and in writing effectively. In addition to understanding and applying the skills at the Proficient level, students performing at the Advanced level use a wide range of strategies to comprehend and interpret a variety of texts, demonstrate a thorough understanding of literary forms, and consistently apply different strategies for accessing and summarizing information. They follow a writing process to compose well-developed and organized papers for a variety of audiences and purposes, while consistently and correctly applying the rules and conventions of Standard English.
Reading			
Students at this level:	**In addition to understanding and applying the skills at the Below Basic level, students at this level:**	**In addition to understanding and applying the skills at the Basic level, students at this level:**	**In addition to understanding and applying the skills at the Proficient level, students at this level:**
• Identify the literal and figurative meaning of words in context • Identify the main idea and some details • Make simple connections • Identify simple text features • May understand the features and purpose of informational materials	• Identify word meanings using context clues and word parts • Identify and explain details in support of a conclusion • Identify or explain main ideas • Attempt to summarize text and/or to make within or among text-to-text	• Apply a variety of strategies to determine meanings of words • Make inferences, draw conclusion, and generalize using textual support • Identify and explain main ideas • Summarize text • Make within and among	• Analyze and evaluates the use of word meanings and shades of meaning • Analyze and evaluates inferences, conclusions, and generalizations • Effectively summarize all ideas within text • Summarize and evaluate abstract themes

Below Basic	Basic	Proficient	Advanced
• May use text structure to locate information • Identify figurative language • Identify characters, character traits, plot, and setting • Determines literal meaning • Identify point of view • May identify the theme of a literary text	connections • Identify and interpret feature of texts, including content appropriate to subsections • Understand the relationships between text structure and organizational patterns • Explain the use of figurative language and literary elements • Differentiate between factual statements and explicitly stated opinions in informational • Identify and describe graphics and charts	text-to-text connections • Interpret and analyze purpose of text and organizational patterns • Interpret and analyze the use of figurative language of the author's style and point of view • Interpret and analyze the use of facts and opinions in informational • Analyze and evaluate graphics and charts	• Analyze and explain within and among text-to-text connections • Analyze and explain differences among features of different texts • Evaluate the author's use of text elements and organizational patterns • Analyze and evaluate the effect of figurative language author's style, and point of view • Analyze and evaluate strategies and evidence used in arguments in informational • Evaluate the relevance and accuracy of information in graphics and charts
Writing			
Students at this level:	**In addition to understanding and applying the skills at the Below Basic level, students at this level:**	**In addition to understanding and applying the skills at the Basic level, students at this level:**	**In addition to understanding and applying the skills at the Proficient level, students at this level:**
• May develop a thesis • May choose an appropriate topic sentence • May contain an unfocused idea and may lack support • May lack evidence of paragraphing or logical order • May use imprecise language in sentences that may be unclear in structure • Show little or no awareness of audience or purpose • Show little evidence of writing techniques • Lack complexity, freshness of thought, and individual perspective • Contain repeated errors in Standard English and spelling that are distracting	• Develop a thesis • Identify a position or argument with supporting evidence, drawing conclusions, and addressing counterclaims, when appropriate • Show evidence of paragraphing and somewhat logical order • May use imprecise language with some variation in sentence structure • Show some awareness of audience and purpose • May lack writing techniques • Contain errors in sentence formation, usage, mechanics, Standard English, and spelling	• Support a logical thesis with examples • Defend a position or argument with relevant evidence, developing clear ideas while addressing counterclaims, when appropriate • Use paragraphing appropriately and progress in a generally logical order • Use precise language and some variation in sentence structure • Show awareness of audience and purpose • Use writing techniques • Demonstrate reasonable control of sentence formation, usage mechanics, Standard English, and spelling	• Support an original and logical thesis • Construct a position or argument with precise and relevant evidence, elaborating ideas clearly while providing effective conclusions and addressing counterclaims, when appropriate • Use paragraphing effectively and progresses in a logical order • Use precise language and varied sentence structure • Show a clear awareness of audience and purpose • Effectively use writing techniques • Use consistent control of sentence formation, usage, mechanics, Standard English, and spelling

Missouri End-of-Course Assessment Achievement Level Descriptors (ALDs)

Algebra I

Below Basic	Basic	Proficient	Advanced
Students performing at the Below Basic level on the Missouri Algebra I End-of-Course Assessment demonstrate limited understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition, students scoring at the Below Basic level carry out strategies to solve simple problems with limited precision and fluency.	Students performing at the Basic level on the Missouri Algebra I End-of-Course Assessment demonstrate partial understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition to understanding and applying the skills at the Below Basic level, students scoring at the Basic level carry out strategies to solve routine problems with partial precision and fluency.	Students performing at the Proficient level on the Missouri Algebra I End-of-Course Assessment demonstrate sufficient understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition to understanding and applying the skills at the Basic level, students scoring at the Proficient level carry out strategies to solve problems with sufficient precision and fluency.	Students performing at the Advanced level on the Missouri Algebra I End-of-Course Assessment demonstrate a thorough understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition to understanding and applying the skills at the Proficient level, students scoring at the Advanced level carry out strategies to solve non-routine problems with high precision and fluency.
Students at this level:	**In addition to understanding and applying the skills at the Below Basic level, students at this level:**	**In addition to understanding and applying the skills at the Basic level, students at this level:**	**In addition to understanding and applying the skills at the Proficient level, students at this level:**
• Use algebraic manipulations to rewrite expressions with unit fraction exponents in radical form and vice versa • Identify rational and irrational numbers • Identify parts of an expression. • Factor a quadratic equation with a leading coefficient of 1 • Add, subtract, and multiply single-variable polynomials of degree 2 or less • Use symbolic algebra to represent and solve one- and two-step linear equations in one variable • Graph a simple linear equation in two variables on a coordinate plane • Distinguish between functions and nonfunctions and identify the domain and range of a function given a graph	• Use algebraic manipulations and extend integral exponent rules to simplify expressions with rational exponents • Perform operations on rational and irrational numbers • Interpret parts of an expression • Rewrite a quadratic expression with integral coefficients by factoring or completing the square • Add, subtract, and multiply multivariable polynomials of which each monomial is degree 2 or less • Use symbolic algebra to represent and solve one- and two-step linear inequalities and simple quadratic equations in one variable • Graph linear equations and inequalities and simple quadratic equations on a coordinate plane	• Apply and use algebraic manipulations to rewrite expressions with rational exponents and extend all the properties of exponents to rational exponents • Understand that the sums or products of a rational number and an irrational number are irrational • Recognize, use, and interpret the structure of an expression to rewrite the expression • Rewrite, solve, and interpret the zeros of a quadratic expression with rational coefficients by factoring and completing the square • Add, subtract, and multiply multivariable polynomials of any degree • Write and solve multi-step linear equations and inequalities • Solve quadratic equations in one variable	• Differentiate when the rules of rational exponents can and cannot be used to rewrite an expression • Demonstrate that the sums or products of a rational number and an irrational number are irrational • Formulate equivalent forms of expressions and interpret parts of the expression to solve problems and make generalizations • Infer and explain that polynomials form a system similar to integers or rational numbers • Solve quadratic equations in one variable with complex roots • Solve a formula for any variable in the formula • Point out and explain an extraneous solution when solving linear, quadratic, radical, and rational

Below Basic	Basic	Proficient	Advanced
• Interpret linear functions given in a context and identify the appropriate graph given key features • Compare the properties of two linear functions represented in different ways • Identify an explicit or recursive function • Select appropriate graphical representations of data • Determine measures of center and describe a data set in terms of center and spread	• Recognize that the graph of a linear or quadratic equation represents the solution set of the equation • Identify the domain and range of a function given a set of ordered pairs or a linear, quadratic, cubic, or absolute value function • Graph linear and quadratic functions and compare two of the same type of functions represented in different ways • Interpret quadratic functions and their key features in context • Write an explicit or recursive function to model a relationship • Describe the differences in the center and spread of two data sets in a familiar context	• Graph polynomial, rational, absolute value, exponential, and logarithmic functions on a coordinate plane • Graph and estimate the solutions of systems of equations and linear inequalities on a coordinate plane • Recognize that the graph of a line, curve, or region represents the solution set of an equation, inequality, or system • Identify the domain and range of a given function in any form • Evaluate a function given in function notation for a given value • Graph exponential functions • Analyze and compare a linear function to another type of function • Translate between explicit and recursive forms of a function • Use appropriate statistics to interpret and explain differences in correlation (strong, weak) and shape (normal, skewed) of two or more data sets, including the effects of outliers	equations • Use a variety of methods to solve equations and inequalities • Determine the value of x for a given function when f(x) is known • Describe complex features of a graph such as holes, symmetries, and end behavior • Interpret data to explain mathematically why a data value is an outlier • Interpret and calculate the approximate area under a normal curve

Missouri End-of-Course Assessment Achievement Level Descriptors (ALDs)

