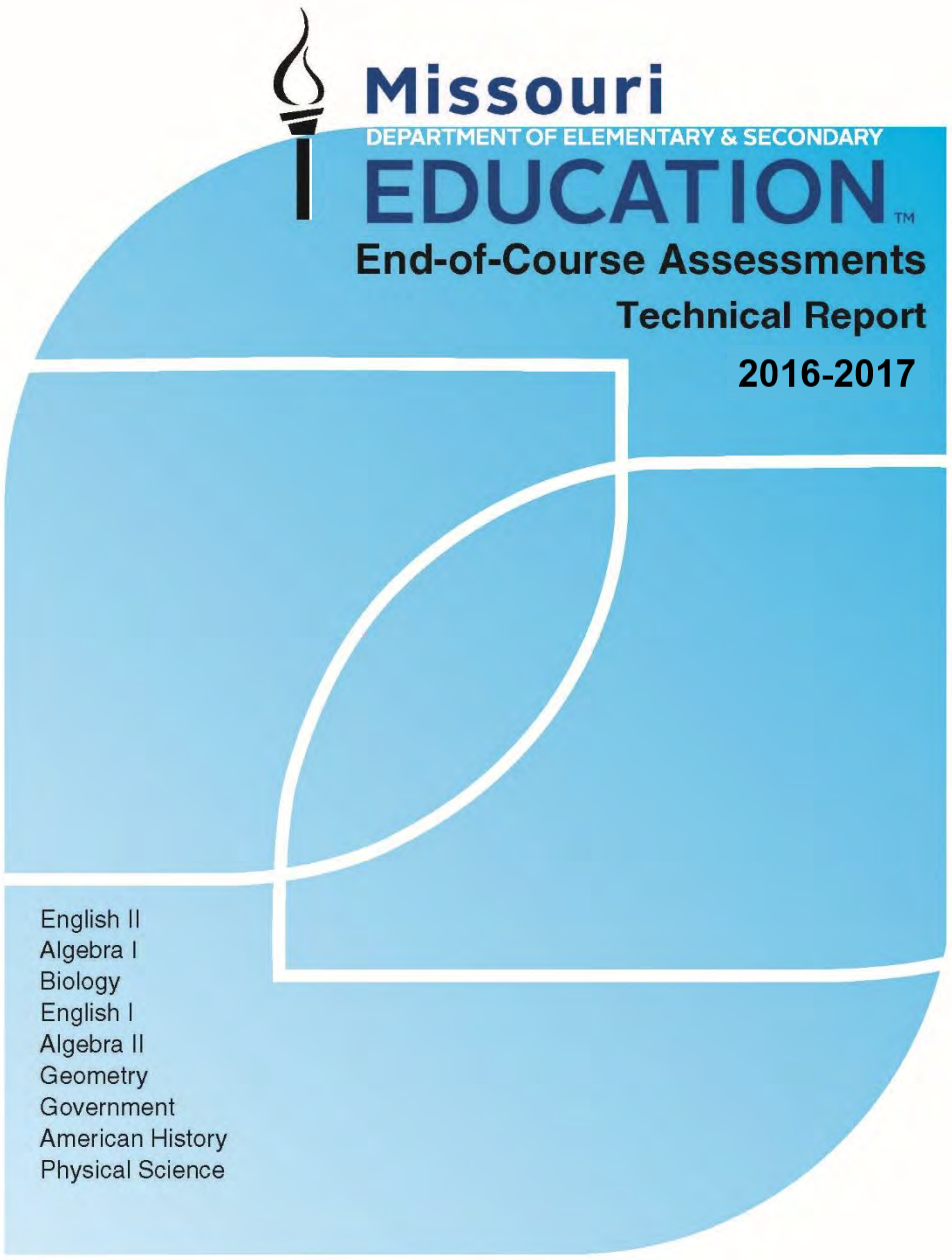

Submitted to the
Missouri Department of Elementary and Secondary Education

Presented by
Questar Assessment Inc.

Questar

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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
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
MLS .....Missouri Learning Standard
MOSIS .....Missouri Student Information System
NCLB.....No Child Left Behind Act
PE.....performance event
RS.....raw score
RSS .....raw-to-scale score
SD .....standard deviation
SE.....standard error
SEM .....standard error of measurement
SR.....selected-response
TAC .....Technical Advisory Committee
WP .....writing prompt

Chapter Summaries

Below are summaries of the information contained in each chapter of this report.

Executive Summary

This section provides a high-level overview and summary of the MO EOC Assessments and the results from the 2016–2017 administration.

Chapter 1: Introduction

Chapter 1 provides background information about the MO EOC Assessments, as well as the MAP in general. It also includes 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 provides the test blueprints and test specifications for the Summer 2016, Fall 2016, and Spring 2017 administrations. Appendix A and Appendix B provide the target and actual point distributions, respectively. Information about item writing, content and bias reviews, test form construction, and statistical item review is also presented because the 2016–2017 test forms were constructed using items field tested in Spring 2008, Spring 2009, or Spring 2010. The evidence is important to the content-related validity of the MO EOC Assessment scores. This chapter also covers principles of universal design and outlines the quality control processes employed throughout the test development process. Documentation of previous test designs can be found in the technical reports located on DESE's website at http://dese.mo.gov/college-career-readiness/assessment/assessment-technical-support-materials.

Chapter 3: Standard Setting

Chapter 3 summarizes the 2015 standard setting for Physical Science and the 2015 cutpoint validation for English I, English II, Algebra I, Algebra II, and Geometry. Full reports for these meetings are provided in the *2014–2015 MO EOC Technical Report*. Information on the 2008 and 2009 standard settings can be found in the *2009–2010 MO EOC Phase I and Phase II Technical Reports*.

Chapter 4: Item Analysis

Chapter 4 contains item-level analysis summary information, including item difficulty and item discrimination indices, for each content area for the Summer 2016, Fall 2016, and Spring 2017 operational items. The results indicate that the MO EOC Assessments have sound psychometric properties. The items measure achievement across a broad range of difficulty and most items are appropriately correlated with the total test score.

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

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. Finally, this chapter provides rater agreement for the Summer 2016, Fall 2016, and Spring 2017 administrations. Information in this chapter provides evidence to support the validity and reliability of rater scores.

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, the scaling and equating process for the Summer 2016, Fall 2016, and Spring 2017 are provided, followed by a description of the recalibration study for Biology. Finally, the raw-to-scale score (RSS) conversion tables for the Summer 2016, Fall 2016, and Spring 2017 operational forms are presented in Appendix D.

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. Classification accuracy and classification consistency statistics are also presented. The results indicate acceptable reliability and measurement precision for the MO EOC tests.

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, 2014). The chapter summarizes and reiterates validity evidence presented in earlier chapters in addition to providing new information. It 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.

Executive Summary

This technical report provides a summary of the 2016–2017 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. More specifically, it is designed to provide validity evidence to support the use and intended interpretation of the MO EOC test scores. The report provides details describing and verifying that the processes and procedures applied to the MO EOC Assessments adhere to professional standards and practices of educational assessment. The statistical analyses presented confirm that the MO EOC Assessments have sound psychometric properties.

Previous technical reports are often referenced to refer to historical information. They 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.

E.1. Assessment Overview

The criterion-referenced MO EOC Assessments are designed to assess students' knowledge of the Missouri Learning Standards. The 2016–2017 school year marked the ninth operational administration of the English II, Algebra I, and Biology Assessments; the eighth operational administration of the English I, Algebra II, Geometry, Government, and American History Assessments; and the third operational administration of the Physical Science Assessment.

Prior to 2014–2015, all MO EOC Assessments were required. However, beginning in Fall 2014, districts were required to administer the English II, Algebra I, Biology, and Government Assessments to all students prior to graduation. For students who completed the Algebra I Assessment prior to high school, Algebra II is the required high school mathematics assessment for accountability purposes. Four MO EOC Assessments are optional (English I, Geometry, Physical Science, and American History).

Test forms for Biology, Government, and American History were original 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 and continued to be applied to the 2016–2017 administration:

- 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)

E.2. 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:

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

E.3. 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 2016, Fall 2016, and Spring 2017 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 and demographic criteria required by Missouri's approved Elementary and Secondary Education Act (ESEA) Flexibility Waiver.

Individual student reports (ISRs) 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 2016–2017 assessment year contained information from Summer 2016, Fall 2016, and Spring 2017.

E.4. 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 2016, Fall 2016, and Spring 2017 MO EOC Assessments, as well as the overall percentages for all three administrations combined. Data for Physical Science is only included for Summer 2016 and Spring 2017 because no student took the Physical Science Assessment during the Fall 2016 administration.

- Table E.2 displays the percentage of students at each achievement level from 2008–2009 to 2016–2017 for the MO EOC Assessments. The test design was changed in Fall 2014 for English II, Algebra I, Algebra II, Biology, and Government. Therefore, it is not recommended to make direct comparisons of the 2014–2015 and 2015-2016 test results to prior results for the MO EOC Assessments. A dark vertical division is placed between the data for the 2013–2014 and 2014–2015 years to indicate caution in comparing results for the five content areas.

Table E.1. Achievement Level Distribution for 2016–2017

Content Area	Achievement Level	Summer 2016		Fall 2016		Spring 2017		Overall	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%
English II	Below Basic	65	20.2	509	16.0	3,576	5.8	4,150	6.4
	Basic	117	36.4	894	28.0	14,098	22.9	15,109	23.2
	Proficient	131	40.8	1,512	47.4	34,148	55.4	35,791	55.0
	Advanced	8	2.5	276	8.6	9,772	15.9	10,056	15.4
	Below Basic + Basic	182	56.7	1,403	44.0	17,674	28.7	19,259	29.6
	Proficient + Advanced	139	43.3	1,788	56.0	43,920	71.3	45,847	70.4
	Total	**321**	**100.0**	**3,191**	**100.0**	**61,594**	**100.0**	**65,106**	**100.0**
Algebra I	Below Basic	167	20.2	1,042	23.5	12,392	20.5	13,601	20.7
	Basic	224	27.1	1,100	24.8	11,601	19.1	12,925	19.6
	Proficient	345	41.7	1,556	35.1	25,069	41.4	26,970	40.9
	Advanced	92	11.1	730	16.5	11,520	19.0	12,342	18.8
	Below Basic + Basic	391	47.2	2,142	48.4	23,993	39.6	26,526	40.3
	Proficient + Advanced	437	52.8	2,286	51.6	36,589	60.4	39,312	59.7
	Total	**828**	**100.0**	**4,428**	**100.0**	**60,582**	**100.0**	**65,838**	**100.0**
Biology	Below Basic	84	34.3	576	18.5	3,947	6.4	4,607	7.1
	Basic	84	34.3	931	29.9	17,191	27.7	18,206	27.9
	Proficient	68	27.8	1,143	36.7	27,831	44.9	29,042	44.5
	Advanced	9	3.7	468	15.0	12,988	21.0	13,465	20.6
	Below Basic + Basic	168	68.6	1,507	48.3	21,138	34.1	22,813	34.9
	Proficient + Advanced	77	31.4	1,611	51.7	40,819	65.9	42,507	65.1
	Total	**245**	**100.0**	**3,118**	**100.0**	**61,957**	**100.0**	**65,320**	**100.0**

Content Area	Achievement Level	Summer 2016		Fall 2016		Spring 2017		Overall	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%
English I	Below Basic	3	13.0	27	10.2	929	7.2	959	7.3
	Basic	9	39.1	64	24.1	3,846	29.9	3,919	29.8
	Proficient	10	43.5	147	55.3	6,875	53.4	7,032	53.4
	Advanced	1	4.3	28	10.5	1,220	9.5	1,249	9.5
	Below Basic + Basic	12	52.2	91	34.2	4,775	37.1	4,878	37.1
	Proficient + Advanced	11	47.8	175	65.8	8,095	62.9	8,281	62.9
	Total	**23**	**100.0**	**266**	**100.0**	**12,870**	**100.0**	**13,159**	**100.0**
Algebra II	Below Basic	6	31.6	124	14.8	2,174	11.8	2,304	12.0
	Basic	1	5.3	133	15.9	2,961	16.1	3,095	16.1
	Proficient	11	57.9	333	39.8	6,761	36.8	7,105	37.0
	Advanced	1	5.3	246	29.4	6,452	35.2	6,699	34.9
	Below Basic + Basic	7	36.8	257	30.7	5,135	28.0	5,399	28.1
	Proficient + Advanced	12	63.2	579	69.3	13,213	72.0	13,804	71.9
	Total	**19**	**100.0**	**836**	**100.0**	**18,348**	**100.0**	**19,203**	**100.00**
Geometry	Below Basic	17	28.8	181	18.0	1,589	22.7	1,787	22.1
	Basic	13	22.0	147	14.6	1,343	19.2	1,503	18.6
	Proficient	24	40.7	447	44.4	2,971	42.4	3,442	42.7
	Advanced	5	8.5	232	23.0	1,100	15.7	1,337	16.6
	Below Basic + Basic	30	50.8	328	32.6	2,932	41.9	3,290	40.8
	Proficient + Advanced	29	49.2	679	67.4	4,071	58.1	4,779	59.2
	Total	**59**	**100.0**	**1,007**	**100.0**	**7,003**	**100.0**	**8,069**	**100.00**
Government	Below Basic	87	11.4	1,377	10.4	3,484	7.5	4,948	8.1
	Basic	193	25.4	3,378	25.4	12,847	27.5	16,418	27.0
	Proficient	308	40.5	5,205	39.1	20,665	44.3	26,178	43.1
	Advanced	172	22.6	3,344	25.1	9,665	20.7	13,181	21.8
	Below Basic + Basic	280	36.8	4,755	35.7	16,331	35.0	21,366	35.2
	Proficient + Advanced	480	63.2	8,549	64.3	30,330	65.0	39,359	64.8
	Total	**760**	**100.0**	**13,304**	**100.0**	**46,661**	**100.0**	**60,725**	**100.00**
American History	Below Basic	11	15.9	137	23.6	1,654	25.5	1,802	25.2
	Basic	19	27.5	141	24.3	1,592	24.5	1,752	24.5
	Proficient	24	34.8	181	31.2	1,943	29.9	2,148	30.0
	Advanced	15	21.7	121	20.9	1,309	20.1	1,445	20.2
	Below Basic + Basic	30	43.5	278	47.9	3,246	50.0	3,554	49.7
	Proficient + Advanced	39	56.5	302	52.1	3,252	50.0	3,593	50.3
	Total	**69**	**100.0**	**580**	**100.0**	**6,498**	**100.0**	**7,147**	**100.00**
Physical Science	Below Basic	--	--	--	--	178	6.1	178	6.0
	Basic	6	54.5	--	--	1,908	64.9	1,914	64.9
	Proficient	5	45.5	--	--	711	24.2	716	24.3
	Advanced	--	--	--	--	143	4.9	143	4.8
	Below Basic + Basic	6	54.5	--	--	2,086	71.0	2,086	71.0
	Proficient + Advanced	5	45.5	--	--	854	29.0	854	29.0
	Total	**11**	**100.0**	**--**	**--**	**2,940**	**100.0**	**2,951**	**100.00**

Table E.2. Achievement Level Distribution Across Years

Content Area	Achievement Level	2008–2009		2009–2010		2010–2011		2011–2012		2012–2013		2013–2014		2014–2015		2015–2016		2016-2017	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%	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	2,691	4.1	3,515	5.4	2,743	4.2	4,150	6.4
	Basic	12,579	21.3	14,903	23.3	14,213	21.5	13,883	21.2	16,889	26.1	13,837	21.3	13,663	21.0	11,061	16.8	15,109	23.2
	Proficient	31,096	52.7	32,828	51.3	31,660	48.0	34,958	53.5	32,780	50.7	29,990	46.1	36,183	55.6	40,795	61.8	35,791	55.0
	Advanced	12,907	21.9	14,381	22.5	17,349	26.3	12,765	19.5	11,848	18.3	18,565	28.5	11,737	18.0	11,385	17.3	10,056	15.4
	Below Basic + Basic	15,008	25.4	16,830	26.3	16,982	25.7	17,636	26.9	19,977	30.9	16,528	25.4	17,178	26.4	13,804	21.0	19,259	29.6
	Proficient + Advanced	44,003	74.6	47,209	73.8	49,009	74.3	47,723	73.0	44,628	69.0	48,555	74.6	47,920	73.6	52,180	79.1	45,847	70.4
	Total	**59,011**	**100.0**	**64,039**	**100.0**	**65,991**	**100.0**	**65,359**	**100.0**	**64,605**	**100.0**	**65,083**	**100.0**	**65,098**	**100.0**	**65,984**	**100.0**	**65,106**	**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	7,255	10.4	12,716	18.5	9,779	14.7	13,601	20.7
	Basic	20,176	36.2	22,185	34.5	20,469	30.2	23,825	34.5	23,741	34.2	24,153	34.7	13,566	19.7	13,090	19.7	12,925	19.6
	Proficient	21,916	39.3	26,644	41.4	27,651	40.7	24,527	35.5	28,264	40.8	24,735	35.6	29,695	43.2	31,498	47.4	26,970	40.9
	Advanced	8,173	14.7	11,275	17.5	13,877	20.4	14,532	21.0	11,389	16.4	13,369	19.2	12,770	18.6	12,103	18.2	12,342	18.8
	Below Basic + Basic	25,685	46.1	26,397	41.0	26,336	38.8	30,015	43.5	29,675	42.8	31,408	45.1	26,282	38.2	22,869	34.4	26,526	40.3
	Proficient + Advanced	30,089	54.0	37,919	58.9	41,528	61.1	39,059	56.5	39,653	57.2	38,104	54.8	42,465	61.8	43,601	65.6	39,312	59.7
	Total	**55,774**	**100.0**	**64,316**	**100.0**	**67,864**	**100.0**	**69,074**	**100.0**	**69,328**	**100.0**	**69,512**	**100.0**	**68,747**	**100.0**	**66,470**	**100.0**	**65,838**	**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	4,139	6.4	2,675	4.0	4,198	6.5	4,607	7.1
	Basic	20,011	34.7	21,866	35.0	20,241	31.2	23,928	36.8	14,028	21.4	17,090	26.5	14,423	21.8	17,306	26.8	18,206	27.9
	Proficient	26,492	46.0	28,955	46.3	29,906	46.1	26,835	41.3	32,398	49.5	29,951	46.4	32,495	49.2	29,548	45.8	29,042	44.5
	Advanced	6,852	11.9	7,707	12.3	10,383	16.0	8,930	13.7	16,499	25.2	13,366	20.7	16,475	24.9	13,501	20.9	13,465	20.6
	Below Basic + Basic	24,243	42.0	25,855	41.4	24,554	37.9	29,289	45.0	16,616	25.4	21,229	32.9	17,098	25.8	21,504	33.3	22,813	34.9
	Proficient + Advanced	33,344	57.9	36,662	58.6	40,289	62.1	35,765	55.0	48,897	74.7	43,317	67.1	48,970	74.1	43,049	66.7	42,507	65.1
	Total	**57,587**	**100.0**	**62,517**	**100.0**	**64,843**	**100.0**	**65,054**	**100.0**	**65,513**	**100.0**	**64,546**	**100.0**	**66,068**	**100.0**	**64,553**	**100.0**	**65,320**	**100.0**
English I	Below Basic	--	--	5,325	12.5	4,641	10.9	4,317	9.6	7,173	11.2	6,042	9.8	1,194	6.4	1,052	6.3	959	7.3
	Basic	--	--	13,372	31.4	13,203	30.9	12,683	28.3	18,166	28.5	18,680	30.3	4,976	26.6	4,523	27.3	3,919	29.8
	Proficient	--	--	16,804	39.4	16,384	38.4	20,301	45.3	25,070	39.3	23,392	37.9	10,452	55.9	9,272	55.9	7,032	53.4
	Advanced	--	--	7,134	16.7	8,466	19.8	7,468	16.7	13,427	21.0	13,557	22.0	2,080	11.1	1,726	10.4	1,249	9.5
	Below Basic + Basic	--	--	18,697	43.9	17,844	41.8	17,000	37.9	25,339	39.7	24,722	40.1	6,170	33.0	5,575	33.6	4,878	37.1
	Proficient + Advanced	--	--	23,938	56.1	24,850	58.2	27,769	62.0	38,497	60.3	36,949	59.9	12,532	67.0	10,998	66.3	8,281	62.9
	Total	**--**	**--**	**42,635**	**100.0**	**42,694**	**100.0**	**44,769**	**100.0**	**63,836**	**100.0**	**61,671**	**100.0**	**18,702**	**100.0**	**16,573**	**100.0**	**13,159**	**100.0**

Content Area	Achievement Level	2008–2009		2009–2010		2010–2011		2011–2012		2012–2013		2013–2014		2014–2015		2015–2016		2016-2017	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Algebra II	Below Basic	--	--	4,314	19.3	1,990	8.6	2,889	11.2	2,979	12.4	2,044	7.8	3,191	14.7	2,578	12.6	2,304	12.0
	Basic	--	--	8,644	38.7	8,823	38.1	8,396	32.6	8,031	33.4	7,525	28.6	4,197	19.3	3,551	17.3	3,095	16.1
	Proficient	--	--	7,110	31.8	9,627	41.6	10,314	40.0	9,224	38.4	10,488	39.8	8,159	37.5	8,267	40.3	7,105	37.0
	Advanced	--	--	2,281	10.2	2,690	11.6	4,189	16.2	3,781	15.7	6,300	23.9	6,182	28.5	6,126	29.9	6,699	34.9
	Below Basic + Basic	--	--	12,958	58.0	10,813	46.7	11,285	43.8	11,010	45.8	9,569	36.4	7,388	34.0	6,129	29.9	5,399	28.1
	Proficient + Advanced	--	--	9,391	42.0	12,317	53.2	14,503	56.2	13,005	54.1	16,788	63.7	14,341	66.0	14,393	70.2	13,804	71.9
	Total	**--**	**--**	**22,349**	**100.0**	**23,130**	**100.0**	**25,788**	**100.0**	**24,015**	**100.0**	**26,357**	**100.0**	**21,729**	**100.0**	**20,522**	**100.0**	**19,203**	**100.00**
Geometry	Below Basic	--	--	5,199	18.9	4,487	16.5	3,799	12.2	4,279	13.6	4,007	10.9	2,282	18.8	1,913	20.3	1,787	22.1
	Basic	--	--	8,034	29.3	9,105	33.5	7,876	25.3	8,137	25.9	8,554	23.2	2,206	18.2	1,746	18.6	1,503	18.6
	Proficient	--	--	9,480	34.5	10,646	39.1	15,295	49.1	12,207	38.8	15,290	41.5	5,568	45.9	4,021	42.8	3,442	42.7
	Advanced	--	--	4,736	17.3	2,957	10.9	4,202	13.5	6,853	21.8	9,019	24.5	2,069	17.1	1,724	18.3	1,337	16.6
	Below Basic + Basic	--	--	13,233	48.2	13,592	50.0	11,675	37.5	12,416	39.5	12,561	34.1	4,488	37.0	3,659	38.9	3,290	40.8
	Proficient + Advanced	--	--	14,216	51.8	13,603	50.0	19,497	62.6	19,060	60.6	24,309	66.0	7,637	63.0	5,745	61.1	4,779	59.2
	Total	**--**	**--**	**27,449**	**100.0**	**27,195**	**100.0**	**31,172**	**100.0**	**31,476**	**100.0**	**36,870**	**100.0**	**12,125**	**100.0**	**9,404**	**100.0**	**8,069**	**100.00**
Gov't	Below Basic	--	--	7,807	13.4	4,766	8.2	6,198	10.6	6,592	11.0	6,264	10.3	4,371	7.2	5,866	9.9	4,948	8.1
	Basic	--	--	21,211	36.5	19,466	33.3	21,975	37.7	20,899	34.9	16,975	27.8	17,811	29.5	15,943	27.0	16,418	27.0
	Proficient	--	--	20,614	35.5	25,283	43.3	21,466	36.9	22,207	37.1	24,726	40.5	26,871	44.5	23,586	39.9	26,178	43.1
	Advanced	--	--	8,466	14.6	8,862	15.2	8,609	14.8	10,164	17.0	13,058	21.4	11,321	18.8	13,717	23.2	13,181	21.8
	Below Basic + Basic	--	--	29,018	49.9	24,232	41.5	28,173	48.3	27,491	45.9	23,239	38.1	22,182	36.7	21,809	36.9	21,366	35.2
	Proficient + Advanced	--	--	29,080	50.1	34,145	58.5	30,075	51.7	32,371	54.1	37,784	61.9	38,192	63.3	37,303	63.1	39,359	64.8
	Total	**--**	**--**	**58,098**	**100.0**	**58,377**	**100.0**	**58,248**	**100.0**	**59,862**	**100.0**	**61,023**	**100.0**	**60,374**	**100.0**	**59,112**	**100.0**	**60,725**	**100.00**
Am. History	Below Basic	--	--	10,551	31.7	8,654	25.9	10,085	25.5	14,712	27.3	13,050	25.1	3,087	25.4	2,306	23.8	1,802	25.2
	Basic	--	--	9,223	27.7	9,015	26.9	10,403	26.3	13,926	25.8	13,957	26.8	3,047	25.1	2,598	26.8	1,752	24.5
	Proficient	--	--	9,510	28.5	13,423	40.1	14,757	37.3	16,661	30.9	16,329	31.4	3,640	30.0	3,151	32.5	2,148	30.0
	Advanced	--	--	4,050	12.1	2,384	7.1	4,342	11.0	8,612	16.0	8,653	16.6	2,369	19.5	1,642	16.9	1,445	20.2
	Below Basic + Basic	--	--	19,774	59.4	17,669	52.8	20,488	51.8	28,638	53.1	27,007	51.9	6,134	50.5	4,904	50.6	3,554	49.7
	Proficient + Advanced	--	--	13,560	40.6	15,807	47.2	19,099	48.3	25,273	46.9	24,982	48.0	6,009	49.5	4,793	49.4	3,593	50.3
	Total	**--**	**--**	**33,334**	**100.0**	**33,476**	**100.0**	**39,587**	**100.0**	**53,911**	**100.0**	**51,989**	**100.0**	**12,143**	**100.0**	**9,697**	**100.0**	**7,147**	**100.00**
Physical Science	Below Basic	--	--	--	--	--	--	--	--	--	--	--	--	344	5.5	299	6.3	178	6.0
	Basic	--	--	--	--	--	--	--	--	--	--	--	--	4,175	67.2	3,103	65.6	1,914	64.9
	Proficient	--	--	--	--	--	--	--	--	--	--	--	--	1,443	23.2	1,106	23.4	716	24.3

Content Area	Achievement Level	2008–2009		2009–2010		2010–2011		2011–2012		2012–2013		2013–2014		2014–2015		2015–2016		2016-2017	
		Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Physical Science	Advanced	--	--	--	--	--	--	--	--	--	--	--	--	250	4.0	220	4.7	143	4.8
	Below Basic + Basic	--	--	--	--	--	--	--	--	--	--	--	--	4,519	72.7	3,402	71.9	2,086	71.0
	Proficient + Advanced	--	--	--	--	--	--	--	--	--	--	--	--	1,693	27.2	1,326	28.1	854	29.0
	Total	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**--**	**6,212**	**100.0**	**4,728**	**100.0**	**2,951**	**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 June 2015, the U.S. Department of Education renewed the approval of Missouri's ESEA Flexibility Waiver for three years, through the end of the 2017–2018 school year. The waiver allows for one state accountability system, focus on continuous improvement, and targeting schools for support.[1]

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. Through the 2011–2012 administration year, all students who took the MO EOC Assessments prior to entering high school were excluded from Missouri's high school accountability data until they enrolled in high school.

The results of the Summer, Fall and Spring administrations, along with historical data, were reviewed by the Technical Advisory Committee (TAC) during the August 18, 2017 TAC meeting. Special attention was given to the Spring English II and Algebra I results, both of which had a reduced percent of students in the Proficient + Advanced performance level compared to the previous Spring. The TAC concluded that form effects were present. Following the TAC's recommendation, the results for English II and Algebra I were not used for accountability purposes for the 2016-2017 school year. Further documentation of the form comparability analyses may be found in Chapter 9.

E.5. Validity Evidence

The MO EOC Assessments are part of an integrated program of testing, accountability, and curricular and instructional support. This technical report provides details about the development and operation of the MO EOC Assessments. While Chapter 11 of this report is devoted 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 interpretation and use of scores for their intended purposes.

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

Chapter 1: Introduction

1.1. Purpose of the Technical Report

This technical report provides for the historical background, statistical results, and details about the operations of the Summer 2016, Fall 2016, and Spring 2017 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.

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 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 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.

1.2. Summary of the MO EOC Assessments

The MO EOC Assessments are criterion-referenced assessments designed to assess students' knowledge of the Missouri Learning Standards that define the knowledge and skills students need in each grade level and course for success in college, other post-secondary training and careers.

English II, Algebra I, and Biology were developed and first administered in 2008–2009. English I, Algebra II, Geometry, Government, and American History were developed and first administered in 2009–2010. Physical Science was first administered in 2014–2015. Therefore, the 2016–2017 administration of the MO EOC Assessments marked the ninth operational year

for English II, Algebra I, and Biology; the eighth operational year for English I, Algebra II, Geometry, Government, and American History; and the third operational year for Physical Science. Previously used operational test forms were re-administered for all content areas for 2015–2016. Table 1.1 provides the major events that have occurred for the MO EOC Assessments from 2008–2009 to 2016–2017 to assist with the understanding and interpretation of test results throughout this report.

Table 1.1. Summary of Major Events from 2008–2009 to 2016–2017

Accountability Year	Event(s)
2008–2009	• 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	• 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	• PE/WPs were temporarily suspended from English II, Algebra I, and Biology starting in Summer 2010. • Assessments with SR items only (which include English I, Algebra II, Geometry, American History, and Government) were available in online format only.
2011–2012	• All assessments were administered online.
2012–2013	• PE/WPs were added back to English II, Algebra I, and Biology starting in Fall 2012.
2013–2014	• iPad and Chromebook administration was available for SR items in Summer 2013. • iPad and Chromebook administration was available for PE/WPs starting in Fall 2013.
2014–2015	• Physical Science was administered for the first time in Fall 2014. • 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. • 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.
2015–2016	• A new Biology RSS table was used to score students for the Spring 2016 administration following a recalibration study.
2016–2017	• Student performance data revealed form comparability issues for the Algebra I and English II assessments. The results for these two tests were excluded from the federal accountability.

For 2016–2017, the English II, Algebra I, Biology, and English I Assessments contained both selected-response (SR) items and performance events/writing prompts (PE/WPs). The Algebra II, Geometry, Government, American History, and Physical Science Assessments contained only SR items. An SR 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.

Testing for the MO EOC Assessments is conducted during three state-designated windows each year for summer, fall, and spring. These tests are designed to be administered in approximately one testing period and are not strictly timed. The 2016–2017 MO EOC Assessments were offered primarily in an online administration mode with Paper/Pencil, Braille, or Large Print forms available for students requiring accommodations.

1.3. Purpose and Intended Use of Test Scores

According to the *Standards for Educational and Psychological Testing* (AERA, APA, and NCME, 2014), Standard 1.1 states that:

> The test developer should set forth clearly how test scores are intended to be interpreted and consequently used. The population(s) for which a test is intended should be delimited clearly, and the construct or constructs that the test is intended to assess should be described clearly.(p. 23)

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 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. 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 interpretative argument involves the interpretation of student performance in terms of individual achievement on the state standards and the conversion of these scores to performance levels (Kane, 2006). Student scores should facilitate proper interpretations while minimizing misinterpretations and unwarranted inferences. The intended interpretation of the MO EOC Assessment scores is that the scores indicate students' progress toward mastering the Missouri Learning Standards. The MO EOC Assessments incorporate meaning of the test scores by anchoring the performance level cut scores to known scale score values.

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.

1.4. Administration

Table 1.2 displays the 2016–2017 MO EOC testing windows. 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. 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.

Table 1.2. Testing Windows

Test Period	Dates
Summer 2016	June 6 – Aug. 26, 2016
Fall 2016	Oct. 3, 2016 – Jan. 20, 2017
Spring 2017	Feb. 20 – May 26, 2017

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.

1.5. Reporting the Results

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.

Individual Student Reports (ISRs) and student raw scores are available to a district five business days after the close of their district testing 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.

1.6. 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 English II and Algebra I. Following the TAC recommendation, DESE will not use the test results for the English II and Algebra I assessments for accountability purposes in 2016-17 due to form comparability issues. Further discussion is provided in Section 9.3.

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, districts were required to administer the English II, Algebra I, Biology, and Government Assessments to all students prior to graduation. For students who completed the Algebra I Assessment prior to high school, Algebra II is the required high school mathematics assessment for accountability purposes.

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. Scores are considered for accountability purposes at the time the student is assessed and in the building that provided the instruction.