Algebra II

Below Basic	Basic	Proficient	Advanced
Students performing at the Below Basic level on the Missouri Algebra II End-of-Course Assessment demonstrate limited understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition, students scoring at the Below Basic level carry out strategies to solve simple problems with limited precision and fluency.	Students performing at the Basic level on the Missouri Algebra II End-of-Course Assessment demonstrate partial understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition to understanding and applying the skills at the Below Basic level, students scoring at the Basic level carry out strategies to solve routine problems with partial precision and fluency.	Students performing at the Proficient level on the Missouri Algebra II End-of-Course Assessment demonstrate sufficient understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition to understanding and applying the skills at the Basic level, students scoring at the Proficient level carry out strategies to solve problems with sufficient precision and fluency.	Students performing at the Advanced level on the Missouri Algebra II End-of-Course Assessment demonstrate a thorough understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition to understanding and applying the skills at the Proficient level, students scoring at the Advanced level carry out strategies to solve non-routine problems with high precision and fluency.
Students at this level:	**In addition to understanding and applying the skills at the Below Basic level, students at this level:**	**In addition to understanding and applying the skills at the Basic level, students at this level:**	**In addition to understanding and applying the skills at the Proficient level, students at this level:**
• Use mathematical properties to create equivalent expressions for polynomial and exponential expressions • Use commutative and associative properties to perform operations with complex numbers • Construct linear and exponential function models to solve routine word problems • Solve routine quadratic equations and systems of equations with real solutions • Calculate the average rate of change of polynomial and exponential functions over a specified interval • Write and graph linear and polynomial functions in equivalent forms and identify key features • Identify the effects of a single transformation, $f(x)+k$ or $kf(x)$, on the	• Use mathematical properties to create equivalent expressions for rational expressions • Use the distributive property to perform operations with complex numbers • Rewrite rational expressions using factoring • Construct linear, exponential, and quadratic function models to solve routine word problems • Calculate the average rate of change of polynomial and exponential functions over a specified interval and estimate the rate of change from a graph • Build functions to model word problems and use the models to solve problems • Write and graph exponential functions in equivalent forms and identify key features • Identify the effects of a	• Use mathematical properties to create equivalent expressions and use them to sketch graphs and identify characteristics • Rewrite rational expressions using long division • Apply the remainder theorem • Construct linear, exponential, and quadratic function models with real or complex solutions to solve word problems • Calculate and interpret the average rate of change over a specified interval • Build functions, including composition of functions, to model word problems and use the models to solve and interpret problems • Write and graph exponential functions in equivalent forms and identify and compare key features	• Use mathematical properties to create and interpret equivalent expressions that can be used to solve non-routine problems • Describe the effect of changing the parameters of a function on the key features of the graph of the function • Use varied approaches to solve non-routine word problems • Compare the average rate of change for different intervals of a graph • Build functions, including the composition of more than two functions, to model more complex word problems and use the models to solve and interpret problems • Determine how the changes in parameters of a function impact its representation • Identify the effects of one or

Below Basic	Basic	Proficient	Advanced
graphs of functions • Identify lines of best fit for scatter plots • Describe a data set in terms of center and spread	single transformation, $f(kx)$ or $f(x+k)$, on the graphs of functions • Draw and identify lines of best fit for scatter plots • Select the appropriate measure, mean or median, to represent the center of a data set with familiar context	• Identify the effects of multiple transformations on the graphs of functions and determine if the resulting function is even or odd • Make predictions from lines of best fit for scatter plots • Interpret more complex data sets using measures of center and spread	more transformations given in context on the graphs of functions • Write equations for lines of best fit for scatter plots and make predictions • Use appropriate measures of center to compare two or more data sets

Missouri End-of-Course Assessment Achievement Level Descriptors (ALDs)

Geometry

Below Basic	Basic	Proficient	Advanced
Students performing at the Below Basic level on the Missouri Geometry End-of-Course Assessment demonstrate limited understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in geometric and spatial relationships, measurement, and probability. In addition, students scoring at the Below Basic level carry out strategies to solve simple problems with limited precision and fluency.	Students performing at the Basic level on the Missouri Geometry End-of-Course Assessment demonstrate partial understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in geometric and spatial relationships, measurement, and probability. In addition to understanding and applying the skills at the Below Basic level, students scoring at the Basic level carry out strategies to solve routine problems with partial precision and fluency.	Students performing at the Proficient level on the Missouri Geometry End-of-Course Assessment demonstrate sufficient understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in geometric and spatial relationships, measurement, and probability. In addition to understanding and applying the skills at the Basic level, students scoring at the Proficient level carry out strategies to solve problems with sufficient precision and fluency.	Students performing at the Advanced level on the Missouri Geometry End-of-Course Assessment demonstrate a thorough understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in geometric and spatial relationships, measurement, and probability. In addition to understanding and applying the skills at the Proficient level, students scoring at the Advanced level carry out strategies to solve non-routine problems with high precision and fluency.
Students at this level:	**In addition to understanding and applying the skills at the Below Basic level, students at this level:**	**In addition to understanding and applying the skills at the Basic level, students at this level:**	**In addition to understanding and applying the skills at the Proficient level, students at this level:**
• Use geometric theorems and properties to solve problems about properties of lines, angle measurement, distance, triangles, and congruence • Specify a transformation that will carry a given figure onto an image or vice versa • Use the Pythagorean Theorem to solve for the missing side in a right triangle in familiar word problems • Use geometric relationships to solve problems involving area and perimeter • Apply geometric concepts to describe, model, and solve applied problems related to geometric shapes, their measures, and properties • Identify basic geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the	• Use geometric theorems and properties to prove statements about properties of lines, angle measurement, distance, triangles, and congruence • Identify relationships among geometric figures using transformations and use them to solve problems • Specify a sequence of transformations, using precise geometric terminology, that will carry a given figure onto an image or vice versa • Use geometric relationships in the coordinate plane to solve problems involving area, perimeter, and ratios of lengths • Solve right triangle problems using the Pythagorean Theorem and its converse • Apply geometric properties and concepts to describe,	• Determine and use appropriate geometric theorems and properties to solve routine problems and prove statements about properties of lines, angle measurement, distance, triangles, and congruence • Use transformations and congruence and similarity criteria for triangles to prove relationships among geometric figures and to solve problems • Use similarity transformations with right triangles to define trigonometric ratios for acute angles • Use trigonometric ratios, the Pythagorean Theorem, and its converse to solve right triangles in mathematical or applied problems • Apply geometric concepts and trigonometric ratios to	• Use transformations, congruence, and similarity criteria to solve multi-step problems and to prove relationships among composite geometric figures • Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied non-routine problems • Apply geometric concepts and trigonometric ratios to describe, model, and solve non-routine applied geometric problems • Apply properties and theorems of angles, segments, and arcs in circles to solve problems, model relationships, and formulate generalizations • Use formulas to solve mathematical and contextual problems that involve the volume of composite figures

Below Basic	Basic	Proficient	Advanced
perpendicular bisector of a line segment • Apply properties and theorems of angles, segments, and arcs in circles to solve problems • Use formulas to find the volume of cylinders, pyramids, cones, and spheres	model, and solve applied problems related to the Pythagorean Theorem, geometric shapes, their measures, and properties • Define trigonometric ratios • Make geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the perpendicular bisector of a line segment • Construct perpendicular and parallel lines given a line and a point not on the line • Complete the square to find the center and radius of a circle given by an equation • Identify the shapes of two-dimensional cross-sections of three-dimensional objects	describe, model, and solve more complex applied geometric problems • Make geometric constructions, given a line and a point not on the line, using a variety of tools and methods (perpendicular and parallel lines, equilateral triangles, squares and regular hexagons inscribed in circles) • Apply properties and theorems of angles, segments, and arcs in circles to solve problems and model relationships • Use formulas to solve mathematical and contextual problems that involve the volume of cylinders, pyramids, cones, and spheres	formed with cylinders, pyramids, cones, and spheres • Apply Cavalieri's principle to find the volume of an oblique cylinder, pyramid, or cone • Identify the shapes of two-dimensional cross-sections of three-dimensional objects and identify three-dimensional objects generated by rotations of two-dimensional objects

Appendix C: Final ALDs

Missouri End-of-Course Assessment Achievement Level Descriptors (ALDs)

English I

Below Basic	Basic	Proficient	Advanced
Students performing at the Below Basic level on the Missouri English I End-of-Course Assessment independently demonstrate a minimal command of the skills and processes identified in the Missouri Reading and Writing Expectations for English I. They demonstrate these skills inconsistently and/or incorrectly in reading processes, in responding to literary and informational texts, and in writing. Students performing at the Below Basic level use few strategies to comprehend and interpret grade-level texts, demonstrate little understanding of literary forms, and apply few strategies for accessing information. They demonstrate little or no ability to organize and/or develop writing, or exhibit a command of the conventions of English.	Students performing at the Basic level on the Missouri English I End-of-Course Assessment independently demonstrate a partial or uneven command of the skills and processes identified in the Missouri Reading and Writing Expectations for English I. They demonstrate these skills inconsistently in reading processes, in responding to both literary and informational texts, and in writing. In addition to demonstrating, understanding, and applying the skills at the Below Basic level, students performing at the Basic level use some strategies to comprehend and interpret a variety of grade-level texts, demonstrate a partial understanding of literary forms, and inconsistently apply few strategies for accessing and summarizing information. They demonstrate an inconsistent ability to organize and/or develop writing or exhibit a command of the conventions of English.	Students performing at the Proficient level on the Missouri English I End-of-Course Assessment independently demonstrate an adequate command of the skills and processes identified in the Missouri Reading and Writing Expectations for English I. They demonstrate these skills adequately in reading processes, in responding to both literary and informational texts, and in writing. In addition to demonstrating, understanding, and applying the skills at the Basic level, students performing at the Proficient level use a range of strategies to comprehend and interpret a variety of grade-level texts, demonstrate an understanding of literary forms, and apply strategies for accessing and summarizing information. They demonstrate an adequate ability to organize and develop writing and exhibit an adequate command of the conventions of English.	Students performing at the Advanced level on the Missouri English I End-of-Course Assessment consistently and independently demonstrate a thorough command of the skills and processes identified in the Missouri Reading and Writing Expectations for English I. They demonstrate these skills completely and thoroughly in reading processes, in responding to both literary and informational texts, and in writing effectively. In addition to demonstrating, understanding, and applying the skills at the Proficient level, students performing at the Advanced level use a range of strategies to comprehend and interpret a variety of grade-level texts, demonstrate a thorough understanding of literary forms, and consistently apply different strategies for accessing and summarizing information. They demonstrate an effective and thorough ability to organize and develop writing and exhibit an adequate command of the conventions of English.
Reading			
Students at this level rarely:	**In addition to demonstrating, understanding, and applying the skills at the Below Basic level, students at this level inconsistently:**	**In addition to demonstrating, understanding, and applying the skills at the Basic level, students at this level usually:**	**In addition to demonstrating, understanding, and applying the skills at the Proficient level, students at this level consistently:**
• Use context clues to identify the literal and figurative meaning of words • Identify simple text features • Use text structure to locate information	• Use context clues and patterns of word changes to determine the literal and figurative meaning of words • Identify text features • Summarize basic ideas to	• Apply a variety of strategies to determine literal and figurative meanings of words • Make inferences, draw conclusions, and generalize using textual support	• Apply a variety of strategies to determine literal, figurative, and connotative meanings of words • Analyze and evaluate inferences, conclusions, and