Data analyses included in this technical report are for the total assessed population, which includes students who have not yet reached the secondary level. The data analyses are based on a combination of assessment results and DESE-provided demographic criteria required under Missouri's approved ESEA Flexibility Waiver. Data for Physical Science are only included for Summer 2016 and Spring 2017 because no students took the Physical Science Assessment during the Fall 2016 administration.

1.7. 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 include 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.

1.8. 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. Archived GLEs and CLEs are available on the DESE website at http://dese.mo.gov/college-career-readiness/curriculum/missouri-learning-standards.

The MO EOC Assessments assess students' progress toward the Missouri Learning Standards, which are Missouri's content standards. The Missouri Learning Standards are aligned to the Show-Me Standards. They define the knowledge and skills students need in each grade level and course for success in college, other post-secondary training and careers. The Missouri Learning Standards include clearer, fewer and deeper expectations for English language arts and math, and literacy standards in other subjects. These standards help ensure students learn basic and higher-order skills, including problem solving and critical thinking. They give school administrators, teachers, parents and students a roadmap for learning expectations for each grade and course.

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

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.

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. Similarly, 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.

1.9. 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 1.3 summarizes the main activities for each group involved with the 2016–2017 MO EOC administrations.

Table 1.3. 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

Group	Responsibilities
	• 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
Questar Assessment, Inc. (Questar)	• 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 • 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

Chapter 2: Test Development

2.1. Introduction

All the EOC tests were intact forms previously administered in other testing administrations. Most recently, 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

According to the *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 2014), "Important validity evidence can be obtained from an analysis of the relationship between the content of a test and the construct it is intended to measure" (p. 14). Accordingly, the descriptions of the test development procedures included in the MO EOC technical reports provide validity evidence of the MO EOC Assessments. Documentation of test development from previous administrations, including the test designs, can be found in previous technical reports, located on DESE's website at http://dese.mo.gov/college-career-readiness/assessment/assessment-technical-support-materials.

2.2. Test Blueprints

Test blueprints specify the relative percentage of items in each high-level content strand. Tables 2.1 – 2.9 provide the Summer 2016, Fall 2016, and Spring 2017 test construction blueprints for English II, Algebra I, Biology, English I, Algebra II, Geometry, Government, American History, and Physical Science.

Table 2.1. Test Construction Blueprint—English II

Claim	Category	Big Idea	Target #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%

Claim	Category	Big Idea	Target #Points	Point Range	Range of Emphasis
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 2.2. Test Construction Blueprint—Algebra I

Content Strand	Target #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 2.3. Test Construction Blueprint—Biology

Content Strand	Target #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 have 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.

Table 2.4. Test Construction Blueprint—English I

Claim	Category	Big Idea	Target #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 2.5. Test Construction Blueprint—Algebra II

Content Strand	Target #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%

Table 2.6. Test Construction Blueprint—Geometry

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

Table 2.7. Test Construction Blueprint—Government

Content Strand	Target #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%	--	--

*Point ranges are determined using a 10 percent tolerance.

Table 2.8. Test Construction Blueprint—American History

Content Strand	Target #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%	--	--

*Point ranges are determined using a 10 percent tolerance.

Table 2.9. Test Construction Blueprint—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%

2.3. Test Specifications

Standard 1.11[2] addresses the appropriateness of test content and its relationship to a solid validity argument. Additionally, Standard 4.2[3] defines test specifications and provides examples of the type of information that should be included in a specifications document. The test specifications describe the content and format of the test and delineate the ideal number of items and points assessed for each standard.

[2] **Standard 1.11:** When the rationale for test score interpretation for a given use rests in part on the appropriateness of test content, the procedures followed in specifying and generating test content should be described and justified with reference to the intended population to be tested and 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. 26).

[3] **Standard 4.2:** In addition to describing intended uses of the test, the test specifications should define the content of the test, the proposed test length, the item formats, the desired psychometric properties of the test items and the test, and the ordering of items and sections. Test specifications should also specify the amount of time allowed for testing; directions for the test takers; procedures to be used for test administration, including permissible variations; any materials to be used; and scoring and reporting procedures. Specifications for computer-based tests should include a description of any hardware and software requirements (p. 85–86).

Appendix A contains the 2016–2017 target point distributions. Appendix B contains the actual point distributions. Details on the development and use of the test specification documents for previous MO EOC test forms can be found in previous technical reports on DESE's website at http://dese.mo.gov/college-career-readiness/assessment/assessment-technical-support-materials.

The following is an overview of the 2016–2017 test specifications:

- **English II**
  - The English II Assessment has 35 SR items and 3 WPs with a score range from 2–4.

- **Algebra I**
  - The Algebra I Assessment measures student achievement in the following content strands:
    - 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.

- **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.

- **English I**
  - The English II Assessment has 35 SR items and 3 WPs with a score range from 2–4.

- **Algebra II**
  - The Algebra II Assessment measures student achievement in the following content strands:
    - Number and Quantity

        - Algebra
        - Functions
        - Statistics and Probability

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

- **Geometry**
    - The Geometry Assessment measures student achievement in the following content strands:
        - Geometry
        - Statistics and Probability

    - The 40 SR items are aligned to Geometry.

- **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

- **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

- **Physical Science**
    - The Physical Science Assessment measures student achievement in the following content and process strands:
        - Properties and Principles of Matter and Energy
        - Properties and Principles of Force and Motion

    - The 45 SR items are aligned to the two strands listed above.

2.4. Item Development

The process of constructing the tests that were administered in 2016-2017 is discussed in this section. Specifically, historical information regarding both item-development procedures and content coverage from Riverside Publishing is presented. Content-related evidence of validity that supports test interpretation is presented in terms of how the MO EOC Assessments were assembled.

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 and 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.

The forms for the Fall 2008 through the Spring 2017 administrations were constructed using items field tested in Spring 2008, 2009, and 2010. During the process of building the forms for the operational test administrations, statistical characteristics (i.e., *p*-values and point-biserial correlations) were used to evaluate the items and test forms. The goal was to construct operational test forms that were similar within each content area. However, the student performance data for the Spring 2017 indicated that the forms administered for English II and Algebra I were more difficult than the forms administered in the previous Spring. Further details are provided in Section 9.3. The English and Mathematics forms for 2016-17 assessed the old standards and will not be used moving forward. Forms that assess the new standards are being developed for 2017-18 and subsequent years for English I, English II, Algebra I, Algebra II, and Geometry. During this process, steps will be taken to ensure form comparability by using strong test design methodology, anchor sets, and equating strategies that are consistent with best practices.

2.4.1. 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.

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 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.

2.4.2. 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
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.

2.4.3. Content and Bias Review Process

Standard 4.8[4] 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 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

[4] **Standard 4.8:** The test review process should include empirical analyses and/or the use of expert judges to review items and scoring criteria. When expert judges are used, their qualifications, relevant experiences, and demographic characteristics should be documented, along with instructions and training in the item review process that the judges receive (p. 88).

- 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?
- ☐ 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 2.10 and 2.11 show the number of items reviewed in 2007 and 2008, respectively. The accepted items in Table 2.10 were placed in a pool of items from which the 2008 standalone field-test forms were built. The accepted items in Table 2.11 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 2.10. 2007 Content/Bias Item Review Acceptance Rates

Content Area	Total #Items Presented for Review	#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%

Table 2.11. 2008 Content/Bias Item Review Acceptance Rates

Content Area	Total #Items Presented for Review	#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%

Content Area	Total #Items Presented for Review	#Items Accepted (as-is or with edits)	Acceptance Rate (items accepted as-is or with edits)
Algebra II	490	488	99.5%
Geometry	488	471	97%
Government	492	474	96%
Am. History	494	470	95%

2.5. Form Construction

2.5.1. 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.

2.5.2. 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.

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 reviewed regarding their 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 2.12 contains the guidelines that were used for data review.

Table 2.12. 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.

2.5.3. 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 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.[5]

2.6. 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, Algebra II, Geometry, Government, and American History were held on Sept. 17 and 18, 2009, and on March 26, 2013. The Braille and Large Print reviews for Physical Science were held on February 5–6, 2015, in Jefferson City, MO.

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

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

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. For 2016–2017, a single Braille and Large Print test version was used for all MO EOC assessments except Government, where two forms alternated across the three administrations.

2.7. 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 the *2013–2014 MO EOC Technical Report*, Appendix C, for the full report). Based on the results of the study, the MO 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.

2.8. Quality Control for Form Construction

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

- 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 0.35 and 0.90 and as many items as possible have point-biserial correlations above 0.20).
- 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.

2.9. Summary

The MO EOC Assessments provide an indication of student progress toward achieving the knowledge and skills identified in the Missouri Learning Standards. Just as the content 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 content standards being assessed while simultaneously considering the overall difficulty of the forms.

Chapter 3: Standard Setting

3.1. Introduction

As shown below, 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.

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 2015 standard setting and cutpoint validation events is provided because the cut scores established at the workshops were applied to the 2015–2016 test scores. For more detailed information on the 2015 standard setting and cutpoint validation, see Chapter 4 in the *2014–2015 MO EOC Technical Report* at http://dese.mo.gov/college-career-readiness/assessment/assessment-technical-support-materials. For information on the 2008 and 2009 standard settings, see Chapter 3 of the *2009–2010 MO EOC Phase I and Phase II Technical Reports*.

3.2. 2015 Standard Setting

Physical Science was administered for the first time in Fall 2014. A standard setting in February 2015 took place to establish recommended cut scores using the Angoff method. The main goal of the 2015 standard setting was to establish three cut scores for the Physical Science MO EOC Assessment:

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 final standard setting report for Physical Science is provided in the *2014–2015 MO EOC Technical Report*.

The Angoff method required panelists to estimate the percentage of students meeting the borderline definition that would respond correctly to each item. Panelists then estimated that percentage for every borderline student definition (i.e., panelists had to estimate these percentages for each cut score recommendation). The overall recommended cut score was computed from the expected scores for individual items.

3.2.1. 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.

3.2.2. 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.

3.2.3. Development of Achievement Level Descriptors (ALDs)

Because 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.

3.2.4. Results

Table 3.1 presents the recommend raw cut scores based on item ratings.

Table 3.1. 2015 Standard Setting Results

Basic RS	Proficient RS	Advanced RS
12	24	33

3.3. 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 justify conducting a full standard setting process for these content areas, so cutpoint validation occurred instead to review the existing cut scores to determine if they were still appropriate. The main goal of the cutpoint validation was to validate the existing cut scores for the English II, Algebra I, English I, Algebra II, and Geometry Assessments following changes to the assessments. Refer to Chapter 2, Section 2.1 for a description of the changes that took place beginning for the Fall 2014 administration. The final cutpoint validation report is provided in the *2014–2015 MO EOC Technical Report*.

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. The focus of cutpoint validation was to revisit

cutpoints that have been previously established. The steps involved were reviewing the Fall 2014 operational form, discussing and fine-tuning the ALDs, reviewing the impact data, reviewing the ordered item booklet with the existing cutpoints indicated, and adjusting the cutpoints as needed. Therefore, cutpoint validation was not a simple replication of the standard setting process.

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

3.3.2. 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.

3.3.3. 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

3.3.4. Results

Table 3.2 presents the recommended cut scores from the cutpoint validation workshop. These new cuts will be used for future assessments.

Table 3.2. 2015 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

Chapter 4: Item Analysis

4.1. Introduction

This chapter presents the item analysis summary information, which includes mean item scores and discrimination indices, at the item level for each content area. These item summary statistics (i.e., *p*-values, point-biserial correlations, and omit rates) are based on the operational administrations that included responses from 2,335 students for Summer 2016, 26,730 students for Fall 2016, and 278,453 students for Spring 2017 across all content areas, as shown in Table 4.1. Differential item functioning (DIF) analyses were also conducted for each content area and administration.

Table 4.1. Number of Students Included in the Analyses

Test Period	Content Area	N-Count
Summer 2016	Algebra I	828
	Algebra II	19
	Am. History	69
	Biology	245
	English I	23
	English II	321
	Geometry	59
	Government	760
	Physical Science	11
	Total	**2,335**
Fall 2016	Algebra I	4,428
	Algebra II	836
	Am. History	580
	Biology	3,118
	English I	266
	English II	3,191
	Geometry	1,007
	Government	13,304
	Total	**26,730**
Spring 2017	Algebra I	60,582
	Algebra II	18,348
	Am. History	6,498
	Biology	61,957
	English I	12,870
	English II	61,594
	Geometry	7,003
	Government	46,661
	Physical Science	2,940
	Total	**278,453**

4.2. Item-Level Statistics

Appendix C presents the item difficulty, discrimination, and omit rates for all items on each assessment for the Summer 2016, Fall 2016, and Spring 2017 operational administrations. Field test items are not included in the tables. The results indicate that the items measure achievement across a range of difficulty and that most items are correlated with the total test score, thereby discriminating between low- and high-performing students.

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 for 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). 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.

4.3. Speededness

The consequence of time limits on students' scores is called *speededness*. A test is speeded if examinees do not have time to respond to all items on the test. Examinees may receive a lower score 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. 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. 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.

Item omit rates, especially for items appearing later in a test, are a gauge of potential test speededness. The "Omit Rate" column in Appendix C shows the percentage of students who omitted each SR item for each MO EOC Assessment. As shown in the tables, the omit rates are negligible or zero for most items, thereby supporting the interpretation that the MO EOC Assessments are power tests.

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 software (Linacre, 2006a) for the PE/WPs. DIF analyses for the MO EOC Assessments presented in this technical report are meant for reporting the results for the purposes of this report only. Items flagged for DIF were still used to score students.

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, 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:

Table 4.2. General Notation for the 2 x 2 Data Matrix

	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.

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.

The critical values for the PEs and WPs were determined by the DIF contrast, calculated by the DIF measure of reference group minus the DIF measure of focal group. Absolute logit values less than 0.43 were classified as A, greater than or equal to 0.64 were classified as C, and between 0.43 and 0.63, inclusively, were classified as B (Linacre, 2006b). Negative DIF contrast values favor the reference group whereas positive DIF contrast values favor the focal group.

Tables 4.3, 4.4, and 4.5 present the results of the DIF analyses for the items included on the Summer 2016, Fall 2016, and Spring 2017 operational forms, respectively. In these analyses, male and white students were considered the reference group, and female, black, and Hispanic students were considered the focal group. DIF analyses were performed when there was a minimum of 200 students in the focal group. As shown in the tables, very few of the SR and CR items showed C-level DIF.

Table 4.3. DIF Results—Summer 2016

Content Area	Group****	N-Count***	SR Items*					PE/WPs*				
			A**	B**	B–**	C**	C–**	A**	B**	B–**	C**	C–**
Summer 2016												
English II	M/F	184/135	--	--	--	--	--	--	--	--	--	--
	W/B	149/140	--	--	--	--	--	--	--	--	--	--
	W/H	149/17	--	--	--	--	--	--	--	--	--	--
Algebra I	M/F	418/410	36	3	1	--	--	4	--	--	--	--
	W/B	521/244	34	3	1	--	2	2	--	1	--	1
	W/H	521/34	--	--	--	--	--	--	--	--	--	--
Biology	M/F	136/108	--	--	--	--	--	--	--	--	--	--
	W/B	118/107	--	--	--	--	--	--	--	--	--	--
	W/H	118/12	--	--	--	--	--	--	--	--	--	--
English I	M/F	11/12	--	--	--	--	--	--	--	--	--	--
	W/B	6/12	--	--	--	--	--	--	--	--	--	--
	W/H	6/3	--	--	--	--	--	--	--	--	--	--
Algebra II	M/F	9/10	--	--	--	--	--	--	--	--	--	--
	W/B	14/3	--	--	--	--	--	--	--	--	--	--
	W/H	14/1	--	--	--	--	--	--	--	--	--	--
Geometry	M/F	33/26	--	--	--	--	--	--	--	--	--	--
	W/B	25/17	--	--	--	--	--	--	--	--	--	--
	W/H	25/16	--	--	--	--	--	--	--	--	--	--
Government	M/F	319/441	38	1	1	--	--	--	--	--	--	--
	W/B	540/126	--	--	--	--	--	--	--	--	--	--
	W/H	540/48	--	--	--	--	--	--	--	--	--	--
Am. History	M/F	26/44	--	--	--	--	--	--	--	--	--	--
	W/B	55/11	--	--	--	--	--	--	--	--	--	--
	W/H	55/2	--	--	--	--	--	--	--	--	--	--
Physical Science	M/F	7/4	--	--	--	--	--	--	--	--	--	--
	W/B	0/10	--	--	--	--	--	--	--	--	--	--
	W/H	0/1	--	--	--	--	--	--	--	--	--	--

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

*The MH procedure is applied for the SR items. WINSTEPS is applied 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.