Below Basic	Basic	Proficient	Advanced
• Identify explicitly stated main ideas and themes • Identify character traits, plot, and setting • Identify literary devices and figurative language	demonstrate comprehension • Identify main idea or theme, with limited supporting details • Identify author's purpose, author's point of view (perspective), and/or audience of a variety of texts • Identify author's tone • Determine character traits, setting, and plot • Identify some literary devices and figurative language • Identify and describe the purpose of graphics and charts	• Summarize and paraphrase text • Analyze and evaluate main ideas and theme • Interpret and analyze purpose of texts and organizational patterns • Interpret and analyze the figurative language, the author's style, tone, purpose, • Interpret and analyze the effectiveness of claims and evidence in informational text • Analyze and evaluate the information and purpose of graphics and charts	generalizations • Interpret ideas within texts • Summarize and evaluate complex themes • Analyze and explain effectiveness of text features • Evaluate the author's use of text's organizational patterns • Analyze and evaluate the effect of figurative language, author's style, tone, and purpose • Analyze and evaluate strategies and evidence used in texts • Evaluate the relevance, accuracy, and purpose of information in graphics and charts
Writing			
Students at this level:	**In addition to demonstrating, understanding, and applying the skills at the Below Basic level, students at this level:**	**In addition to demonstrating, understanding, and applying the skills at the Basic level, students at this level:**	**In addition to demonstrating, understanding, and applying the skills at the Proficient level, students at this level:**
• May have little or no discernible organizational structure • May have a focus (controlling or main idea) that is confusing or ambiguous • May use few or no transitional strategies • May provide minimal elaboration, support, or evidence for the controlling idea • May use vague or confusing language, or lack clarity • May demonstrate little or no evidence of style • May show little or no command of conventions of English	• May demonstrate uneven organization • May make a cursory attempt at a focus (main idea), or is not maintained throughout their writing • May attempt transitions in and between paragraphs • May use uneven or cursory elaboration • May attempt style or demonstrate uneven style • May show inconsistent command of the conventions of English	• Demonstrate adequate and appropriate organization • Use an adequate focus (main idea) that is mostly maintained throughout their writing • Use transitions in and between paragraphs • Use adequate elaboration • Use adequate style across their writing for the task, purpose, and audience • Show an adequate command of the conventions of English	• Demonstrate an effective and thorough organizational structure • Use an effective focus (main idea) that is maintained throughout their writing • Use effective transitions in and between paragraphs • Effectively and thoroughly support the controlling idea • Use precise and effective language • Employ an effective style for the task, purpose, and audience throughout their writing • Show an adequate command of the conventions of English

Missouri End-of-Course Assessment Achievement Level Descriptors (ALDs)

English II

Below Basic	Basic	Proficient	Advanced
Students performing at the Below Basic level on the Missouri English II End-of-Course Assessment independently demonstrate a minimal command of the skills and processes identified in the Missouri Reading and Writing Expectations for English II. They demonstrate these skills inconsistently and/or incorrectly in reading processes, in responding to both literary and informational texts, and in writing. Students performing at the Below Basic level use few strategies to comprehend and interpret grade-level texts, demonstrate little understanding of literary forms, and apply few strategies for accessing information. They demonstrate little or no ability to organize and/or develop writing, or exhibit a command of the conventions of English.	Students performing at the Basic level on the Missouri English II End-of-Course Assessment independently demonstrate a partial or uneven command of the skills and processes identified in the Missouri Reading and Writing Expectations for English II. They demonstrate these skills inconsistently in reading processes, in responding to both literary and informational texts, and in writing. In addition to demonstrating, understanding, and applying the skills at the Below Basic level, students performing at the Basic level use some strategies to comprehend and interpret a variety of grade-level texts, demonstrate a partial understanding of literary forms, and inconsistently apply few strategies for accessing and summarizing information. They demonstrate an inconsistent ability to organize and/or develop writing or exhibit a command of the conventions of English.	Students performing at the Proficient level on the Missouri English II End-of-Course Assessment independently demonstrate an adequate command of the skills and processes identified in the Missouri Reading and Writing Expectations for English II. They demonstrate these skills adequately in reading processes, in responding to both literary and informational texts, and in writing. In addition to demonstrating, understanding, and applying the skills at the Basic level, students performing at the Proficient level use a range of strategies to comprehend and interpret a variety of grade-level texts, demonstrate an understanding of literary forms, and apply strategies for accessing and summarizing information. They demonstrate an adequate ability to organize and develop writing and exhibit an adequate command of the conventions of English.	Students performing at the Advanced level on the Missouri English II End-of-Course Assessment consistently and independently demonstrate a thorough command of the skills and processes identified in the Missouri Reading and Writing Expectations for English II. They demonstrate these skills completely and thoroughly in reading processes, in responding to both literary and informational texts, and in writing effectively In addition to demonstrating, understanding, and applying the skills at the Proficient level, students performing at the Advanced level use a range of strategies to comprehend and interpret a variety of grade-level texts, demonstrate a thorough understanding of literary forms, and consistently apply different strategies for accessing and summarizing information. They demonstrate an effective and thorough ability to organize and develop writing and exhibit an adequate command of the conventions of English.
Reading			
Students at this level rarely:	**In addition to demonstrating, understanding, and applying the skills at the Below Basic level, students at this level inconsistently:**	**In addition to demonstrating, understanding, and applying the skills at the Basic level, students at this level usually:**	**In addition to demonstrating, understanding, and applying the skills at the Proficient level, students at this level consistently:**
• Use context clues to identify the literal and figurative meaning of words • Identify the main idea, theme, and supporting details • Make simple connections among ideas and between texts	• Identify literal and figurative word meanings using context clues and word parts • Identify and explain details to support a conclusion • Identify or explain main ideas and theme • Identify author's purpose, author's point of view	• Apply a variety of strategies to determine literal and figurative meanings of words • Make inferences, draw conclusions, and generalize using textual support • Analyze and evaluate main ideas and themes	• Apply a variety of strategies to determine literal and connotative meanings of words • Analyze and evaluate inferences, conclusions, and generalizations • Interpret ideas within text • Summarize and evaluate

Below Basic	Basic	Proficient	Advanced
• Demonstrate an understanding of the organization and purpose of text • Identify literary devices and figurative language • Identify characters, character traits, plot, and setting • Identify author's purpose	(perspective), and/or audience of a variety of texts • Determine character traits, setting, and plot • Identify and interpret text features • Explain the use of figurative language and literary elements • Identify author's tone • Identify and describe the purpose of graphics and charts	• Interpret and analyze purpose of texts and organizational patterns • Interpret and analyze the figurative language, the author's style, tone, and purpose • Interpret and analyze the effectiveness of claims, evidence, and reasoning in informational text • Analyze and evaluate the information and purpose of graphics and charts	abstract themes • Analyze and explain effectiveness of text features • Evaluate the author's use of text's organizational patterns • Analyze and evaluate the effect of figurative language, author's style, tone, and purpose • Analyze and evaluate strategies and evidence used in texts • Evaluate the relevance, accuracy, and purpose of information in graphics and charts
Writing			
Students at this level:	**In addition to demonstrating, understanding, and applying the skills at the Below Basic level, students at this level:**	**In addition to demonstrating, understanding, and applying the skills at the Basic level, students at this level:**	**In addition to demonstrating, understanding, and applying the skills at the Proficient level, students at this level:**
• May have little or no discernible organizational structure • May have a focus (controlling or main idea) that is confusing or ambiguous • May use few or no transitional strategies • May provide minimal elaboration, support, or evidence for the controlling idea • May use vague or confusing language, or lack clarity • May demonstrate little or no evidence of style • May show little or no command of conventions of English	• May use an uneven organizational structure • May make a cursory attempt at a focus (main idea), or is not maintained throughout their writing • May attempt transitions in and between paragraphs • May provide cursory or uneven support or weakly integrated support for the controlling idea • May use clear but simplistic language • May use a weak or inconsistent style • May show limited command of the conventions of English	• Demonstrate an adequate and appropriate organizational structure • Use an adequate focus (main idea) that is mostly maintained throughout their writing • Use adequate transitions in and between paragraphs • Adequately and accurately support the controlling idea • Employ a mix of general and precise language • A generally appropriate style is employed for the task, purpose, and audience throughout their writing • Show an adequate command of the conventions of English	• Demonstrate an effective and thorough organizational structure • Use an effective focus (main idea) that is maintained throughout their writing • Use effective transitions in and between paragraphs • Effectively and thoroughly support the controlling idea • Use precise and effective language • Employ an effective style for the task, purpose, and audience throughout their writing • Show an adequate command of the conventions of English