Table 4.4. DIF Results—Fall 2016

Content Area	Group[****]	N-Count[***]	SR Items[*]					PE/WPs[*]				
			A[**]	B[**]	B–[**]	C[**]	C–[**]	A[**]	B[**]	B–[**]	C[**]	C–[**]
Fall 2016												
English II	M/F	136/130	--	--	--	--	--	--	--	--	--	--
	W/B	217/22	--	--	--	--	--	--	--	--	--	--
	W/H	217/7	--	--	--	--	--	--	--	--	--	--
Algebra I	M/F	2,372/2,052	40	--	--	--	--	4	--	--	--	--
	W/B	3,027/880	37	1	1	--	1	3	--	--	--	1
	W/H	3,027/326	40	--	--	--	--	3	--	1	--	--
Biology	M/F	1,676/1,441	35	--	--	--	--	13	--	--	--	--
	W/B	2,037/656	34	1	--	--	--	12	--	--	--	1
	W/H	2,037/246	34	--	1	--	--	13	--	--	--	--
English I	M/F	136/130	--	--	--	--	--	--	--	--	--	--
	W/B	217/22	--	--	--	--	--	--	--	--	--	--
	W/H	217/7	--	--	--	--	--	--	--	--	--	--
Algebra II	M/F	390/446	33	4	3	--	--	--	--	--	--	--
	W/B	621/93	--	--	--	--	--	--	--	--	--	--
	W/H	621/54	--	--	--	--	--	--	--	--	--	--
Geometry	M/F	464/543	35	3	1	--	1	--	--	--	--	--
	W/B	721/117	--	--	--	--	--	--	--	--	--	--
	W/H	721/68	--	--	--	--	--	--	--	--	--	--
Government	M/F	6,682/6,622	40	--	--	--	--	--	--	--	--	--
	W/B	9,370/2,491	38	1	1	--	--	--	--	--	--	--
	W/H	9,370/653	40	--	--	--	--	--	--	--	--	--
Am. History	M/F	306/274	35	--	2	2	1	--	--	--	--	--
	W/B	463/53	--	--	--	--	--	--	--	--	--	--
	W/H	463/54	--	--	--	--	--	--	--	--	--	--

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

[*]The MH procedure is applied for the SR items. WINSTEPS is applied 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.

Table 4.5. DIF Results—Spring 2017

Content Area	Group***	N-Count	SR Items*					PE/WPs*				
			A**	B**	B–**	C**	C–**	A**	B**	B–**	C**	C–**
Spring 2017												
English II	M/F	30,685/30,861	35	--	--	--	--	2	1	--	--	--
	W/B	46,369/8,731	35	--	--	--	--	3	--	--	--	--
	W/H	46,369/3,242	35	--	--	--	--	3	--	--	--	--
Algebra I	M/F	30,580/29,985	40	--	--	--	--	3	--	--	--	--
	W/B	44,166/9,609	40	--	--	--	--	3	--	--	--	--
	W/H	44,166/3,460	40	--	--	--	--	3	--	--	--	--
Biology	M/F	31,203/3,0731	35	--	--	--	--	10	--	--	--	--
	W/B	46,696/8,528	35	--	--	--	--	10	--	--	--	--
	W/H	46,696/3,481	35	--	--	--	--	10	--	--	--	--
English I	M/F	6,450/6,416	34	1	--	--	--	--	3	--	--	--
	W/B	10,629/1,132	34	1	--	--	--	3	--	--	--	--
	W/H	10,629/564	34	1	--	--	--	3	--	--	--	--
Algebra II	M/F	8,486/9,862	37	--	3	--	--	--	--	--	--	--
	W/B	15,121/1,146	37	--	3	--	--	--	--	--	--	--
	W/H	15,121/888	37	--	3	--	--	--	--	--	--	--
Geometry	M/F	3,356/3,647	37	1	2	--	--	--	--	--	--	--
	W/B	6,066/313	37	1	2	--	--	--	--	--	--	--
	W/H	6,066/294	37	1	2	--	--	--	--	--	--	--
Government	M/F	23,743/22,918	39	--	1	--	--	--	--	--	--	--
	W/B	35,074/6,847	39	--	1	--	--	--	--	--	--	--
	W/H	35,074/2,467	39	--	1	--	--	--	--	--	--	--
Am. History	M/F	3,273/3,225	37	--	3	--	--	--	--	--	--	--
	W/B	5,712/310	37	--	3	--	--	--	--	--	--	--
	W/H	5,712/197	37	--	3	--	--	--	--	--	--	--
Physical Science	M/F	1,474/1,466	42	--	1	--	2	--	--	--	--	--
	W/B	2,618/169	--	--	--	--	--	--	--	--	--	--
	W/H	2,618/73	--	--	--	--	--	--	--	--	--	--

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

*The MH procedure is applied for the SR items. WINSTEPS is applied 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.

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 2016–2017 operational administrations show that item difficulty does not depend on group membership after conditioning on student ability.

Chapter 5: Test Administration

5.1. Introduction

This chapter contains information about DESE and Questar's processes that ensure the standardized administration of the MO EOC Assessments. The *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 2014) state, "For tests designed to assess the test taker's knowledge, skills, abilities, or other personal characteristics, standardization helps to ensure that all test takers have the same opportunity to demonstrate their competencies" (p. 111). In other words, 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, 2011–2012 was the first year in which districts were required to use an online delivery format unless a Paper/Pencil, Braille, or Large Print edition 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 2016–2017.

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 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. The other MO EOC Assessments that all students, including ELL students, are required to take are Algebra I, Biology, and Government.

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.

5.5. District and Test Examiner Training

Both Questar and DESE were responsible for training the district staff on EOC test administration. DESE provided training webinars, scripts, and PowerPoint presentations on the Test Administration Manual, state procedures, and general testing issues. These training resources were available both on the DESE website and on the online test administration site. Appendix G contains the 2016–2017 training PowerPoint presentations for the MO EOC assessments.

Questar provided training on the online assessment platform. Questar training contained proprietary 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 had about the MO EOC Assessment administration.

5.6. Test Security

5.6.1. Summary

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.[6]

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 returned all of their secure materials after the completion of testing. The Paper/Pencil forms included a barcode 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

[6] **Standard 6.7:** Test users have the responsibility of protecting the security of test materials at all times (p. 117).

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.

5.6.2. 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 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.[7] This QA process was issued to District Test Coordinators in an administrative memo.[8] 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

[7] View the QA form online at http://tiny.cc/deseqaself2017.
[8] View the memo online at https://dese.mo.gov/sites/default/files/am/documents/CCR-17-001.pdf.

Assessments. The questions on the form were designed to focus attention and help districts examine important areas of assessment training, administration, and test security.

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. 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 tutorial of the online assessment platform prior to testing. This tutorial 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:

- 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. Students taking the English I and English II writing prompts had access to a dictionary, thesaurus, and grammar handbook. Students taking any of the mathematic assessments had access to the Mathematics Reference Sheet and students taking the Physical Science assessment had access to the Periodic Table of Elements.

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.)

5.7.4. Directions for Administration

In accordance with Standard 6.1,[9] 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 2016–2017 Test Administration Manual (TAM) for the Geometry EOC Assessment.

Figure 5.1. Directions for Administering from the TAM—Geometry

Geometry Assessment Online

Directions for Administering

Distribute scratch, unlabeled grid or graph paper. If you have decided the students should use calculators for this assessment, make sure all students have a working calculator. Hard copies of the Mathematics Reference Sheet may also be distributed.

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 Geometry. You may use a calculator and scratch paper to work through the questions. The Mathematics Reference Sheet is available during testing by clicking the reference sheet icon. 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.**

On your desktop, locate the icon titled "Questar Secure Browser MOEOC."

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

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.

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[9] **Standard 6.1:** Test administrators should follow carefully the standardized procedures for administration and scoring specified by the test developer and any instructions from the test user (p. 114).

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 6.3,[10] 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 2016, Fall 2016, and Spring 2017, respectively. The most prevalent type of accommodation for the Summer 2016, Fall 2016 and Spring 2017 administrations across all MO EOC Assessments was testing in "Other Setting." See Appendix H for a list of accommodation codes from the 2016–2017 Test Administration Manual.

[10] **Standard 6.3:** Changes or disruptions to standardized test administration procedures or scoring should be documented and reported to the test user (p. 115).

Table 5.1. Accommodation Distributions—Summer 2016

Accommodation	English II		Algebra I		Biology		English I		Algebra II		Geometry		Government		Am. History		Ph. Science	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Braille	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Large Print	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oral Reading	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oral Reading— Blind/Partial Sight	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oral Reading—Paper/Pencil Only	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Signing of Assessment	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Paper Based Assessment—Paper/Pencil Only	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oral Reading in Native Language ELA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Use of Scribe	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Speech to Text Online not Embedded	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Abacus	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Multiplication Table	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Specialized Calculator	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Alternate Response	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oral Reading Assistive Technology-Non ELA	1	0.31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oral Reading Assistive Technology-ELA only	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oral Reading Any—not Embedded	7	2.18	12	1.45	1	0.41	--	--	--	--	--	--	1	0.13	--	--	--	--
Color Contrast—Paper/Pencil	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color Overlay—Paper/Pencil	1	0.31	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnification	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Masking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Translation	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oral Reading in Native Language Non ELA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Use of Scribe Non ELA Writing without IEP or 504	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bilingual Dictionary on Writing Performance Task for ELL	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Setting	9	2.80	15	1.81	3	1.22	--	--	--	--	--	--	5	0.66	--	--	--	--

Table 5.2. Accommodation Distributions—Fall 2016

Accommodation	English II		Algebra I		Biology		English I		Algebra II		Geometry		Government		Am. History	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Braille	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Large Print	2	0.06	1	0.02	1	0.03	1	0.37	1	0.12	1	0.10	2	0.02	--	--
Oral Reading	53	1.66	--	--	--	--	15	5.62	--	--	--	--	--	--	--	--
Oral Reading— Blind/Partial Sight	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Oral Reading—Paper/Pencil Only	--	--	--	--	--	--	--	--	--	--	--	--	6	0.05	--	--
Signing of Assessment	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Paper Based Assessment—Paper/Pencil Only	3	0.09	6	0.14	4	0.13	2	0.75	--	--	3	0.30	--	--	1	0.17
Oral Reading in Native Language ELA	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Use of Scribe	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Speech to Text Online not Embedded	--	--	--	--	1	0.03	--	--	--	--	--	--	1	0.01	--	--
Abacus	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Multiplication Table	2	0.06	4	0.09	1	0.03	--	--	--	--	--	--	1	0.01	--	--
Specialized Calculator	--	--	--	--	1	0.03	--	--	--	--	--	--	--	--	--	--
Alternate Response	--	--	--	--	--	--	--	--	--	--	--	--	3	0.02	--	--
Oral Reading Assistive Technology-Non ELA	--	--	--	--	--	--	--	--	--	--	--	--	5	0.04	1	0.17
Oral Reading Assistive Technology-ELA only	--	--	--	--	--	--	1	0.37	--	--	--	--	--	--	--	--
Oral Reading Any—not Embedded	20	0.63	70	1.58	90	2.89	2	0.75	2	0.24	35	3.47	306	2.3	29	5.00
Color Contrast—Paper/Pencil	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Color Overlay—Paper/Pencil	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Magnification	--	--	--	--	--	--	--	--	--	--	--	--	1	0.01	--	--
Masking	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Translation	1	0.03	--	--	1	0.03	--	--	--	--	--	--	15	0.11	--	--
Oral Reading in Native Language Non ELA	5	0.16	3	0.07	3	0.10	--	--	--	--	1	0.1	7	0.05	--	--
Use of Scribe Non ELA Writing without IEP or 504	6	0.19	--	--	1	0.03	--	--	--	--	--	--	7	0.05	--	--
Bilingual Dictionary on Writing Performance Task for ELL	4	0.13	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Other Setting	153	4.79	146	3.30	163	5.23	30	11.24	9	1.08	79	7.84	571	4.29	55	9.48

Table 5.3. Accommodation Distributions—Spring 2017

Accommodation	English II		Algebra I		Biology		English I		Algebra II		Geometry		Government		Am. History		Ph. Science	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Braille	7	0.01	10	0.02	9	0.01	3	0.02	--	--	--	--	3	0.01	1	0.02	1	0.03
Large Print	28	0.05	23	0.04	27	0.04	8	0.06	2	0.01	--	--	24	0.05	--	--	--	--
Oral Reading	1,273	2.07	--	--	--	--	358	2.78	--	--	--	--	--	--	--	--	--	--
Oral Reading— Blind/Partial Sight	1	0.00	--	--	--	--	1	0.01	--	--	--	--	--	--	--	--	--	--
Oral Reading—Paper/Pencil Only	1	0.00	--	--	--	--	1	0.01	--	--	--	--	--	--	--	--	--	--
Signing of Assessment	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Paper Based Assessment—Paper/Pencil Only	94	0.15	111	0.18	98	0.16	24	0.19	7	0.04	5	0.07	88	0.19	5	0.08	--	--
Oral Reading in Native Language ELA	4	0.01	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Use of Scribe	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Speech to Text Online not Embedded	13	0.02	5	0.01	4	0.01	2	0.02	--	--	--	--	--	--	--	--	--	--
Abacus	--	--	1	0.00	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Multiplication Table	4	0.01	91	0.15	16	0.03	2	0.02	--	--	1	0.01	4	0.01	1	0.02	--	--
Specialized Calculator	7	0.01	66	0.11	44	0.07	3	0.02	3	0.02	6	0.09	2	0.00	--	--	4	0.14
Alternate Response	2	0.00	3	0.00	4	0.01	--	--	--	--	--	--	1	0.00	--	--	--	--
Oral Reading Assistive Technology-Non ELA	5	0.01	35	0.06	18	0.03	16	0.12	5	0.03	2	0.03	17	0.04	13	0.20	8	0.27
Oral Reading Assistive Technology-ELA only	94	0.15	--	--	--	--	20	0.16	--	--	--	--	--	--	--	--	--	--
Oral Reading Any—not Embedded	696	1.13	1,448	2.39	1,799	2.90	137	1.06	63	0.34	97	1.39	1,436	3.08	152	2.34	91	3.09
Color Contrast—Paper/Pencil	1	0.00	1	0.00	1	0.00	--	--	--	--	--	--	1	0.00	--	--	--	--
Color Overlay—Paper/Pencil	1	0.00	1	0.00	1	0.00	6	0.05	1	0.01	--	--	1	0.00	--	--	--	--
Magnification	2	0.00	5	0.01	5	0.01	1	0.01	--	--	--	--	3	0.01	--	--	--	--
Masking	--	--	--	--	2	0.00	--	--	--	--	--	--	--	--	--	--	--	--
Translation	27	0.04	35	0.06	27	0.04	--	--	--	--	--	--	18	0.04	--	--	--	--
Oral Reading in Native Language Non ELA	29	0.05	58	0.10	52	0.08	--	--	--	--	--	--	77	0.16	--	--	--	--
Use of Scribe Non ELA Writing without IEP or 504	72	0.12	58	0.10	62	0.10	15	0.12	1	0.01	2	0.03	29	0.06	7	0.11	6	0.20
Bilingual Dictionary on Writing Performance Task for ELL	99	0.16	--	--	--	--	10	0.08	--	--	--	--	--	--	--	--	--	--
Other Setting	3,447	5.59	3,186	5.26	3,647	5.88	735	5.71	120	0.65	216	3.08	2,410	5.16	315	4.85	184	6.26

5.9. Materials Handling and Return

5.9.1. Materials Handling during Administration

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:

- 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 (used and unused) to the District Test Coordinator
- Destroying all nonsecure testing materials

After receiving the used and unused 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.

5.9.2. 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 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.

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 of the PE/WPs

Questar handscored the English II and English I Assessments, which contained WPs, 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 2016–2017, which was consistent for all three administrations (Summer 2016, Fall 2016, and Spring 2017). The PE/WPs were scored by human raters.

6.2.1. 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 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:

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.

6.2.2. 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.

The training materials were inherited from the previous vendor. DESE provided any new training materials since the transition of the program to Questar. DESE provided the Algebra responses used for the training materials. The responses were pre-designated as either training or qualifying sets. Per DESE's request, the Biology Crickets training materials were updated from paper/pencil to online responses. The new online responses mirrored the paper/pencil responses in content and scores.

6.3. 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.

- 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.

6.4. 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. The range of possible scores is noted below. The 4-point items have possible score points of 0, 1, 2, 3 and 4 or 1, 2, 3, and 4 depending on the item. All other hand-scored items have 0 as the lowest score. Perfect agreement is based on agreement to the answer key.

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

6.4.1. Second Read Procedures

Rater agreement is the agreement between the first and second scores assigned to student responses. Rater agreement indices include exact, adjacent, and nonadjacent agreement. Guidelines for rater agreement are determined in accordance with customer requirements and

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

Questar's scoring system included comprehensive rater agreement 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 rater agreement purposes only.

6.4.2. Scoring Monitoring and Recalibration Procedures

6.4.2.1. 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. The team leads used an internal report to monitor and ensure consistent scoring. If an incorrect score was identified during the read-behind, the correct score was assigned and that score became the score of record.

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.

6.4.2.2. 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.

Calibration sets are developed throughout the scoring window, using responses that serve as training examples, both in one-on-one and group situations. Calibration sets are also used after a weekend off, if needed. These papers are shredded after the project is complete.

6.4.2.3. 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 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. Validity Responses

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 the scoring director as examples that clearly earn certain scores. There is only one scoring director per content area. 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 because 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 the summaries of the validity paper results at the end of the project for the Fall 2016 and Spring 2017 administrations, respectively. The "Rater Agreement Plan" column indicates the expected percent of agreement given the maximum points available for the item. A higher percent was expected for items with fewer points, and a lower percent was expected for items with more points. For example, the rater agreement plan was 100 percent for 1-point items and 80 percent for 4-point items. The "Rater Agreement Actual" column shows the observed rater agreement. The variance is the difference between the actual and planned rater agreement. Positive values indicate that the actual agreement was higher than the planned agreement, whereas negative values indicate that the actual agreement was lower than the planned agreement. Overall, items worth one point tended to have smaller variances than items worth two or more points. The item with the largest variance in the Fall administration was an item where rater agreement was lower than the planned rater agreement (79% versus 95% for a 2-point English item).The item with the largest variance in the Spring was an item where rater agreement exceeded the planned rater agreement (98% versus 80% for a 4-point Algebra I item). The results of the validity paper scoring indicate that for the majority of items, the variance was relatively small and within 10%.

Summer 2016 validity paper results are unavailable due to the low n-counts and small number of scorers. Because Summer 2016 had such low n-counts, responses were read by expert scorers such as the scoring director and team leaders.

Table 6.1. Summary of Validity Paper Results—Fall 2016

Item	N-Count	#Points	Rater Agreement Plan	Rater Agreement Actual	Variance
English I – 100085793-1	271	4	80%	82%	2%
English I – 100085793-2	271	4	80%	79%	-1%
English I – 100085793-3	271	2	95%	84%	-11%
English II – 100085923-1	3,153	4	80%	87%	7%
English II – 100085923-2	3,153	4	80%	87%	7%
English II – 100085923-3	3,153	2	95%	79%	-16%
Algebra I – 100076683-1	4,415	2	95%	96%	1%
Algebra I – 100076683-2	4,415	4	80%	83%	3%
Algebra I – 100076683-3	4,415	1	100%	100%	0%
Algebra I – 100076683-4	4,415	3	85%	90%	5%
Biology 1 – 100089024	3,091	1	100%	98%	-2%
Biology 2 – 100089025	3,084	1	100%	98%	-2%
Biology 3 – 100089036	3,081	1	100%	99%	-1%
Biology 4 – 100089027	3,076	1	100%	94%	-6%
Biology 5 – 100089029	3,030	3	85%	87%	2%
Biology 6 – 100089030	3,068	4	80%	90%	10%
Biology 7 – 100089038	3,081	1	100%	100%	0%
Biology 8 – 100089040	3,058	1	100%	99%	-1%
Biology 9 – 100089034	3,048	1	100%	97%	-3%
Biology 10 – 100089033	3,039	2	95%	85%	-10%

Biology 11 – 100089039	3,038	1	100%	92%	-8%
Biology 12 – 100089035	3,022	2	95%	83%	-12%
Biology 13 – 100089022	3,026	1	100%	96%	-4%

Table 6.2. Summary of Validity Paper Results—Spring 2017

Item	N-Count	#Points	Rater Agreement Plan	Rater Agreement Actual	Variance
English I – 100085793-1	13,093	4	80%	81%	1%
English I – 100085793-2	13,093	4	80%	77%	-3%
English I – 100085793-3	13,093	2	95%	86%	-9%
English II – 100085792-1	62,991	4	80%	83%	3%
English II – 100085792-2	62,991	4	80%	78%	-2%
English II – 100085792-3	62,991	2	95%	90%	-5%
Algebra I – 100076622-1	63,686	4	80%	98%	18%
Algebra I – 100076622-2	63,682	2	95%	97%	2%
Algebra I – 100076622-3	63,689	4	80%	89%	9%
Biology 1 – 100075983	61,842	1	100%	94%	-6%
Biology 2 – 100075984	61,804	1	100%	91%	-9%
Biology 3 – 100075985	61,813	1	100%	99%	-1%
Biology 4 – 100075986	61,814	3	85%	90%	5%
Biology 5 – 100075992	61,609	2	95%	87%	-8%
Biology 6 – 100075987	61,769	3	85%	95%	10%
Biology 7 – 100075989	61,701	4	80%	88%	8%
Biology 8 – 100075988	61,158	3	85%	86%	1%
Biology 9 – 100075990	61,649	1	100%	100%	0%
Biology 10 – 100075991	61,626	1	100%	99%	-1%

6.5.1. 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. 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. Anomalous scoring trends were determined by comparing individual reader distribution of scores to the overall group distribution of scores. 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.

6.5.3. Retraining and Resetting Scores

Questar's electronic scoring system has the ability to purge the scores assigned by a scorer whose work was deemed substandard. In those cases, the scores assigned by that individual would be cleared from the database. The responses would then be rerouted to qualified scorers and rescored according to the original scoring design. The scoring system also allows scoring leadership to reset scores for a date range or an item. Questar has not had to use this process to-date during this project. If it had, that reader would have been removed from the project.

6.5.4. 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.

6.5.5. Item Types and Score Points for each Content Area

6.5.5.1. Summer 2016

English Writing Prompts:

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

Algebra I Performance Event: Multi-part (four sections) with a graphing task.
0–1, 0–2, 0–3, and 0–4 score points

Biology Performance Event:

- 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
- 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

6.5.5.2. Fall 2016

English Writing Prompts:

- English I contained a narrative essay prompt, with score points 1–4, 1–4 and 0–2

- English II contained an explanatory essay prompt, with score points 1–4, 1–4 and 0–2

Algebra I Performance Event: Multi-part (four sections) with a graphing task.
0–1, 0–2, 0–3, and 0–4 score points

Biology Performance Event:
- 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
- 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

6.5.5.3. Spring 2017

English Writing Prompts:
- 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 I Performance Event: Multi-part (four sections) with a graphing task.
0–2, and 0–4 score points

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

6.6. Rater Agreement

Rater agreement provides evidence supporting scorer consistency. Tables 6.3, 6.4, and 6.5 present the rater agreement for each item for Summer 2016, Fall 2016, and Spring 2017, respectively. The tables 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. Because Summer 2016 had low *n*-counts, responses were read by expert scorers such as the scoring director and team leaders. The percent of student responses of which two raters agreed exactly for a given item is presented (Exact Agreement Actual). Some degree of disagreement is to be expected with human judges, so the Exact + Adjacent Agreement is presented. For a few 1-point items, the Exact + Adjacent Agreement is less than 100% due to instances where the raters disagreed on whether the student response was scoreable. Across the three administrations, the Exact agreements were higher than 80% with a few exceptions and the Exact + Adjacent agreements were perfect (100%) for the majority of items and 95% or higher for the remaining items.

Another approach to rater agreement is weighted kappa, which corrects for chance agreement (i.e., the probability that two raters will agree simply by chance based on number of score points available). The Fleiss-Cohen weights were applied for the weighted kappa statistic (Fleiss & Cohen, 1973). Landis and Koch (1977) proposed the following interpretation guidelines for kappa values.

κ	Interpretation
<0	Poor agreement
0.01 to 0.20	Slight agreement
0.21 to 0.40	Fair agreement
0.41 to 0.60	Moderate agreement
0.61 to 0.80	Substantial agreement
0.81 to 1.00	Almost perfect agreement

Across the three administrations, most of the weighted kappa values fall within the category of Almost Perfect Agreement (49 of 59, 83%), although there are a few items in the Substantial (6 of 59, 10%) and Moderate (4 of 59, 7%) Agreement classifications. In summary, the rater agreement percentages (i.e., Exact, Exact + Adjacent) and the weighted kappa results indicate a high degree of consensus among raters for the hand-scored items.

Table 6.3. Rater Agreement—Summer 2016

Item	# of Score Points	N-Count	N-Count of Double Reads	Exact Agreement Plan	Exact Agreement Actual	Exact + Adjacent Plan	Exact + Adjacent Actual	Weighted Kappa
Summer 2016								
English I – 100085793-1	4	24	—	80%	—	100%	—	
English I – 100085793-2	4	24	—	80%	—	100%	—	
English I – 100085793-3	2	24	—	95%	—	100%	—	
English II – 100085923-1	4	319	—	80%	—	100%	—	
English II – 100085923-2	4	319	—	80%	—	100%	—	
English II – 100085923-3	2	319	—	95%	—	100%	—	
Algebra I – 100076683-1	2	846	158	95%	100%	100%	100%	1.00
Algebra I – 100076683-2	4	846	134	80%	87%	100%	100%	0.91

Item	# of Score Points	N-Count	N-Count of Double Reads	Exact Agreement Plan	Exact Agreement Actual	Exact + Adjacent Plan	Exact + Adjacent Actual	Weighted Kappa
Summer 2016								
Algebra I – 100076683-3	1	846	158	100%	99%	100%	99%	1.00
Algebra I – 100076683-4	3	846	156	85%	94%	100%	100%	0.98
Biology 1 – 100089024	1	249	50	100%	100%	100%	100%	1.00
Biology 2 – 100089025	1	248	46	100%	100%	100%	100%	1.00
Biology 3 – 100089036	1	246	46	100%	100%	100%	100%	1.00
Biology 4 – 100089027	1	248	48	100%	100%	100%	100%	1.00
Biology 5 – 100089029	3	242	44	85%	86%	100%	100%	0.91
Biology 6 – 100089030	4	242	46	80%	91%	100%	95%	0.99
Biology 7 – 100089038	1	248	46	100%	100%	100%	100%	1.00
Biology 8 – 100089040	1	245	48	100%	100%	100%	100%	1.00
Biology 9 – 100089034	1	242	44	100%	100%	100%	100%	1.00
Biology 10 – 100089033	2	242	42	95%	67%	100%	100%	0.58
Biology 11 – 100089039	1	240	46	100%	96%	100%	100%	0.86
Biology 12 – 100089035	2	239	42	95%	100%	100%	100%	1.00
Biology 13 – 100089022	1	241	44	100%	95%	100%	100%	0.90

Table 6.4. Rater Agreement—Fall 2016

Item	# of Score Points	N-Count	N-Count of Double Reads	Exact Agreement Plan	Exact Agreement Actual	Exact + Adjacent Plan	Exact + Adjacent Actual	Weighted Kappa
Fall 2016								
English I – 100085793-1	4	271	38	80%	82%	100%	100%	0.84
English I – 100085793-2	4	271	38	80%	79%	100%	100%	0.81
English I – 100085793-3	2	271	38	95%	84%	100%	100%	0.48
English II – 100085923-1	4	3,153	502	80%	87%	100%	100%	0.91
English II – 100085923-2	4	3,153	502	80%	87%	100%	100%	0.91
English II – 100085923-3	2	3,153	502	95%	79%	100%	100%	0.67
Algebra I – 100076683-1	2	4,415	844	95%	96%	100%	100%	0.97
Algebra I – 100076683-2	4	4,415	702	80%	83%	100%	99%	0.93
Algebra I – 100076683-3	1	4,415	802	100%	100%	100%	100%	1.00
Algebra I – 100076683-4	3	4,415	828	85%	90%	100%	100%	0.96
Biology 1 – 100089024	1	3,091	606	100%	98%	100%	98%	0.99
Biology 2 – 100089025	1	3,084	592	100%	98%	100%	99%	0.97
Biology 3 – 100089036	1	3,081	598	100%	99%	100%	100%	0.97
Biology 4 – 100089027	1	3,076	608	100%	94%	100%	100%	0.86
Biology 5 – 100089029	3	3,030	598	85%	87%	100%	99%	0.92
Biology 6 – 100089030	4	3,068	596	80%	90%	100%	98%	0.97
Biology 7 – 100089038	1	3,081	604	100%	100%	100%	100%	0.99

Item	# of Score Points	N-Count	N-Count of Double Reads	Exact Agreement Plan	Exact Agreement Actual	Exact + Adjacent Plan	Exact + Adjacent Actual	Weighted Kappa
Biology 8 – 100089040	1	3,058	612	100%	99%	100%	100%	0.99
Biology 9 – 100089034	1	3,048	596	100%	97%	100%	99%	0.92
Biology 10 – 100089033	2	3,039	592	95%	85%	100%	98%	0.85
Biology 11 – 100089039	1	3,038	598	100%	92%	100%	100%	0.85
Biology 12 – 100089035	2	3,022	588	95%	83%	100%	99%	0.82
Biology 13 – 100089022	1	3,026	596	100%	96%	100%	100%	0.92

Table 6.5. Rater Agreement —Spring 2017

Item	# of Score Points	N-Count	N-Count of Double Reads	Exact Agreement Plan	Exact Agreement Actual	Exact + Adjacent Plan	Exact + Adjacent Actual	Weighted Kappa
Spring 2017								
English I – 100085793-1	4	13,093	2,554	80%	81%	100%	100%	0.75
English I – 100085793-2	4	13,093	2,554	80%	77%	100%	100%	0.75
English I – 100085793-3	2	13,093	2,554	95%	86%	100%	100%	0.53
English II – 100085792-1	4	62,991	12,450	80%	83%	100%	100%	0.64
English II – 100085792-2	4	62,991	12,450	80%	78%	100%	100%	0.67
English II – 100085792-3	2	62,991	12,450	95%	90%	100%	100%	0.52
Algebra I – 100076622-1	4	63,686	12,612	80%	98%	100%	100%	0.99
Algebra I – 100076622-2	2	63,682	12,316	95%	97%	100%	100%	0.98
Algebra I – 100076622-3	4	63,689	12,424	80%	89%	100%	100%	0.95
Biology 1 – 100075983	1	61,842	12,324	100%	94%	100%	100%	0.85
Biology 2 – 100075984	1	61,804	12,312	100%	91%	100%	100%	0.79
Biology 3 – 100075985	1	61,813	12,318	100%	99%	100%	100%	0.98
Biology 4 – 100075986	3	61,814	12,312	85%	90%	100%	100%	0.86
Biology 5 – 100075992	2	61,609	12,266	95%	87%	100%	100%	0.88
Biology 6 – 100075987	3	61,769	12,312	85%	95%	100%	100%	0.97
Biology 7 – 100075989	4	61,701	12,192	80%	88%	100%	100%	0.97
Biology 8 – 100075988	3	61,158	12,058	85%	86%	100%	100%	0.94
Biology 9 – 100075990	1	61,649	12,304	100%	100%	100%	100%	0.88
Biology 10 – 100075991	1	61,626	12,292	100%	99%	100%	100%	0.89

Chapter 7: Scaling and Equating

7.1. Introduction

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

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 IRT models used for equating, followed by an overview of the scaling and equating procedures.

The Summer 2016, Fall 2016, and Spring 2017 administrations used previously administered test forms for all content areas and the RSS conversions already in existence. However, a special recalibration study for Biology was undertaken to investigate item parameter shift. Students from the Spring 2017 administration were scored using the RSS conversion table based on the recalibration. Beginning in Fall 2014, five content areas (English I, English II, Algebra I, Algebra II, and Geometry) had updated test forms, so a post-equating was completed in 2014–2015 for those assessments.

Detailed procedures for scaling and equating for the 2014–2015 administration are provided in the *2014–2015 MO EOC Technical Report*. Scaling and equating procedures for the Summer 2014 and previous administrations—as well as for the Biology, Government, and American History, which used previously intact forms—are provided in the *2009–2010 MO EOC Phase I Technical Report* and the *2009–2010 MO EOC Phase II Technical Report* located on the DESE website at http://dese.mo.gov/college-career-readiness/assessment/assessment-technical-support-materials.

7.2. Item Response Theory (IRT)

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

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

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.

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.

7.3. Scaling and Equating

7.3.1. Scale Score Ranges

Table 7.1 presents the scale score ranges for Summer 2016, Fall 2016 and Spring 2017.