Missouri End-of-Course Assessment Achievement Level Descriptors (ALDs)

Algebra I

Below Basic	Basic	Proficient	Advanced
Students performing at the Below Basic level on the Missouri Algebra I End-of-Course Assessment demonstrate limited understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition, students scoring at the Below Basic level carry out strategies to solve simple problems with limited precision and fluency.	Students performing at the Basic level on the Missouri Algebra I End-of-Course Assessment demonstrate partial understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition to demonstrating, understanding, and applying the skills at the Below Basic level, students scoring at the Basic level carry out strategies to solve routine problems with partial precision and fluency.	Students performing at the Proficient level on the Missouri Algebra I End-of-Course Assessment demonstrate sufficient understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition to demonstrating, understanding, and applying the skills at the Basic level, students scoring at the Proficient level carry out strategies to solve problems with sufficient precision and fluency.	Students performing at the Advanced level on the Missouri Algebra I End-of-Course Assessment demonstrate a thorough understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition to demonstrating, understanding, and applying the skills at the Proficient level, students scoring at the Advanced level carry out strategies to solve non-routine problems with high precision and fluency.
Students at this level:	**In addition to understanding and applying the skills at the Below Basic level, students at this level:**	**In addition to understanding and applying the skills at the Basic level, students at this level:**	**In addition to understanding and applying the skills at the Proficient level, students at this level:**
• Use algebraic manipulations to rewrite expressions with unit fraction exponents in radical form and vice versa • Identify rational and irrational numbers • Identify parts of an expression. • Use symbolic algebra to solve one- and two-step linear equations in one variable • Graph a simple linear equation in two variables on a coordinate plane • Compare the properties of two linear functions represented graphically • Determine measures of center and describe a data set in terms of center and spread	• Use algebraic manipulations and extend integral exponent rules to simplify expressions with rational exponents • Perform operations on rational and irrational numbers • Interpret parts of an expression • Factor a quadratic equation with a leading coefficient of 1 • Add, subtract, and multiply single-variable polynomials of degree 2 or less • Use symbolic algebra to represent and solve one- and two-step linear inequalities and simple quadratic equations in one variable • Graph linear equations and inequalities and simple quadratic equations on a coordinate plane • Interpret linear functions	• Apply and use algebraic manipulations to rewrite expressions with rational exponents and extend all the properties of exponents to rational exponents • Understand that the sums or products of a rational number and an irrational number are irrational • Recognize, use, and interpret the structure of an expression to rewrite the expression • Rewrite a quadratic expression with integral coefficients by factoring or completing the square • Add, subtract, and multiply multivariable polynomials of which each monomial is degree 2 or less • Write and solve multi-step linear equations and inequalities • Solve quadratic equations in	• Differentiate when the rules of rational exponents can and cannot be used to rewrite an expression • Demonstrate that the sums or products of a rational number and an irrational number are irrational • Formulate equivalent forms of expressions and interpret parts of the expression to solve problems and make generalizations • Rewrite, solve, and interpret the zeros of a quadratic expression with rational coefficients by factoring and completing the square • Add, subtract, and multiply multivariable polynomials of any degree • Infer and explain that polynomials form a system similar to integers or rational numbers

Below Basic	Basic	Proficient	Advanced
	given in a context and identify the appropriate graph given key features • Recognize that the graph of a linear or quadratic equation represents the solution set of the equation • Distinguish between functions and nonfunctions and identify the domain and range of a function given a graph • Graph linear and quadratic functions and compare two of the same type of functions represented in different ways • Graph and estimate the solutions of systems of equations and linear inequalities on a coordinate plane • Identify an explicit or recursive function • Describe the differences in the center and spread of two data sets in a familiar context • Evaluate a function given in function notation for a given value	one variable • Graph polynomial, absolute value, exponential, and functions on a coordinate plane • Interpret quadratic functions and their key features in context • Recognize that the graph of a line, curve, or region represents the solution set of an equation, inequality, or system • Identify the domain and range of a function given a set of ordered pairs or a linear, quadratic, cubic, or absolute value function • Graph exponential functions • Analyze and compare a linear function to another type of function • Represent, graph and solve systems of linear equations and inequalities • Write an explicit or recursive function to model a relationship • Use appropriate statistics including standard deviation to interpret and explain differences in correlation (strong, weak) and shape (normal, skewed) of two or more data sets, including the effects of outliers • Select appropriate graphical representations of data	• Solve a formula for any variable in the formula • Use a variety of methods to solve equations and inequalities • Describe complex features of a graph such as, symmetries, and end behavior • Identify the domain and range of a given function in any form • Interpret the solution(s) of systems of linear equations and inequalities in the context given. • Determine the value of x for a given function when $f(x)$ is known • Translate between explicit and recursive forms of a function • Interpret data to explain mathematically why a data value is an outlier

Missouri End-of-Course Assessment Achievement Level Descriptors (ALDs)

Algebra II

Below Basic	Basic	Proficient	Advanced
Students performing at the Below Basic level on the Missouri Algebra II End-of-Course Assessment demonstrate limited understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition, students scoring at the Below Basic level carry out strategies to solve simple problems with limited precision and fluency.	Students performing at the Basic level on the Missouri Algebra II End-of-Course Assessment demonstrate partial understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition to demonstrating, understanding, and applying the skills at the Below Basic level, students scoring at the Basic level carry out strategies to solve routine problems with partial precision and fluency.	Students performing at the Proficient level on the Missouri Algebra II End-of-Course Assessment demonstrate sufficient understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition to demonstrating, understanding, and applying the skills at the Basic level, students scoring at the Proficient level carry out strategies to solve problems with sufficient precision and fluency.	Students performing at the Advanced level on the Missouri Algebra II End-of-Course Assessment demonstrate a thorough understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition to demonstrating, understanding, and applying the skills at the Proficient level, students scoring at the Advanced level carry out strategies to solve non-routine problems with high precision and fluency.
Students at this level:	**In addition to understanding and applying the skills at the Below Basic level, students at this level:**	**In addition to understanding and applying the skills at the Basic level, students at this level:**	**In addition to understanding and applying the skills at the Proficient level, students at this level:**
• Use mathematical properties to create equivalent expressions for polynomial and exponential expressions • Use commutative and associative properties to perform operations with complex numbers • Construct linear and exponential function models to solve routine word problems • Solve routine quadratic equations and systems of equations with real solutions • Estimate the rate of change of polynomials from a graph • Graph linear functions in equivalent forms and identify key features • Identify the effects of a single transformation, $f(x)+k$ or $kf(x)$, on simple functions • Create surveys to answer a	• Use mathematical properties to create equivalent expressions for rational expressions • Use the distributive property to perform operations with complex numbers • Rewrite rational expressions using factoring • Construct linear, exponential, and quadratic function models to solve routine word problems • Calculate the average rate of change of polynomial and exponential functions over a specified interval • Build functions to model word problems and use the models to solve problems • Write and graph exponential functions in equivalent forms and identify key features • Identify the effects of a single transformation, $f(kx)$	• Use mathematical properties to create equivalent expressions and use them to sketch graphs and identify characteristics • Rewrite rational expressions using long division • Construct linear, exponential, and quadratic function models with real or complex solutions to solve word problems • Calculate and interpret the average rate of change over a specified interval • Build functions, including composition of functions, to model word problems and use the models to solve and interpret problems • Write and graph exponential and polynomial functions in equivalent forms and identify and compare key features	• Use mathematical properties to create and interpret equivalent expressions that can be used to solve non-routine problems • Apply the remainder theorem • Construct logarithmic and trigonometric function models to solve real world problems. • Analyze the average rate of change for different intervals of a graph • Build functions, including the composition of more than two functions, to model more complex word problems and use the models to solve and interpret problems • Describe the effect of changing the parameters of a function on the key features of the graph of the function • Determine how the changes

Below Basic	Basic	Proficient	Advanced
statistical questions	or $f(x+k)$, on the graphs of various functions • Review survey methods for possible bias.	• Identify the effects of multiple transformations on the graphs of functions and determine if the resulting function is even or odd • Make inferences and justify conclusions from sample surveys and experiments.	in parameters of a function impact its representation • Identify the effects of one or more transformations given in context on the graphs of functions • Evaluate reports based on data. • Calculate expected values and use them to evaluate decisions and solve problems.