Table 7.1. Scale Score Ranges by Achievement Level

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

Content Area	Achievement Level	Scale Score Range
	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

7.3.2. Recalibration for Biology

Due to the drop in student performance observed for the Spring 2016 Biology Assessment, the Missouri TAC and DESE requested that Questar recalibrate the Biology forms to minimize variations in test results statewide due to form differences. The result was a set of updated Biology RSS tables used for assigning student performance levels so that the tables are more equivalent across the test forms.

Because the Biology forms did not have common items or common students, the approach recommended by the TAC was to combine data from the most recent large Spring administrations. Specifically, the Spring 2014, 2015, and 2016 administrations were combined into one large free run calibration using Winsteps to place items from all three forms onto a common theta scale. The assumption was that the students testing each Spring were similar to each other.

The following steps describe the procedure:

1. Prepare the data so that the Spring 2014, 2015, and 2016 data are in the same file but occupy separate columns.
2. Run Winsteps to simultaneously calibrate the data from the three years together, centering on people.
3. Run Winsteps separately by year using an item anchor file to create a raw score to theta table for each test form.
4. Generate the RSS table and apply the appropriate scale score rounding rules.

The results indicated that performance rates regressed toward the mean of the different forms yielding less variation between forms. The Basic, Proficient, and Advanced cut scores for the Spring 2016 form changed from 19 to 17, 34 to 31, and 46 to 44, respectively. Students who took the Spring 2016 Biology Assessment were rescored with the recalibrated RSS conversion table.

The recalibrated RSS conversion tables were used for the Fall 2016 and Spring 2017 Biology Assessments.

7.3.3. Estimation of the Slope and Intercept

Table 7.2 presents the slopes and intercepts for the RSS linear transformation.

Table 7.2. Theta to Scale Score Transformation with Slopes and Intercepts

	Basic		Proficient		Advanced			
Content Area	**Theta**	**SS**	**Theta**	**SS**	**Theta**	**SS**	**Slope**	**Intercept**
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
Biology	-0.69	177	0.51	200	1.79	225	19.53	189.99
English I	-0.55	180	0.58	200	2.01	225	17.55	189.76
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
Government	-0.56	179	0.56	200	1.86	225	19.11	189.37
American History	-0.11	182	0.56	200	1.49	225	26.64	185.19
Physical Science	-1.23	168	0.14	200	1.21	225	23.43	196.62

7.4. RSS Conversions

Appendix D provides the RSS conversions for Summer 2016, Fall 2016, and Spring 2017.

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 regarding 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. 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.

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. Questar also 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.

8.2. Test Scores

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. ALDs provide details about the content expectations that students at each level meet or exceed. The scores are scaled in several ways: raw scores, scale scores (derived from the Rasch model), and achievement level (based on scale score cuts) that 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. Subscale scores are not reported for the MO EOC Assessments.

Missouri 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.

To determine the achievement level scores, Questar converted each student's raw score points earned into a scale score that ranged from 100 to 250, as described in Chapter 7. The scale score determined the student's achievement level. For all content areas, a scale score of 200 to 224 was considered Proficient, and a scale score of 225 and above was considered Advanced. Each achievement level represented standards of performance for each assessed content area. Test results were 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, IEP status, and accommodations used during testing. Scores are reported to schools and districts in annually published reports (see Chapter 9 for more information).

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 MO 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 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.pdf). Teachers are counseled to interpret individual student scores only in the context of other assessment results and their own experience.

8.3. Individual Student Report (ISR)

The 2016–2017 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.

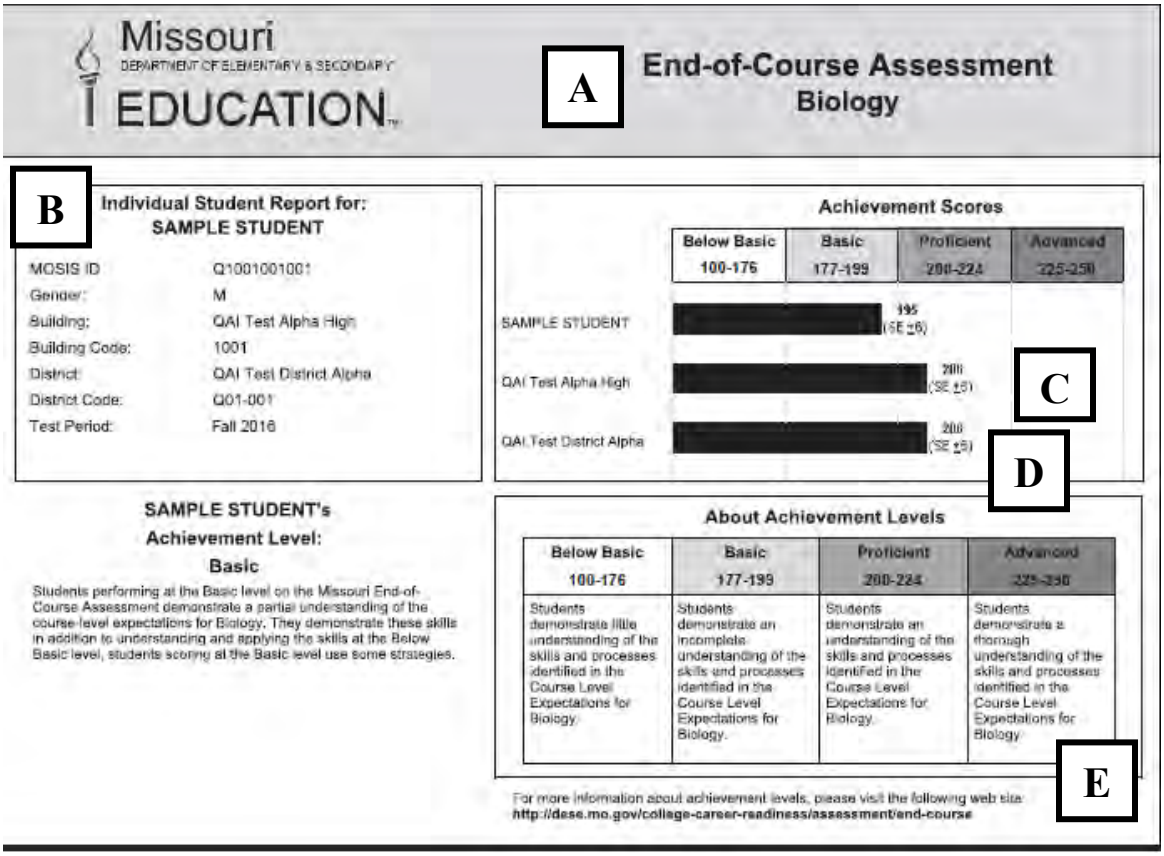
C. The individual student's results are presented numerically as a three-digit scale score with the SE. An accompanying bar graph to the right of the scale score illustrates the achievement level obtained by the student. Achievement levels (whether Below Basic, Basic, Proficient, or Advanced) are based 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.

Figure 8.1. Individual Student Report (ISR)



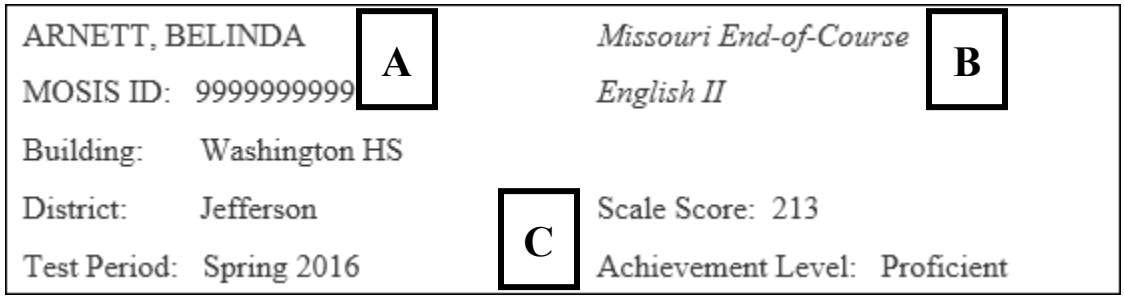
8.4. Student Score Label

The 2016–2017 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.

Figure 8.2. Student Score Label



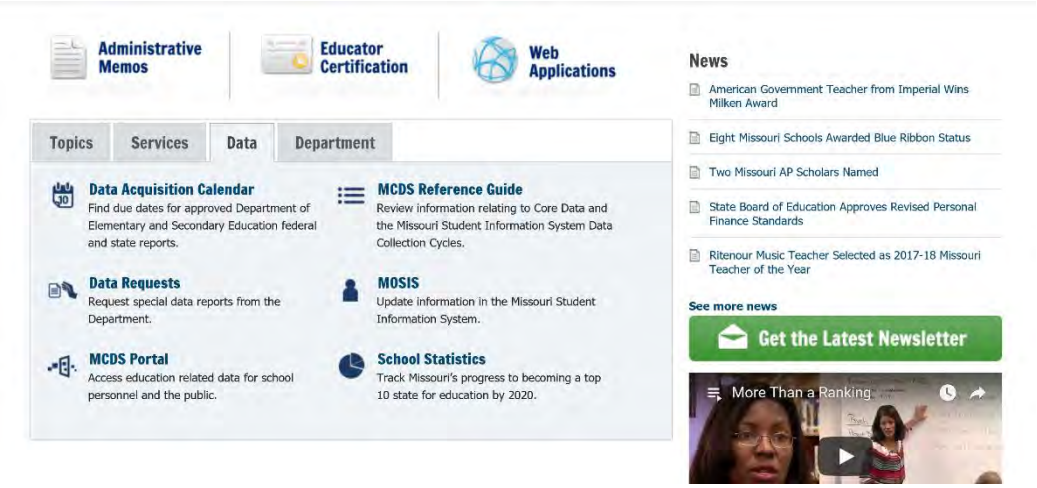
8.5. Missouri Comprehensive Data System (MCDS) Portal

8.5.1. Purpose and Use

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.

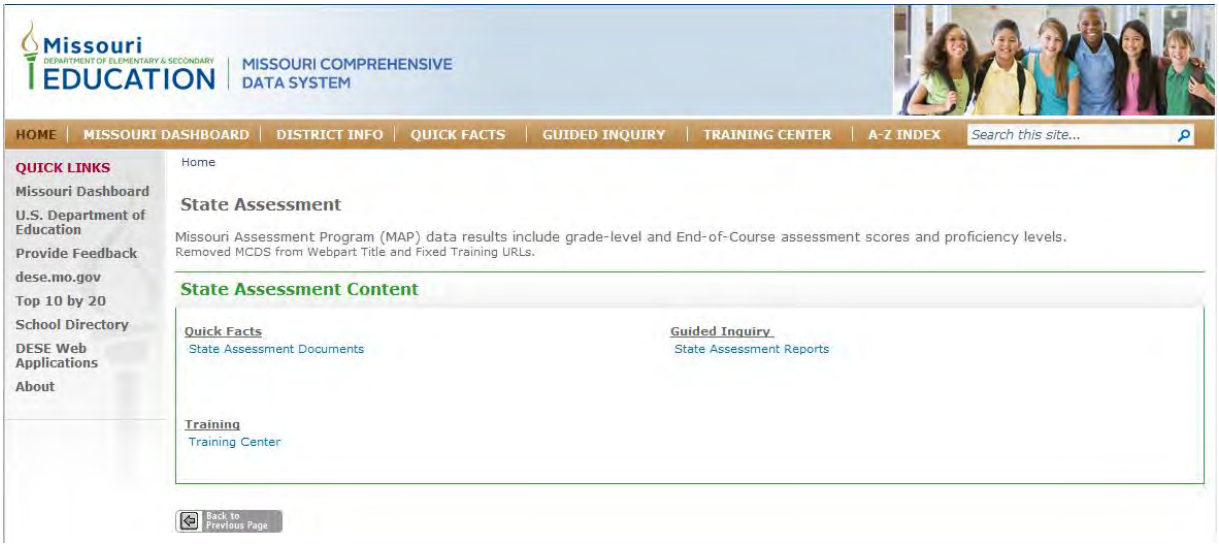
Beginning with the 2011–2012 school year, DESE transitioned all assessment reporting to the state's data portal, the Missouri Comprehensive Data System (MCDS). MCDS provides the general public with access to high-level EOC summary reports and allows school district personnel with appropriate permissions 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, as shown in the following image.



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.

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.



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

8.5.2. 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

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.

Chapter 9: Summary Statistics

9.1. Introduction

This chapter provides descriptive statistics for the number correct raw score and scale scores for each of the eight MO EOC Assessments from the Fall 2016 administration and for each of the nine MO EOC Assessments from the Summer 2016 and Spring 2017 administrations. Statistics include n-counts, means, standard deviations (SD), minimum and maximum values, and a variety of data disaggregation.

9.2. Descriptive Statistics

9.2.1. Total Raw Score

Table 9.1 summarizes the descriptive statistics for total raw score (RS) by test administration (test period) and content area. The information includes the total number of students who took the particular MO EOC Assessment (n-count), the number of items and possible points, the observed minimum and maximum scores, and mean and standard deviation of raw scores.

Table 9.1. Descriptive Statistics for Total Raw Score

Test Period	Content Area	N-Count	#Items	#Pts. Possible	Min.	Max.	Mean	SD
Summer 2016	English II	321	38	45	4	42	24.06	8.82
	Algebra I	828	44	50	4	49	19.79	8.28
	Biology	245	48	55	0	52	24.38	11.30
	English I	23	38	45	14	38	25.61	6.38
	Algebra II	19	40	40	11	33	21.00	6.94
	Geometry	59	40	40	4	40	19.75	7.35
	Government	760	40	40	2	40	26.50	8.12
	Am. History	69	40	40	8	37	24.61	6.64
	Physical Science	11	45	45	19	32	23.64	4.15
Fall 2016	English II	3,191	38	41	0	43	26.61	8.66
	Algebra I	4,428	44	50	0	49	20.44	9.67
	Biology	3,118	48	55	0	55	31.16	11.78
	English I	266	38	45	10	42	28.33	7.04
	Algebra II	836	40	40	0	40	24.52	7.92
	Geometry	1,007	40	40	0	40	23.33	7.56
	Government	13,304	40	40	0	40	26.99	7.92
	Am. History	580	40	40	5	39	23.55	7.76
Spring 2017	English II	61,594	38	45	0	45	30.77	6.85
	Algebra I	60,582	43	50	0	50	25.23	9.44
	Biology	61,957	45	55	0	55	35.76	9.92
	English I	12,870	38	45	3	44	28.24	6.67
	Algebra II	18,348	40	40	0	40	25.00	7.37
	Geometry	7,003	40	40	4	40	21.56	7.19
	Government	46,661	40	40	0	40	25.98	7.16
	Am. History	6,498	40	40	0	40	23.28	7.66

Test Period	Content Area	N-Count	#Items	#Pts. Possible	Min.	Max.	Mean	SD
Spring 2017	Physical Science	2,940	45	45	0	43	20.41	6.40

9.2.2. Total Raw Score by Cluster

Tables 9.2, 9.3, and 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 Cluster—Summer 2016

Test Period	Content Area	Cluster	#Pts. Possible	#Items	Mean	SD	SEM
Summer 2016	English II	Reading	35	35	18.09	6.87	2.62
		Writing	10	3	6.14	2.46	0.74
	Algebra I	Number and Quantity	3	3	1.09	0.92	0.77
		Algebra	27	21	9.08	4.66	2.35
		Functions	15	15	6.83	2.91	1.74
		Statistics and Probability	5	5	2.79	1.41	0.98
	Biology	Characteristics and Interactions of Living Organisms	22	22	10.28	4.25	2.14
		Changes in Ecosystems and Interactions of Organisms with their Environments	13	13	6.73	3.26	1.57
		Scientific Inquiry	20	13	7.50	4.96	2.02
	English I	Reading	35	35	18.83	5.62	2.59
		Writing	10	3	6.78	1.54	0.70
	Algebra II	Algebra	16	16	7.42	3.76	1.72
		Functions	24	24	13.58	4.03	2.24
	Geometry	Geometry	33	33	16.49	6.08	2.50
		Statistics and Probability	7	7	3.25	1.67	1.16
	Government	Principles and Processes of Governance Systems	20	20	13.35	4.27	1.85
		Principles of Constitutional Democracy	20	20	13.15	4.26	1.88
	Am. History	Missouri, United States, and World History	40	40	24.61	6.64	2.71
	Physical Science	Properties and Principles of Force and Motion	16	16	8.55	1.29	1.60
		Properties and Principles of Matter and Energy	29	29	15.09	3.75	2.27

Table 9.3. Descriptive Statistics for Total Raw Score by Cluster—Fall 2016

Test Period	Content Area	Cluster	#Pts. Possible	#Items	Mean	SD	SEM
Fall 2016	English II	Reading	35	35	20.30	6.94	2.53
		Writing	6	3	6.43	2.25	0.77
	Algebra I	Number and Quantity	3	3	1.02	0.92	0.76
		Algebra	27	21	9.73	5.43	2.43
		Functions	15	15	6.87	3.23	1.70
		Statistics and Probability	5	5	2.82	1.45	0.97
	Biology	Characteristics and Interactions of Living Organisms	22	22	12.57	4.71	2.07
		Changes in Ecosystems and Interactions of Organisms with their Environments	13	13	8.47	3.17	1.45
		Scientific Inquiry	20	13	10.21	5.01	2.20
	English I	Reading	35	35	21.21	5.89	2.48
		Writing	10	3	7.17	1.66	0.68
	Algebra II	Algebra	16	16	9.81	3.43	1.68
		Functions	24	24	14.72	4.99	2.09
	Geometry	Geometry	33	33	19.19	6.10	2.42
		Statistics and Probability	7	7	4.14	1.85	1.10
	Government	Principles and Processes of Governance Systems	20	20	13.49	4.07	1.86
		Principles of Constitutional Democracy	20	20	13.51	4.26	1.84
	Am. History	Missouri, United States, and World History	40	40	23.55	7.76	2.78

Table 9.4. Descriptive Statistics for Total Raw Score by Cluster—Spring 2017

Test Period	Content Area	Cluster	#Pts. Possible	#Items	Mean	SD	SEM
Spring 2017	English II	Reading	35	35	23.17	6.02	2.48
		Writing	10	3	7.65	1.33	0.57
	Algebra I	Number and Quantity	3	3	1.60	1.04	0.76
		Algebra	23	19	10.04	4.65	2.22
		Functions	19	16	10.45	3.98	2.09
		Statistics and Probability	5	5	3.14	1.24	0.97
	Biology	Characteristics and Interactions of Living Organisms	22	22	13.19	4.28	2.05
		Changes in Ecosystems and Interactions of Organisms with their Environments	13	13	10.04	2.70	1.33

Test Period	Content Area	Cluster	#Pts. Possible	#Items	Mean	SD	SEM
Spring 2017	Biology	Scientific Inquiry	20	10	12.56	4.24	2.23
	English I	Reading	35	35	20.74	5.75	2.51
		Writing	10	3	7.53	1.52	0.66
	Algebra II	Algebra	18	18	11.37	3.53	1.75
		Functions	22	22	13.63	4.41	2.00
	Geometry	Geometry	33	33	17.73	5.89	2.49
		Statistics and Probability	7	7	3.83	1.75	1.16
	Government	Principles and Processes of Governance Systems	20	20	12.54	4.05	1.86
		Principles of Constitutional Democracy	20	20	13.44	3.57	1.84
	Am. History	Missouri, United States, and World History	40	40	23.28	7.66	2.79
	Physical Science	Properties and Principles of Force and Motion	16	16	7.45	2.44	1.70
		Properties and Principles of Matter and Energy	29	29	12.96	4.67	2.44

9.2.3. Scale Scores

Table 9.5 summarizes the descriptive statistics of scale scores for each MO EOC Assessment by administration. The scale score range is 100 to 250 for every content area. Table 9.6 then summarizes the minimum scale score needed to obtain each level of achievement. As shown in the table, the cut scores for the achievement levels of Proficient and Advanced are 200 and 225, respectively, for each content area.

The mean scale score data in Table 9.5 may be reviewed in light of the Proficient cut score of 200. The results for the Summer administration show three of the nine content areas had mean scale scores of 200 or higher (i.e., Algebra I, Government, and American History). The results for Fall show that six content areas had mean scale scores of 200 or higher. English II, Biology, and American History had mean scores very close to 200. For Spring, seven content areas had mean scale scores of 200 or higher; American History and Physical Science had mean scale scores greater than 190. The results indicate that student performance is higher in the Spring and Fall administrations compared to the Summer where the test taking populations are much smaller than the other two administrations.

The number and percentage of students in each achievement level by content area from 2008–2009 to 2016–2017 are provided in Table E.2 as part of the executive summary.

Table 9.5. Descriptive Statistics of the Scale Scores

Test Period	Content Area	N-Count	Min.	Max.	Mean	SD
Summer 2016	English II	321	152	242	194.63	17.06

Test Period	Content Area	N-Count	Min.	Max.	Mean	SD
Summer 2016	Algebra I	828	153	250	201.05	17.54
	Biology	245	100	250	186.07	22.15
	English I	23	171	228	196.78	14.55
	Algebra II	19	170	237	199.00	20.24
	Geometry	59	148	250	197.75	19.40
	Government	760	128	250	205.03	22.19
	Am. History	69	146	250	203.51	22.92
	Physical Science	11	187	222	199.18	11.03
Fall 2016	English II	3,191	111	249	199.97	17.36
	Algebra I	4,428	100	250	202.01	21.03
	Biology	3,118	100	250	199.25	22.79
	English I	266	162	248	203.42	16.82
	Algebra II	836	100	250	209.85	24.38
	Geometry	1,007	100	250	207.54	20.73
	Government	13,304	100	250	206.47	21.89
	Am. History	580	132	250	199.74	26.22
Spring 2017	English II	61,594	105	250	206.69	16.15
	Algebra I	60,582	100	250	204.94	20.58
	Biology	61,957	100	250	206.47	19.42
	English I	12,870	137	250	203.07	15.85
	Algebra II	18,348	100	250	212.68	22.74
	Geometry	7,003	148	250	202.90	19.27
	Government	46,661	100	250	205.47	19.88
	Am. History	6,498	100	250	198.78	25.76
	Physical Science	2,940	100	250	190.75	17.49

Table 9.6. Scale Score Cuts

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

9.2.4. By Demographic Group

Descriptive statistics of scale scores and percentage distributions of students' achievement levels by demographic groups are summarized in Appendix E and Appendix F. 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.

9.3. Performance Level Results

The results of the Spring administration were reviewed with the TAC on July 27, 2017 during a conference call. Special attention was given to the English II and Algebra I results, both of which had a reduced percent of students in the Proficient + Advanced performance level classification. Specifically, the percent of English II students achieving the Proficient + Advanced level was 71.3 for Spring 2017 compared to 80.8 for Spring 2016 (a decline of 9.5%) and the percent of Algebra I students achieving the Proficient + Advanced level was 60.4 for Spring 2017 compared to 67.4 for Spring 2016 (a decline of 7.0%).

The TAC concluded that form effects were present for English II and Algebra I. Form H was administered in the Spring 2015 and 2017 and Form G was administered in the Spring 2016. The Spring 2017 results show a slight decline in students achieving the Proficient + Advanced level compared to the Spring 2015 results (a 3.2% decline for English II and a 2.4% decline for Algebra I).

Both content areas were included in a recalibration study conducted in 2016 and reviewed by the TAC. Refer to Section 7.3.2 for a description of the Biology Assessment recalibration study. Although the recalibration results produced reasonable cut scores for English II, the cut scores for Algebra I were not reasonable so no action was taken at that time. During the July meeting, the TAC generally favored lowering the Proficient cut scores by one raw score point so students and districts would not be disadvantaged by the form effect. Soon after the July TAC meeting, DESE asked Questar to compute impact results if the cut scores for all performance levels were lowered by one point.

9.3.1. English II

Table 9.7 shows the impact data for the original RSS table and the adjusted RSS table if the cut scores were lowered by one point for English II. The raw score range for each performance level, student counts, and percent of students at each performance level are provided for the original and adjusted results. The percent of students at the Proficient + Advanced level increased by almost four percent (71.3 to 75.2%) when the adjusted cut scores were applied.

Table 9.7. Performance Level Results for English II

Performance Level	Original RSS Results			Adjusted RSS Results		
	Raw Score	N-Count	Percent	Raw Score	N-Count	Percent
Below Basic	0–18	3,576	5.8	0–17	2,823	4.6
Basic	19–27	14,098	22.9	18–26	12,425	20.2
Proficient	28–37	34,148	55.4	27–36	32,962	53.5
Advanced	38–45	9,772	15.9	37–50	13,384	21.7

Performance Level	Original RSS Results			Adjusted RSS Results		
	Raw Score	N-Count	Percent	Raw Score	N-Count	Percent
Below Basic + Basic		17,674	28.7		15,248	24.8
Proficient + Advanced		43,920	71.3		46,346	75.2
Total		**61,594**	**100.0**		**61,594**	**100.0**

9.3.2. Algebra I

Table 9.8 shows the impact data for the original RSS table and the adjusted RSS table if the cut scores were lowered by one point for Algebra I. The percent of students at the Proficient + Advanced level increased by almost four percent (60.4 to 64.2%) when the adjusted cut scores were applied.

Table 9.8. Performance Level Results for Algebra I

Performance Level	Original RSS Results			Adjusted RSS Results		
	Raw Score	N-Count	Percent	Raw Score	N-Count	Percent
Below Basic	0–16	12,392	20.5	0–15	10,153	16.8
Basic	17–21	11,601	19.1	16–20	11,557	19.1
Proficient	22–34	25,069	41.4	21–33	25,822	42.6
Advanced	35–50	11,520	19.0	34–50	13,050	21.5
Below Basic + Basic		23,993	39.6		21,710	35.8
Proficient + Advanced		36,589	60.4		38,872	64.2
Total		**60,582**	**100.0**		**60,582**	**100.0**

9.3.3. Historic Impact Data

Tables 9.9 and 9.10 show longitudinal impact data from the Fall 2014 to the Spring 2017 administrations for English II and Algebra I, respectively. The last column of each table (SPR Adj Cuts) presents the results for lowering each performance level cut score by one raw score point. Spring Form H and Spring Form G are highlighted in different shades of grey to indicate the different form versions. The results for Spring 2017 using the adjusted cut scores were more consistent with the results observed for the Spring 2015 administration for both content areas.

Table 9.9. Percent of Students at Each Performance Level: English II

	2014–2015		2015–2016			2016–2017			
Performance Level	FALL Form G	SPR Form H	SUM Form G	FALL Form H	SPR Form G	SUM Form G	FALL Form G	SPR Form H	SPR Adj Cuts
Below Basic	14.1	5.0	21.2	22.6	3.2	20.2	16.0	5.8	4.6
Basic	30.1	20.5	38.6	29.7	16.0	36.4	28.0	22.9	20.2
Proficient	44.5	56.1	37.0	39.7	63.0	40.8	47.4	55.4	53.5
Advanced	11.3	18.4	3.3	8.0	17.8	2.5	8.6	15.9	21.7
Below Basic + Basic	44.2	25.5	59.8	52.3	19.2	56.7	44.0	28.7	24.8
Proficient + Advanced	55.8	74.5	40.3	47.7	80.8	43.3	56.0	71.3	75.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Table 9.10. Percent of Students at Each Performance Level: Algebra I

	2014–2015		2015–2016			2016–2017			
Performance Level	FALL Form G	SPR Form H	SUM Form G	FALL Form H	SPR Form G	SUM Form G	FALL Form G	SPR Form H	SPR Adj Cuts
Below Basic	23.6	18.1	21.4	35.8	13.0	20.2	24	20.5	16.8
Basic	24.5	19.0	23.5	20.2	19.6	27.1	25	19.1	19.1
Proficient	39.0	43.7	44.5	30.7	48.7	41.7	35	41.4	42.6
Advanced	12.9	19.1	10.6	13.4	18.7	11.1	16	19.0	21.5
Below Basic + Basic	48.1	37.1	44.9	56.0	32.6	47.2	48.4	39.6	35.8
Proficient + Advanced	51.9	62.8	55.1	44.1	67.4	52.8	51.6	60.4	64.2
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

9.3.4. Accountability

The results of these analyses were discussed during the August 17-18 TAC meeting. The TAC considered whether the 2016-2017 results for Algebra I and English II were valid for use in the state accountability program. The TAC considered several possible courses of action. In the end, the consensus TAC recommendation was for DESE to exclude the results for English II and Algebra I in the accountability program for 2016-2017. Following the TAC's recommendation, DESE will not use the results for English II and Algebra I for accountability purposes for the 2016-17 school year.

Chapter 10: Reliability

10.1. Introduction

DESE is required to ensure that the instruments used to measure student achievement for school accountability provide reliable results. As Standard 2.0 of the *Standards for Educational and Psychological Testing* states "Appropriate evidence of reliability/precision should be provided for the interpretation for each intended score use" (p. 42). This chapter provides evidence that scores from the MO EOC Assessments measure student achievement in a reliable manner[11] and that the size of the measurement error associated with reported test scores is reasonable[12], especially at the Proficient cut score.

10.2. Reliability

10.2.1. Defining Reliability

According to the *Standards for Educational and Psychological Testing* and consistent with the measurement literature, reliability is defined two different ways:

> First, the term has been used to refer to the reliability coefficients of classical test theory, defined as the correlation between scores on two equivalent forms of the test, presuming that taking one form has no effect on performance on the second form. Second, the term has been used in a more general sense, to refer to the consistency of scores across replications of a testing procedure, regardless of how this consistency is estimated or reported. (p. 33)

In general, reliability refers to the consistency of student test scores, or the extent to which an assessment yields the same results repeatedly. Reliability considers random error, which results from outside influences that can affect a student's score. An assessment that produces highly consistent, stable results (i.e., mostly free from random error) is considered highly reliable. The less random error, the more reliable the test scores are. The more reliable the assessment scores are, the more consistent a student's test scores will be if the student takes a replicated version of the test (i.e., a test that has different items but that covers the same topics using the same number of items per topic.) 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).

10.2.2. Reliability Coefficient

Classical test theory (CTT) provides a means for quantifying reliability. In CTT, an observed measurement, such as test score (X) is defined as a composite of true score (T) and an associated random error component (E):

$$X = T + E.$$

[11] **Standard 2.3:** For each total score, subscore, or combination of scores that is to be interpreted, estimates of relevant indices of reliability/precision should be reported (p. 43).

[12] **Standard 2.13:** The standard error of measurement, both overall and conditional (if reported), should be provided in units of each reported score (p. 45).

The definitions and assumptions in CTT lead to several important properties. For example, it can be demonstrated that observed score variance equals the sum of (1) the variance in true scores—true individual differences in the attribute being measured, and (2) the variance from random fluctuations due to the imperfections in the measurement process (error variance).

$$\sigma_x^2 = \sigma_t^2 + \sigma_e^2$$

Normally a covariance term is required when adding variances, but it is not in this case as true scores and errors are assumed to be uncorrelated in CTT. The reliability coefficient expresses the consistency of test scores as the ratio of true-score variance to total observed-score variance.

$$\rho_{x_1 x_2} = \frac{\sigma_t^2}{\sigma_x^2}$$

Reliability coefficients theoretically range from 0.0 to 1.0, although the extremes are never achieved in applied testing programs. Larger coefficients are more desirable because they indicate that test scores are less influenced by random error. If all test score variance were true, the scores would be perfectly consistent and the index would equal 1.0. The index would be 0.0 if none of the test score variance were true. Such scores would be pure random noise (i.e., all measurement error).

10.2.3. Estimating Reliability

The reliability of a specific test cannot be directly estimated from the equation above. Although several different reliability indices exist, an industry-standard index for describing internal consistency reliability based on a single test administration is coefficient alpha (Cronbach, 1951), which provides an estimate of reliability that is mathematically equivalent to the average of all possible split-half reliability estimates computed by the Rulon method. 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 computed as follows:

$$\alpha = \left(\frac{p}{1-p}\right)\left(1 - \frac{\sum_{j=1}^{p} \sigma_{Y_j}^2}{\sigma_X^2}\right)$$

10.2.4. Interpretation Considerations

Coefficient alpha indicates the internal consistency of the responses over a set of items measuring an underlying trait, in this case, academic achievement in the MO EOC content tests. As an internal consistency index, it can be conceptualized as indicating the extent to which an exchangeable set of items from the same domain would result in a similar rank ordering of students.

Relative error is reflected by coefficient alpha. Further, coefficient alpha is only sensitive to random errors due to the sampling of items. It does not take into account other random sources of error (e.g., variations associated with the linking process; daily fluctuation in student health and behavior, the testing environment; rater inconsistency).

10.3. Reliability Evidence

Reliability evidence for the 2016–2017 MO EOC Assessments includes the following:

- Internal consistency
- Standard error of measurement (SEM) for raw scores
- Conditional standard error of measurement (CSEM) for Scale Scores
- Classification accuracy and consistency
- Rater agreement (presented in Section 6.6)

10.3.1. Standard Error of Measurement (SEM) for Raw Scores

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 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.