Missouri End-of-Course Assessment Achievement Level Descriptors (ALDs)

Geometry

Below Basic	Basic	Proficient	Advanced
Students performing at the Below Basic level on the Missouri Geometry End-of-Course Assessment demonstrate limited understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in geometric and spatial relationships, measurement, and probability. In addition, students scoring at the Below Basic level carry out strategies to solve simple problems with limited precision and fluency.	Students performing at the Basic level on the Missouri Geometry End-of-Course Assessment demonstrate partial understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in geometric and spatial relationships, measurement, and probability. In addition to demonstrating, understanding, and applying the skills at the Below Basic level, students scoring at the Basic level carry out strategies to solve routine problems with partial precision and fluency.	Students performing at the Proficient level on the Missouri Geometry End-of-Course Assessment demonstrate sufficient understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in geometric and spatial relationships, measurement, and probability. In addition to demonstrating, understanding, and applying the skills at the Basic level, students scoring at the Proficient level carry out strategies to solve problems with sufficient precision and fluency.	Students performing at the Advanced level on the Missouri Geometry End-of-Course Assessment demonstrate a thorough understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in geometric and spatial relationships, measurement, and probability. In addition to demonstrating, understanding, and applying the skills at the Proficient level, students scoring at the Advanced level carry out strategies to solve non-routine problems with high precision and fluency.
Students at this level:	**In addition to understanding and applying the skills at the Below Basic level, students at this level:**	**In addition to understanding and applying the skills at the Basic level, students at this level:**	**In addition to understanding and applying the skills at the Proficient level, students at this level:**
• Use geometric theorems and properties to solve problems about properties of lines, angle measurement, distance, triangles, and congruence • Use the Pythagorean Theorem to solve for the missing side in a right triangle • Specify a transformation that will carry a given figure onto an image or vice versa • Use geometric relationships to solve problems involving area and perimeter • Apply geometric concepts to describe, model, and solve applied problems related to geometric shapes, their measures, and properties • Identify basic geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the	• Use geometric theorems and properties to prove statements about properties of lines, angle measurement, distance, triangles, and congruence • Solve right triangle problems using the Pythagorean Theorem and its converse • Specify a sequence of transformations, using precise geometric terminology, that will carry a given figure onto an image or vice versa • Identify relationships among geometric figures using transformations and use them to solve problems • Use geometric relationships in the coordinate plane to solve problems involving area, perimeter, and ratios of lengths • Define trigonometric ratios	• Determine and use appropriate geometric theorems and properties on routine problems • Use trigonometric ratios, the Pythagorean Theorem, and its converse to solve right triangles in mathematical or applied problems • Use transformations and congruence and similarity criteria for triangles to prove relationships among geometric figures and to solve problems • Use similarity transformations with right triangles to define trigonometric ratios for acute angles • Apply properties and theorems of angles, segments, and arcs in circles to solve problems and model relationships	• Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied non-routine problems • Use transformations, congruence, and similarity criteria to solve multi-step problems and to prove relationships among composite geometric figures • Apply properties and theorems of angles, segments, and arcs in circles to solve problems, model relationships, and formulate generalizations • Apply geometric concepts and trigonometric ratios to describe, model, and solve non-routine applied geometric problems • Apply Cavalieri's principle to find the volume of an oblique cylinder, pyramid, or

Below Basic	Basic	Proficient	Advanced
perpendicular bisector of a line segment • Apply properties and theorems of angles, segments, and arcs in circles to solve problems • Use formulas to find the volume of cylinders, pyramids, cones, and spheres	• Apply geometric properties and concepts to describe, model, and solve applied problems related to the Pythagorean Theorem, geometric shapes, their measures, and properties • Make geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the perpendicular bisector of a line segment • Construct perpendicular and parallel lines given a line and a point not on the line • Identify the center and radius in the equation of a circle in standard form • Use formulas to solve mathematical and contextual problems that involve the volume of cylinders, pyramids, cones, and spheres • Identify the shapes of two-dimensional cross-sections of three-dimensional objects	• Apply geometric concepts and trigonometric ratios to describe, model, and solve more complex applied geometric problems • Make geometric constructions, given a line and a point not on the line, using a variety of tools and methods (perpendicular and parallel lines, equilateral triangles, squares and regular hexagons inscribed in circles) • Use formulas to solve mathematical and contextual problems that involve the volume of composite figures formed with cylinders, pyramids, cones, and spheres • Construct the shapes of two-dimensional cross-sections of three-dimensional objects • Derive the equations for circles of given center and radius using the Pythagorean theorem	cone • Identify three-dimensional objects generated by rotations of two-dimensional objects • Complete the square to find the center and radius of a circle given by an equation • Derive the equation of a parabola given a focus and directrix

Appendix D: Agendas

English I, English II

Day 1: Tuesday, Feb. 17, 2015
8:00 a.m.: Registration and breakfast *(large-group session with all panels together)*

8:30 a.m.: Welcome and General Process Overview
- Welcome, introductions, and logistics (DESE)
- General process overview (Questar)
    - Overview of the MO EOC Assessments
    - Overview of the standard setting and cutpoint validation workshops
    - Overview of the ALDs
    - Brief review of previous MO EOC standard setting

10:00 a.m.: Break
Panelists will now break into individual groups that will be facilitated separately. All subsequent panel work will take place in the separate sessions.

- Overview of the cutpoint validation process

Noon: Lunch

1:00 p.m.: Panelists validate the cut scores (English II)
- Panelists review the Fall 2014 operational form (English II)
- Panelists discuss and fine-tune the draft ALDs
- Presentation of impact data
- Presentation of ordered item booklet (OIB)
- Validate cut scores

5:30 p.m.: Panelists excused

Day 2: Wednesday, Feb. 18, 2015
8:00 a.m.: Registration and breakfast
8:30 a.m.: Panelists validate the cut scores (English I)
- Panelists review the Fall 2014 operational form (English I)
- Panelists discuss and fine-tune the draft ALDs
- Presentation of impact data
- Presentation of ordered item booklet (OIB)
- Validate cut scores

Noon: Lunch

1:00 p.m.: Panelists continue to validate the cut scores (English I)
- Wrap-up, evaluation, and final review of the ALDs

5:00 p.m.: Panelists dismissed

Algebra I, Algebra II, Geometry

Day 1: Tuesday, Feb. 17, 2015

8:00 a.m.: Registration and breakfast *(large-group session with all panels together)*

8:30 a.m.: Welcome and General Process Overview

- Welcome, introductions, and logistics (DESE)
- General process overview (Questar)
    - Overview of the MO EOC Assessments
    - Overview of the standard setting and cutpoint validation workshops
    - Overview of the ALDs
    - Brief review of previous MO EOC standard setting

10:00 a.m.: Break

Panelists will now break into individual groups that will be facilitated separately. All subsequent panel work will take place in the separate sessions.

- Overview of the cutpoint validation process

Noon: Lunch

1:00 p.m.: Panelists validate the cut scores (Algebra I)

- Panelists review the Fall 2014 operational form (Algebra I)
- Panelists discuss and fine-tune the draft ALDs
- Presentation of impact data
- Presentation of ordered item booklet (OIB)
- Validate cut scores

5:30 p.m.: Panelists excused

Day 2: Wednesday, Feb. 18, 2015

8:00 a.m.: Registration and breakfast

8:30 a.m.: Panelists validate the cut scores (Algebra II)

- Panelists review the Fall 2014 operational form (Algebra II)
- Panelists discuss and fine-tune the draft ALDs
- Presentation of impact data
- Presentation of ordered item booklet (OIB)
- Validate cut scores

Noon: Lunch

1:00 p.m.: Panelists continue to validate the cut scores (Algebra II)

5:00 p.m.: Panelists excused

Day 3: Thursday, Feb. 19, 2015[3]
8:00 a.m.: Registration and breakfast
8:30 a.m.: Panelists validate the cut scores (Geometry)

- Panelists review the Fall 2014 operational form (Geometry)
- Panelists discuss and fine-tune the draft ALDs
- Presentation of impact data
- Presentation of ordered item booklet (OIB)
- Validate cut scores

Noon: Lunch

1:00 p.m.: Panelists continue to validate the cut scores (Geometry)

- Wrap-up, evaluation, and final review of the ALDs

3:00 p.m.: Panelists dismissed

[3] The original plan was to conduct cutpoint validation for Panel 2 in three days (one day per content area). However, due to the efficiency of the online content management system, the cutpoint validation workshop was completed in just two days.

Appendix E: PowerPoint Presentation

MISSOURI END-OF-COURSE (MO EOC) ASSESSMENTS

Standard Setting and Cutpoint Validation Overview

February 17–19, 2015

QUESTAR® ASSESSMENT, INC.

Overview

- Welcome and Housekeeping
- MO EOC Assessment and ALD overview
- Standard setting and cutpoint validation overview
- Review of previous MO EOC standard setting procedure
- Report to assigned room
- Small-group focused training
  - Standard Setting
    - Physical Science
  - Cutpoint Validation
    - Panel I: English I, English II
    - Panel II: Algebra I, Algebra II, Geometry
- Complete standard setting and cutpoint validation

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Welcome!

- Missouri DESE
  - Shaun Bates
  - Susan Newbold
  - Jeremy Ellis
  - Melia Franklin
- Questar
  - Dr. Canda Mueller
  - Mary Rehm
  - Dr. Lei Yu
  - Dr. Ping Yin
  - Dr. Jonghwan (Jay) Lee
  - Jared Agrimson
  - Luke Johnson
  - Elizabeth Shamla

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Housekeeping

- Agenda
- DESE forms

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MO EOC Assessments

- The Missouri Assessment Program (MAP) assesses students' progress toward the Missouri Learning Standards, which are Missouri's content standards.
- MO EOC Assessments are taken when a student has received instruction on the Missouri Learning Standards for an assessment, regardless of grade level.

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MO EOC Assessments

- Beginning in Fall 2014, five MO EOC Assessments are required and four are optional.
  - Required: English II, Algebra I, Algebra II, Biology, Government
  - Optional: English I, Geometry, Physical Science, American History
- Physical Science was administered for the first time in Fall 2014.

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MO EOC Assessments

- Fall 2014 also reflected changes in English I, English II, Algebra I, Algebra II, and Geometry.
  - Revised test blueprints
  - New test forms
  - Alignment of existing items in ELA and Mathematics to the Missouri Learning Standards
  - New scoring rubrics for performance events (PEs) and change of PE scores
  - Change of test length and total score points
  - Addition of PEs to English I
  - Updated ALDs

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Achievement Level Descriptors (ALDs)

- The MO EOC Assessments have four achievement levels:
  - Below Basic
  - Basic
  - Proficient
  - Advanced
- The ALDs describe the specific knowledge and skills that a student at that level must be able to demonstrate.
- Questar worked with DESE to update previous ALDs for English I, English II, Algebra I, Algebra II, and Geometry (align to the Missouri Learning Standards).
- Questar worked with DESE to create draft ALDs for Physical Science.

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Achievement Level Descriptors (ALDs)

- You will review draft ALDs in your respective content area to help you determine your cut score recommendations or evaluate existing cut scores throughout standard setting and the cutpoint validation process.
- You will also have opportunities to fine-tune the draft ALDs as part of the standard setting and cutpoint validation process.
- DESE will collect your recommendations for ALD revisions for consideration in the final wording of the ALDs.

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Previous MO EOC Standard Setting

- Standard setting using the Modified Angoff procedure:
  - Nov. 3–5, 2008, for English II and Algebra I
  - Nov. 2–5, 2009, for English I, Algebra II, and Geometry
- Panelists determined the percentage of students meeting the borderline definition that will respond correctly to each item
- Three rounds of panelist judgment

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Standard Setting (Physical Science)

- Key elements:
  - Take the operational assessment.
  - Discuss ALDs and identify 3–5 distinguishing characteristics between achievement levels.
  - Define the borderline students.
  - Pre-survey.
  - Group practice exercise.
  - Provide item rating (2 rounds, third round optional).

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Cutpoint Validation

- Key elements:
  - Review the operational assessment.
  - Discuss ALDs and identify 3–5 distinguishing characteristics between achievement levels.
  - Define the borderline students.
  - Presentation of impact data
    - Percentages of students statewide whose performance would likely be labeled Below Basic, Basic, Proficient, or Advanced

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Cutpoint Validation

- Presentation of ordered item booklet (OIB)
  - An OIB orders the items from easiest to most difficult based on Fall 2014 data.
  - Each multiple-choice item appears in the OIB only once.
  - Each constructed-response item appears in the OIB once for each score point. For example, a 4-point constructed-response item will appear 4 times in the OIB.
  - Existing cut points are identified in the OIB.
- Panelists validate cutpoints in the OIB

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What to Expect Next

- Meet in assigned rooms
- More detailed training and discussion about standard setting/cutpoint validation
- Introduction to Questar's online management system
  - Previous and draft ALDs
  - Fall 2014 operational test forms
  - Missouri Learning Standards
  - Test blueprints
  - Pre-survey (SS)
  - Post-survey

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Questions? Comments?

- Take a 10-minute break and then report to your assigned room.

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MISSOURI END-OF-COURSE (MO EOC) ASSESSMENTS

Cutpoint Validation

February 17–19, 2015

Dr. Lei Yu, Senior Psychometrician

Dr. Ping Yin, Senior Psychometrician

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Are you in the right room?

- Any additional questions from the group overview?

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Review

- Fall 2014 also reflected changes in English I, English II, Algebra I, Algebra II, and Geometry. For example:
  - New test forms
  - New scoring rubrics for performance events (PEs) and change of PE scores
  - Change of test length and total score points
- Raw scores on different forms are not directly comparable
  - Current raw score cutpoints cannot be applied to the Fall 2014 forms
- What are we validating?
  - The underlying ability/skills at each cutpoint
  - Our assumption is that the underlying ability/skill required at each cutpoint remain the same despite the changes in forms

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Total Raw Score Points

	Spring 2014	Fall 2014
Algebra I	39	50
Algebra II	40	40
English I	40	45
English II	39	45
Geometry	40	40

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Cutpoint Validation Overview

- Review the operational assessment
- Discuss ALDs and identify 3–5 distinguishing characteristics between achievement levels
- Define the borderline students
- Presentation of impact data
- Presentation of ordered item booklet (OIB)
  - Focus on the underlying ability/skills at each cutpoint
- Panelists validate cutpoints in the OIB

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Review the Operational Test

- Become familiar with the assessment content.
- Discuss the assessment content such as difficulty, sources of challenges, scoring issues, and general and specific reactions.
- You will have access to the test administration procedures, the actual test content, and all relevant scoring materials through Questar's online content management system.

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Discuss and Fine-Tune the ALDs

- Materials:
  - Current ALDs and draft (updated) ALDs
  - Blueprint
  - Course-Level Expectations (CLEs)
  - Missouri Learning Standards
- Facilitator will lead the discussion and record updates in the draft ALDs.
- DESE will collect your recommendations for ALD revisions for consideration in the final wording of the ALDs.
- You will determine 3–5 distinguishing characteristics between each adjacent set of achievement levels, which will be used to define the borderline students.

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Borderline Student

- The student just at the threshold of two achievement levels
- Three borderline student definitions will be established:
  - Basic borderline student: between Below Basic and Basic (i.e., the "minimally Basic" student)
    - What skills does a low Basic student possess that a high Below Basic student does not?
  - Proficient borderline student: between Basic and Proficient (i.e., the "minimally Proficient" student)
    - What skills does a low Proficient student possess that a high Basic student does not?
  - Advanced borderline student: between Proficient and Advanced (i.e., the "minimally Advanced" student)
    - What skills does a low Advanced student possess that a high Proficient student does not?

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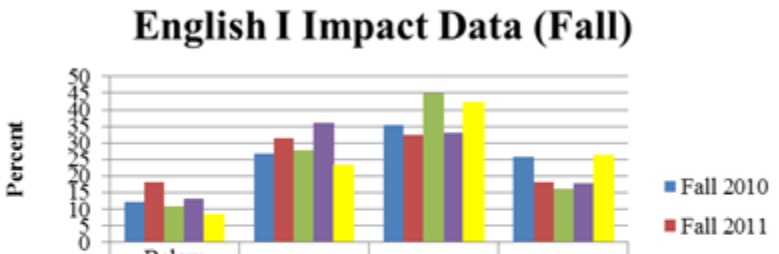
Impact Data (with current cutpoints)



	Below Basic	Basic	Proficient	Advanced
Fall 2010	12.2	26.6	35.5	25.7
Fall 2011	18.2	31.4	32.4	18.2
Fall 2012	10.9	27.8	45.0	16.3
Fall 2013	13.2	36.0	33.0	17.8
Fall 2014	8.5	23.2	42.2	26.1

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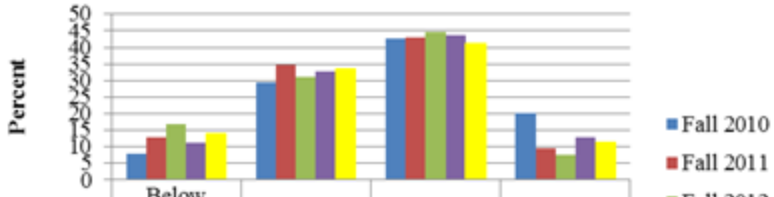
Impact Data (with current cutpoints)

English II Impact Data (Fall)



	Below Basic	Basic	Proficient	Advanced
Fall 2010	7.9	29.3	42.6	20.2
Fall 2011	12.8	34.8	43.1	9.4
Fall 2012	16.9	30.9	44.7	7.5
Fall 2013	11.1	32.8	43.5	12.7
Fall 2014	14.1	33.5	41.2	11.3

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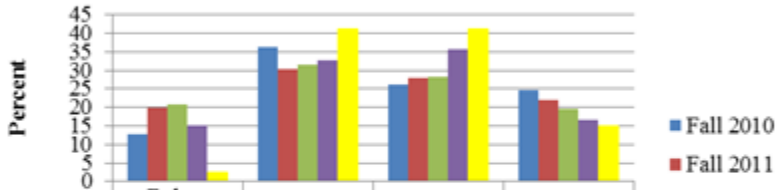
Impact Data (with current cutpoints)

Algebra I Impact Data (Fall)



	Below Basic	Basic	Proficient	Advanced
Fall 2010	12.9	36.2	26.3	24.6
Fall 2011	19.9	30.3	27.9	21.9
Fall 2012	20.9	31.5	28.2	19.5
Fall 2013	15.1	32.8	35.6	16.5
Fall 2014	2.6	41.2	41.3	14.9

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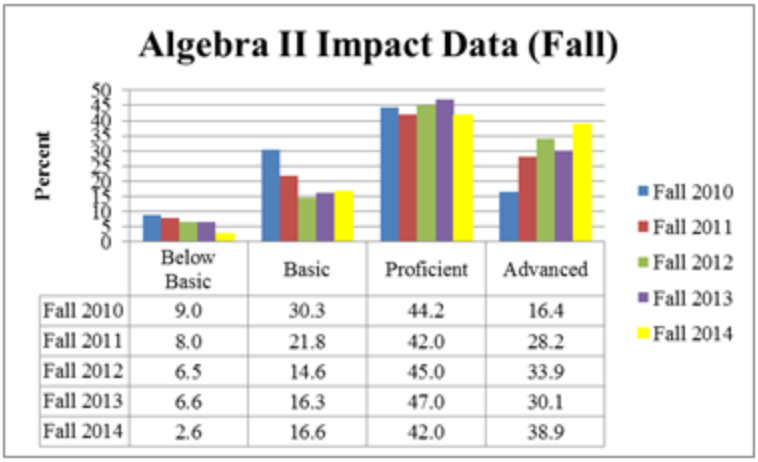
Impact Data (with current cutpoints)



	Below Basic	Basic	Proficient	Advanced
Fall 2010	9.0	30.3	44.2	16.4
Fall 2011	8.0	21.8	42.0	28.2
Fall 2012	6.5	14.6	45.0	33.9
Fall 2013	6.6	16.3	47.0	30.1
Fall 2014	2.6	16.6	42.0	38.9

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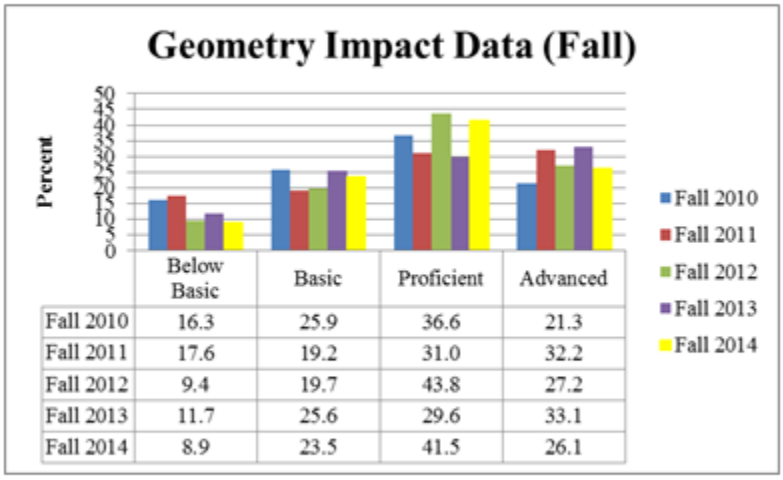
Impact Data (with current cutpoints)



	Below Basic	Basic	Proficient	Advanced
Fall 2010	16.3	25.9	36.6	21.3
Fall 2011	17.6	19.2	31.0	32.2
Fall 2012	9.4	19.7	43.8	27.2
Fall 2013	11.7	25.6	29.6	33.1
Fall 2014	8.9	23.5	41.5	26.1

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Ordered Item Booklet (OIB)

- Provide context for cutpoint validation.
- An OIB orders the items from easiest to most difficult based on Fall 2014 data.
- Each multiple choice item appears in the OIB only once.
- Each construct response item appears in the OIB once for each score point. For example, a 4-point constructed-response item will appear 4 times in the OIB.
  - Indicated by "Item ID–Score Point" (e.g., ID01-2)
- Items associated with current cutpoints are identified in the OIB.

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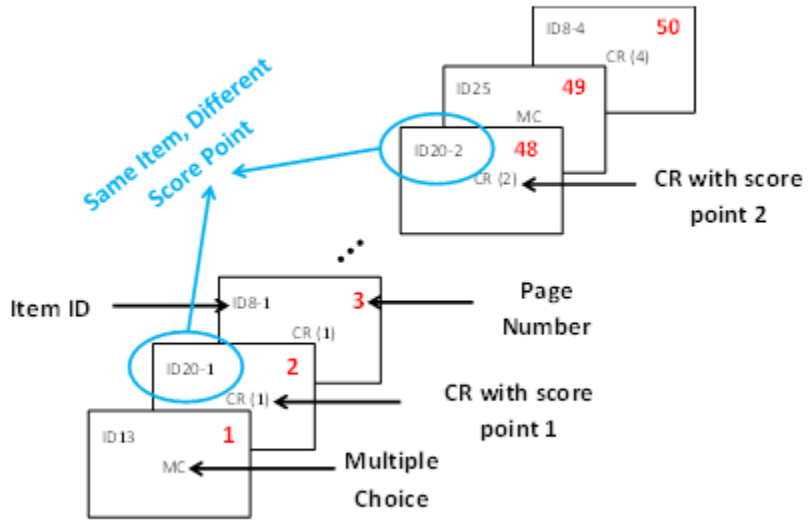
Hypothetical Illustration of an OIB



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Considering the Current Cutpoints

- Think about 100 borderline students: would 67 out of 100 of them respond correctly to the item associated with the current cutpoint?
  - Focus on the 3–5 distinguishing characteristics between each adjacent set of achievement levels.
  - Impact data
  - Focus on the particular content area and achievement level of students who took the MO EOC Assessment.
- If the answer is "yes," you agree with the current cutpoint.
- If the answer is "no," you disagree with the current cutpoint.
  - You will identify the page number for the last item in the OIB that 67 out of 100 of borderline students will answer correctly. This is your recommended cutpoint.

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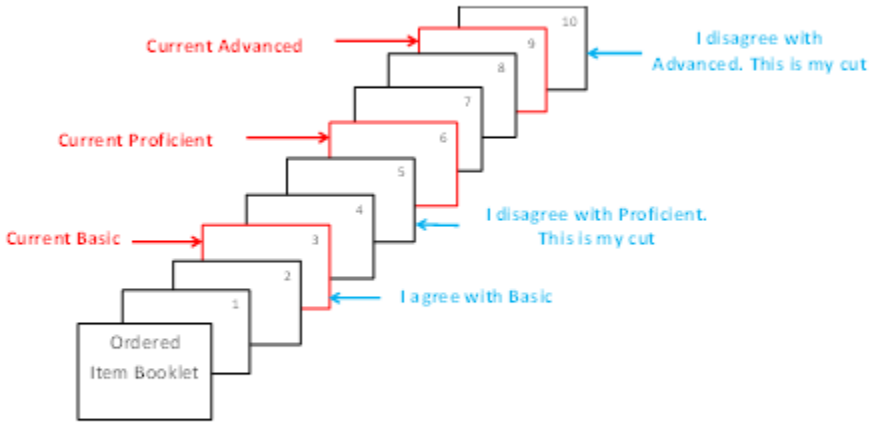
Validate Cutpoints in a Hypothetical OIB



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Are you ready?

- Think about the borderline student definitions.
  - 3–5 distinguishing characteristics
- Go through the OIB in this order:
  - Minimally Proficient student
  - Minimally Advanced student
  - Minimally Basic student
- Remember that any statistical information will be relevant to, but not essential for, verifying existing cutpoints
- Complete the readiness form.
- You may begin.

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English I and II Borderline Student Definition

- **Basic**
  - Inconsistent application of reading and writing skills across a variety of genres (vs incorrectly for Below Basic)
  - Some comprehension strategies (vs few for Below Basic)
  - Inconsistently identify figurative vs literal meaning
  - Limited vocabulary and few strategies

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English I and II Borderline Student Definition

- **Proficient**
  - Usual application of reading and writing skills across a variety of genres
  - Range of comprehension strategies
  - Adequate
  - Analyze
  - Adequate range of vocabulary strategies

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English I and II Borderline Student Definition

- **Advanced**
  - Consistent application of reading and writing skills across a variety of genres at a higher level
  - A wide range of comprehension strategies
  - Effective and thorough
  - Evaluate
  - Broad vocabulary and multiple strategies

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Algebra I Borderline Student Definition

- **Basic**
  - Factor a quadratic equation with a leading coefficient of 1
  - Use symbolic algebra to represent and solve one- and two-step linear inequalities
  - Graph linear equations and inequalities on a coordinate plane
  - Evaluate a function given in function notation for a given value
  - Add, subtract, and multiply single-variable polynomials of degree 2 or less

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Algebra I Borderline Student Definition

- **Proficient**
  - Solve quadratic equations in one variable
  - Solve and write multi-step linear equations
  - Solve systems of linear equations and inequalities
  - Recognize that the graph of a line, curve, or region represents the solution set of an equation, inequality, or system
  - Graph polynomial, absolute value, exponential, and functions on a coordinate plane
  - Add, subtract, and multiply multivariable polynomials of which each monomial is degree 2 or less

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Algebra I Borderline Student Definition

- **Advanced**
  - Identify the domain and range of a given function in any form
  - Solve a formula for any variable in the formula
  - Interpret the solution(s) of systems of linear equations and inequalities, and quadratic equations in the context given
  - Interpret data and strategize non-routine problems

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Algebra II Borderline Student Definition

- **Basic**
  - Use the distributive property to perform operations with complex numbers
  - Identify the effects of a single transformation, $f(kx)$ or , $f(x+k)$ on the graphs of linear, exponential, and quadratic functions
  - Calculate the average rate of change of polynomial and exponential functions over a specified interval
  - Graph exponential functions in equivalent forms and identify key features

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Algebra II Borderline Student Definition

- **Proficient**
  - Rewrite rational expressions using long division
  - Build functions, including composition of functions, to model word problems and use the models to solve problems
  - Identify the effects of multiple transformations on the graphs of functions
  - Calculate and interpret the average rate of change over a specified interval

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Algebra II Borderline Student Definition

- **Advanced**
  - Apply the remainder theorem
  - Construct logarithmic and simple trigonometric function models to solve real world problems
  - Identify the effects of one or more transformations given in context on the graphs of functions
  - Use mathematical properties to create and interpret equivalent expressions that can be used to solve non-routine problems

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Geometry Borderline Student Definition

- **Basic**
  - Solve right triangle problems using the Pythagorean Theorem and its converse
  - Use formulas to solve mathematical and contextual problems that involve the volume of cylinders, pyramids, cones, and spheres
  - Define trigonometric ratios
  - Identify the center and radius in the equation of a circle in standard form

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Geometry Borderline Student Definition

- **Proficient**
  - Use trigonometric ratios, the Pythagorean Theorem, and its converse to solve right triangles in mathematical or applied problems
  - Determine and use appropriate geometric theorems and properties to routine problems
  - Use transformations and congruence and similarity criteria for triangles to prove relationships among geometric figures and to solve problems
  - Use formulas to solve mathematical and contextual problems that involve the volume of composite figures formed with cylinders, pyramids, cones, and spheres
  - Derive the equations for circles of given center and radius using the Pythagorean theorem

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Geometry Borderline Student Definition

- **Advanced**
  - Identify three-dimensional objects generated by rotations of two-dimensional objects
  - Apply properties and theorems of angles, segments, and arcs in circles to solve problems, model relationships, and formulate generalizations
  - Apply Cavalier's principle to find the volume of an oblique cylinder, pyramid, or cone

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Cutpoint Validation Process

- The same process is repeated for the second content area.
- The same process is repeated for the third content area.

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Cutpoint Validation Process

- Review the operational assessment
- Discuss ALDs and identify 3–5 distinguishing characteristics between achievement levels
- Define the borderline students
- Presentation of impact data
- Presentation of ordered item booklet (OIB)
  - Focus on the underlying ability/skills at each cutpoint
- Panelists validate cutpoints in the OIB

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Thank you for your participation!

- Please remember:
  - You cannot take secure materials with you.
  - You cannot discuss the outcome of this meeting.
- Please fill out your post-survey.

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Appendix F: Readiness Form

The readiness form as seen by panelists in the online content management system:

Readiness Statement

By clicking "Begin" I am indicating that I understand my task for cutpoint validation and I am ready to begin validating cutpoints." If you have concerns, please raise your hand and the facilitator will chat with you and address them.

Begin

Appendix G: Borderline Student Definitions

English I and English II Borderline Student Definitions

Basic

1. Inconsistent application of reading and writing skills across a variety of genres (vs incorrectly for Below Basic)
2. Some comprehension strategies (vs few for Below Basic)
3. Inconsistently identify figurative vs literal meaning
4. Limited vocabulary and few strategies

Proficient

1. Usual application of reading and writing skills across a variety of genres
2. Range of comprehension strategies
3. Adequate
4. Analyze
5. Adequate range of vocabulary strategies

Advanced

1. Consistent application of reading and writing skills across a variety of genres at a higher level
2. A wide range of comprehension strategies
3. Effective and thorough
4. Evaluate
5. Broad vocabulary and multiple strategies

Algebra I Borderline Student Definitions

Basic

1. Factor a quadratic equation with a leading coefficient of 1
2. Use symbolic algebra to represent and solve one- and two-step linear inequalities
3. Graph linear equations and inequalities on a coordinate plane
4. Evaluate a function given in function notation for a given value
5. Add, subtract, and multiply single-variable polynomials of degree 2 or less

Proficient

1. Solve quadratic equations in one variable
2. Solve and write multi-step linear equations
3. Solve systems of linear equations and inequalities
4. Recognize that the graph of a line, curve, or region represents the solution set of an equation, inequality, or system
5. Graph polynomial, absolute value, exponential, and functions on a coordinate plane
6. Add, subtract, and multiply multivariable polynomials of which each monomial is degree 2 or less

Advanced

1. Identify the domain and range of a given function in any form
2. Solve a formula for any variable in the formula
3. Interpret the solution(s) of systems of linear equations and inequalities, and quadratic equations in the context given
4. Interpret data and strategize non-routine problems

Algebra II Borderline Student Definitions

Basic

1. Use the distributive property to perform operations with complex numbers
2. Identify the effects of a single transformation, $f(kx)$ or , $f(x+k)$ on the graphs of linear, exponential, and quadratic functions
3. Calculate the average rate of change of polynomial and exponential functions over a specified interval
4. Graph exponential functions in equivalent forms and identify key features

Proficient

1. Rewrite rational expressions using long division
2. Build functions, including composition of functions, to model word problems and use the models to solve problems
3. Identify the effects of multiple transformations on the graphs of functions
4. Calculate and interpret the average rate of change over a specified interval

Advanced

1. Apply the remainder theorem
2. Construct logarithmic and simple trigonometric function models to solve real world problems
3. Identify the effects of one or more transformations given in context on the graphs of functions
4. Use mathematical properties to create and interpret equivalent expressions that can be used to solve non-routine problems

Geometry Borderline Student Definitions

Basic

1. Solve right triangle problems using the Pythagorean Theorem and its converse
2. Use formulas to solve mathematical and contextual problems that involve the volume of cylinders, pyramids, cones, and spheres
3. Define trigonometric ratios
4. Identify the center and radius in the equation of a circle in standard form

Proficient

1. Use trigonometric ratios, the Pythagorean Theorem, and its converse to solve right triangles in mathematical or applied problems
2. Determine and use appropriate geometric theorems and properties to routine problems
3. Use transformations and congruence and similarity criteria for triangles to prove relationships among geometric figures and to solve problems
4. Use formulas to solve mathematical and contextual problems that involve the volume of composite figures formed with cylinders, pyramids, cones, and spheres
5. Derive the equations for circles of given center and radius using the Pythagorean theorem

Advanced

1. Identify three-dimensional objects generated by rotations of two-dimensional objects
2. Apply properties and theorems of angles, segments, and arcs in circles to solve problems, model relationships, and formulate generalizations
3. Apply Cavalier's principle to find the volume of an oblique cylinder, pyramid, or cone

Appendix H: Evaluation Survey

Panelist ID (optional): _____

Please complete the following survey. Your responses will be anonymous and will be analyzed in conjunction with the responses of the other cutpoint validation panelists.

Please indicate your agreement level with the following statements.

1. The opening session provided adequate background information about the MO EOC Assessments.

   ☐ Strongly Agree
   ☐ Agree
   ☐ Neutral
   ☐ Disagree
   ☐ Strongly Disagree

2. The information presented during the introduction to cutpoint validation was very clear and understandable.

   ☐ Strongly Agree
   ☐ Agree
   ☐ Neutral
   ☐ Disagree
   ☐ Strongly Disagree

3. After discussing the ALDs, my understanding of the Advanced, Proficient, Basic, and Below Basic achievement levels was well formed or confirmed.

   ☐ Strongly Agree
   ☐ Agree
   ☐ Neutral
   ☐ Disagree
   ☐ Strongly Disagree

4. The information presented for borderline students was very clear and understandable.

   ☐ Strongly Agree
   ☐ Agree
   ☐ Neutral
   ☐ Disagree
   ☐ Strongly Disagree

5. The information provided in impact data was very useful.

   ☐ Strongly Agree
   ☐ Agree
   ☐ Neutral
   ☐ Disagree
   ☐ Strongly Disagree

6. I understood the tasks I needed to accomplish cutpoint validation.

   ☐ Strongly Agree
   ☐ Agree
   ☐ Neutral
   ☐ Disagree
   ☐ Strongly Disagree

7. This cutpoint validation provided me an opportunity to use my best judgment in evaluating the appropriateness of the existing cut scores for Proficient performance.

   ☐ Strongly Agree
   ☐ Agree
   ☐ Neutral
   ☐ Disagree
   ☐ Strongly Disagree

8. This cutpoint validation provided me an opportunity to use my best judgment in evaluating the appropriateness of the existing cut scores for Basic performance.

   ☐ Strongly Agree
   ☐ Agree
   ☐ Neutral
   ☐ Disagree
   ☐ Strongly Disagree

9. This cutpoint validation provided me an opportunity to use my best judgment in evaluating the appropriateness of the existing cut scores for Advanced performance.

   ☐ Strongly Agree
   ☐ Agree
   ☐ Neutral
   ☐ Disagree
   ☐ Strongly Disagree

10. Any additional comments about the cutpoint validation meeting? Please use the back for additional space if needed.

Appendix I: Open-Ended Responses from the Evaluation Survey

Additional Comments	Suggestions
I appreciated having Melia in our group to provide guidance and clarification.	No. The technology part ran smoothly and our facilitators were knowledgeable and very helpful.
Information presented during the introduction was made more clear as the process progressed.	No
Valuable session, both for my personal/professional growth and feeling like this work effects all stakeholders in MO education.	All good.
It was a valuable experience to have. I have a deeper understanding of the assessment criteria.	This was limited because of the weather issue.
I don't know if the median score would be the best tool to use to move the raw score.	No...everything was great!
The facilitator did an excellent job.	
	I enjoyed the web portion of this workshop.
I would suggest that you have a better range of teachers. We were making decisions on Geometry and not one teacher in the meeting was currently teaching Geometry.	
I feel like the tests were not properly aligned and that made the process harder than it had to be. I also feel that since several of the people in the room were not actually teachers (or didn't teach the course we were discussing -- i.e. no one was currently a geometry teacher) -- it made their thoughts and perceptions skewed and therefore had a negative impact on the results.	Maybe to have had the ALD drafts to look over prior to the meeting.
The Algebra 1 cut score for Basic should remain at 12.	
In the future, possibly do not make Alg 1 the first test that we do the cut points for since it has the biggest impact on us. Maybe start with Alg 2 or Geo. Also, after lengthy discussion and seeing the results of our decisions, we should be allowed to change our decisions as a group!	
ALDs may match the standards but I wouldn't say they always match the test. Updated items are needed.	
I would think that doing Algebra 1 later in the cutpoint process would be beneficial. As we all had questions about the process initially, and became more comfortable afterwards, it would have been better to work on a content area that was less crucial for the students of Missouri.	I enjoyed working online. Perhaps all documents could be made available online so that the paper would not be used.
The ALD's don't exactly match the tests, which then it was difficult to determine cut scores based on what we considered to be borderline students. Testing needs to match standards in order for this process to work correctly.	Worked well
While the process was well facilitated the actual work was frustrating since the assessments are not aligned well with the standards.	doing everything electronically with the large rectangular tables in the middle was great for having whole group d

Additional Comments	Suggestions
The discussion that the panel had was quite helpful in considering the validity of cut points; however, I wanted to put questions into specific achievement descriptor baskets based on our expectations for students and discussed this as a group before making my individual determination of the cut points.	