10.3.1.1. Traditional SEMs and Traditional Confidence Intervals (CIs)

The SEM is defined as the standard deviation of the distribution of observed scores for students with identical true scores. The standard deviation is a measure of the dispersion of the observed scores; for the normal distribution, about 32 percent of observations are more than one standard deviation above or below the mean.

The SEM formula:

$$SEM = \sigma_X\sqrt{1-\alpha}$$

indicates that the value of the SEM depends on both the reliability coefficient and the standard deviation of test scores.

SEMs allow statements regarding the overall precision of test scores. SEMs help place "reasonable limits" (Gulliksen, 1950) around observed scores through construction of an approximate score band or confidence intervals (CIs). These bands are constructed by taking the observed scores, *X*, and adding and subtracting a multiplicative factor of the SEM. As an example, students with a given true score will have observed scores that fall between +/-1 SEM about two-thirds of the time.

10.3.1.2. Reliabilities and SEMs by Student Subgroup

Separate analyses were performed for each EOC content area. Tables 10.1 – 10.25 provide the reliabilities and SEMs for the total population and for select student subgroups. For each table, the effect size, reliability, and SEM are reported for each group provided there were at least 50 students in the group.

In large-scale state summative assessments, reliabilities from the mid 0.80s to the low 0.90s are common. The reliabilities for all students were within the range of 0.85 to 0.91 for the tests across the three administrations, with three exceptions. The reliabilities for American History for

the Summer administration, and English I and Physical Science for the Spring 2017 administration were 0.83, 0.84 and 0.78, respectively. The majority of SEMs were lower than 3.0, with only the Algebra I and Biology assessments having SEMs greater than 3.0. The SEMs range from a low of 2.62 for the Fall and Spring Government tests and for the Spring English II test to a high of 3.43 for the Summer and Fall Biology tests. These results indicate acceptable reliability and measurement precision for the MO EOC tests.

An effect size is reported within each group, provided minimal sample size requirements are met. The 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 calculated using Cohen's *d* equation:

$$d = \frac{\bar{X}_F - \bar{X}_R}{\hat{\sigma}_X},$$

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 1.0 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 sizes are also 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.

Table 10.1. Alpha Coefficients and SEMs—English II, Summer 2016

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	321	24.06	8.82	--	0.88	2.99
Gender						
Female	135	24.70	9.21	0.13	0.90	2.95
Male	186	23.60	8.51	--	0.87	3.02
Ethnicity						
American Indian/Alaskan Native	3	28.33	9.45	--	--	--
Asian	3	34.67	7.02	--	--	--
Pacific Islander	1	10.00	--	--	--	--
Black (not Hispanic)	141	22.20	8.80	-0.39	0.88	3.03
Hispanic	17	25.24	6.32	--	--	--
White (not Hispanic)	150	25.56	8.71	--	0.88	2.96
Multi-racial	6	22.00	8.29	--	--	--
LEP						
No	306	24.23	8.80	--	0.88	2.99
Yes	5	28.00	5.79	--	--	--

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
IEP						
No	287	24.25	9.00	--	0.89	3.00
Yes	24	24.75	5.24	--	0.71	2.82
Migrant						
No	311	24.29	8.76	--	0.88	2.99
Yes	--	--	--	--	--	--
FRL						
No	113	27.22	6.30	--	0.80	2.84
Yes	198	22.61	9.51	-0.54	0.90	3.05
Title I						
No	290	24.11	8.73	--	0.88	2.99
Yes	21	26.71	9.02	--	--	--
Accommodations						
No	312	24.07	8.92	--	0.89	2.99
Yes	9	23.67	3.94	--	--	--

Table 10.2. Alpha Coefficients and SEMs—Algebra I, Summer 2016

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	828	19.79	8.28	--	0.85	3.20
Gender						
Female	410	20.31	8.39	0.13	0.85	3.21
Male	418	19.28	8.14	--	0.85	3.18
Ethnicity						
American Indian/Alaskan Native	2	24.00	5.66	--	--	--
Asian	9	26.89	9.97	--	--	--
Pacific Islander	3	17.00	5.57	--	--	--
Black (not Hispanic)	244	15.58	6.43	-0.80	0.78	3.05
Hispanic	34	17.29	4.83	--	--	--
White (not Hispanic)	521	21.86	8.44	--	0.85	3.23
Multi-racial	15	17.73	6.51	--	--	--
LEP						
No	800	19.95	8.32	--	0.85	3.20
Yes	15	15.53	4.52	--	--	--
IEP						
No	742	20.16	8.35	--	0.85	3.21
Yes	73	16.88	6.90	-0.40	0.80	3.09
Migrant						
No	815	19.87	8.28	--	0.85	3.20
Yes	--	--	--	--	--	--
FRL						
No	408	22.49	8.09	--	0.84	3.22

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
Yes	407	17.24	7.62	-0.67	0.83	3.14
Title I						
No	702	19.50	8.12	--	0.85	3.19
Yes	113	22.16	8.90	0.32	0.87	3.20
Accommodations						
No	806	19.91	8.30	--	0.85	3.20
Yes	22	15.36	6.12	--	--	--

Table 10.3. Alpha Coefficients and SEMs—Biology, Summer 2016

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	245	24.38	11.30	--	0.91	3.43
Gender						
Female	109	24.14	12.03	-0.04	0.92	3.46
Male	136	24.57	10.73	--	0.90	3.40
Ethnicity						
American Indian/Alaskan Native	1	42.00	--	--	--	--
Asian	2	31.50	7.78	--	--	--
Pacific Islander	2	19.50	6.36	--	--	--
Black (not Hispanic)	108	21.46	10.91	-0.45	0.90	3.43
Hispanic	12	26.75	10.20	--	--	--
White (not Hispanic)	118	26.46	11.34	--	--	3.40
Multi-racial	2	34.00	4.24	--	--	--
LEP						
No	235	24.74	11.31	--	0.91	3.44
Yes	2	12.00	4.24	--	--	--
IEP						
No	212	24.56	11.51	--	0.91	3.43
Yes	25	25.32	9.85	--	0.87	3.50
Migrant						
No	237	24.64	11.33	--	0.91	3.44
Yes	--	--	--	--	--	--
FRL						
No	104	29.65	9.97	--	0.88	3.48
Yes	133	20.71	10.80	-0.86	0.90	3.37
Title I						
No	209	23.60	11.31	--	0.91	3.43
Yes	28	32.36	8.17	--	--	--
Accommodations						
No	241	24.39	11.35	--	0.91	3.44
Yes	4	24.00	9.45	--	--	--

Table 10.4. Alpha Coefficients and SEMs—English I, Summer 2016

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	23	25.61	6.38	--	--	--
Gender						
Female	12	27.58	6.30	--	--	--
Male	11	23.45	6.01	--	--	--
Ethnicity						
American Indian/Alaskan Native	--	--	--	--	--	--
Asian	2	22.50	10.61	--	--	--
Pacific Islander	--	--	--	--	--	--
Black (not Hispanic)	12	25.83	6.59	--	--	--
Hispanic	3	23.00	4.36	--	--	--
White (not Hispanic)	6	27.50	6.41	--	--	--
Multi-racial	--	--	--	--	--	--
LEP						
No	20	26.30	6.22	--	--	--
Yes	3	21.00	6.56	--	--	--
IEP						
No	21	26.05	6.52	--	0.83	2.72
Yes	2	21.00	0.00	--	--	--
Migrant						
No	23	25.61	6.38	--	--	--
Yes	--	--	--	--	--	--
FRL						
No	6	24.83	5.78	--	--	--
Yes	17	25.88	6.73	--	--	--
Title I						
No	11	27.27	7.11	--	--	--
Yes	12	24.08	5.48	--	--	--
Accommodations						
No	23	25.61	6.38	--	--	--
Yes	--	--	--	--	--	--

Table 10.5. Alpha Coefficients and SEMs—Algebra II, Summer 2016

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	19	21.00	6.94	--	--	--
Gender						
Female	10	18.50	6.40	--	--	--
Male	9	23.78	6.76	--	--	--
Ethnicity						
American Indian/Alaskan Native	--	--	--	--	--	--
Asian	1	11.00	--	--	--	--
Pacific Islander	--	--	--	--	--	--
Black (not Hispanic)	3	19.00	7.21	--	--	--
Hispanic	1	11.00	--	--	--	--
White (not Hispanic)	14	22.86	6.21	--	--	--
Multi-racial	--	--	--	--	--	--
LEP						
No	18	21.50	6.78	--	--	--
Yes	--	--	--	--	--	--
IEP						
No	18	21.50	6.78	--	--	--
Yes	--	--	--	--	--	--
Migrant						
No	18	21.50	6.78	--	--	--
Yes	--	--	--	--	--	--
FRL						
No	7	22.29	7.97	--	--	--
Yes	11	21.00	6.26	--	--	--
Title I						
No	9	17.78	6.08	--	--	--
Yes	9	25.22	5.43	--	--	--
Accommodations						
No	19	21.00	6.94	--	--	--
Yes	--	--	--	--	--	--

Table 10.6. Alpha Coefficients and SEMs—Geometry, Summer 2016

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	59	19.75	7.35	--	0.86	2.75
Gender						
Female	26	19.81	6.82	--	--	--
Male	33	19.70	7.84	--	--	--
Ethnicity						
American Indian/Alaskan Native	--	--	--	--	--	--
Asian	1	39.00	--	--	--	--
Pacific Islander	--	--	--	--	--	--
Black (not Hispanic)	17	17.35	5.05	--	--	--
Hispanic	16	20.38	8.08	--	--	--
White (not Hispanic)	25	20.20	7.26	--	--	--
Multi-racial	--	--	--	--	--	--
LEP						
No	55	19.53	7.46	--	0.86	2.74
Yes	4	22.75	5.38	--	--	--
IEP						
No	58	19.67	7.39	--	0.86	2.75
Yes	1	24.00	--	--	--	--
Migrant						
No	59	19.75	7.35	--	0.86	2.75
Yes	--	--	--	--	--	--
FRL						
No	20	19.10	6.36	--	--	--
Yes	39	20.08	7.87	--	--	--
Title I						
No	33	18.33	7.47	--	--	--
Yes	26	21.54	6.93	--	--	--
Accommodations						
No	59	19.75	7.35	--	0.86	2.75
Yes	--	--	--	--	--	--

Table 10.7. Alpha Coefficients and SEMs—Government, Summer 2016

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	760	26.50	8.12	--	0.89	2.64
Gender						
Female	441	26.26	7.87	-0.07	0.89	2.66
Male	319	26.83	8.44	--	0.91	2.59
Ethnicity						
American Indian/Alaskan Native	3	26.67	10.12	--	--	--
Asian	29	30.10	7.58	--	--	--
Pacific Islander	3	26.33	5.77	--	--	--
Black (not Hispanic)	126	20.40	8.22	-0.95	0.88	2.86
Hispanic	48	26.25	6.86	--	--	--
White (not Hispanic)	540	27.71	7.59	--	0.88	2.58
Multi-racial	11	28.36	7.07	--	--	--
LEP						
No	731	26.77	8.04	--	0.89	2.62
Yes	16	19.56	6.94	--	--	--
IEP						
No	713	26.93	8.01	--	0.89	2.61
Yes	34	20.03	6.64	--	--	--
Migrant						
No	747	26.62	8.08	--	0.89	2.63
Yes	--	--	--	--	--	--
FRL						
No	440	29.05	6.86	--	0.86	2.52
Yes	307	23.13	8.43	-0.79	0.89	2.78
Title I						
No	699	26.72	8.22	--	0.90	2.62
Yes	48	25.13	5.56	--	--	--
Accommodations						
No	755	26.54	8.12	--	0.89	2.63
Yes	5	21.00	4.85	--	--	--

Table 10.8. Alpha Coefficients and SEMs—American History, Summer 2016

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	69	24.61	6.64	--	0.83	2.71
Gender						
Female	44	24.07	6.30	--	--	--
Male	25	25.56	7.22	--	--	--
Ethnicity						
American Indian/Alaskan Native	--	--	--	--	--	--
Asian	1	32.00	--	--	--	--
Pacific Islander	--	--	--	--	--	--
Black (not Hispanic)	11	24.73	6.07	--	--	--
Hispanic	2	25.00	5.66	--	--	--
White (not Hispanic)	55	24.44	6.86	--	0.84	2.71
Multi-racial	--	--	--	--	--	--
LEP						
No	69	24.61	6.64	--	0.83	2.71
Yes	--	--	--	--	--	--
IEP						
No	67	25.03	6.24	--	0.81	2.70
Yes	2	10.50	3.54	--	--	--
Migrant						
No	69	24.61	6.64	--	0.83	2.71
Yes	--	--	--	--	--	--
FRL						
No	44	24.98	6.44	--	--	--
Yes	25	23.96	7.06	--	--	--
Title I						
No	69	24.61	6.64	--	0.83	2.71
Yes	--	--	--	--	--	--
Accommodations						
No	69	24.61	6.64	--	0.83	2.71
Yes	--	--	--	--	--	--

Table 10.9. Alpha Coefficients and SEMs—Physical Science, Summer 2016

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	11	23.64	4.15	--	--	--
Gender						
Female	4	25.00	5.48	--	--	--
Male	7	22.86	3.44	--	--	--
Ethnicity						
American Indian/Alaskan Native	--	--	--	--	--	--
Asian	--	--	--	--	--	--
Pacific Islander	--	--	--	--	--	--
Black (not Hispanic)	10	23.90	4.28	--	--	--
Hispanic	1	21.00	--	--	--	--
White (not Hispanic)	--	--	--	--	--	--
Multi-racial	--	--	--	--	--	--
LEP						
No	11	23.64	4.15	--	--	--
Yes	--	--	--	--	--	--
IEP						
No	11	23.64	4.15	--	--	--
Yes	--	--	--	--	--	--
Migrant						
No	11	23.64	4.15	--	--	--
Yes	1	15.00	--	--	--	--
FRL						
No	3	24.67	4.04	--	--	--
Yes	8	23.25	4.40	--	--	--
Title I						
No	1	21.00	--	--	--	--
Yes	10	23.90	4.28	--	--	--
Accommodations						
No	11	23.64	4.15	--	--	--
Yes	--	--	--	--	--	--

Table 10.10. Alpha Coefficients and SEMs—English II, Fall 2016

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	3,191	26.61	8.66	--	0.89	2.83
Gender						
Female	1,465	28.41	8.08	0.39	0.88	2.76
Male	1,726	25.08	8.83	--	0.89	2.88
Ethnicity						
American Indian/Alaskan Native	12	26.50	8.53	--	--	--
Asian	43	30.56	8.57	--	--	--
Pacific Islander	7	23.29	7.83	--	--	--
Black (not Hispanic)	1,282	24.97	8.27	-0.33	0.88	2.88
Hispanic	268	27.15	7.99	-0.07	0.88	2.80
White (not Hispanic)	1,481	27.76	8.84	--	0.90	2.81
Multi-racial	98	27.59	9.20	-0.02	0.91	2.78
LEP						
No	3,058	26.79	8.67	--	0.89	2.83
Yes	129	22.43	7.28	-0.51	0.84	2.94
IEP						
No	2,794	27.59	8.37	--	0.89	2.80
Yes	393	19.70	7.47	-0.95	0.84	2.97
Migrant						
No	3,183	26.61	8.66	--	0.89	2.83
Yes	4	28.50	4.43	--	--	--
FRL						
No	981	29.17	8.48	--	0.90	2.73
Yes	2,206	25.48	8.50	-0.44	0.89	2.88
Title I						
No	2,677	26.59	8.72	--	0.89	2.84
Yes	510	26.76	8.32	0.02	0.89	2.79
Accommodations						
No	3,022	26.92	8.60	--	0.89	2.82
Yes	169	21.07	7.78	-0.68	0.85	2.98

Table 10.11. Alpha Coefficients and SEMs—Algebra I, Fall 2016

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	4,428	20.44	9.67	--	0.89	3.22
Gender						
Female	2,052	20.42	9.26	0.00	0.88	3.24
Male	2,376	20.45	10.02	--	0.90	3.21
Ethnicity						
American Indian/Alaskan Native	10	20.70	9.83	--	--	--
Asian	86	30.60	12.16	3.07	0.89	0.94
Pacific Islander	5	15.20	5.93	--	--	--
Black (not Hispanic)	881	14.84	6.97	-0.79	0.81	3.03
Hispanic	327	17.91	8.15	-0.44	0.85	3.18
White (not Hispanic)	3,029	22.04	9.60	--	0.89	3.25
Multi-racial	90	21.07	10.94	-0.10	0.91	3.24
LEP						
No	4,232	20.68	9.71	--	0.89	3.23
Yes	149	15.77	7.77	-0.51	0.85	3.04
IEP						
No	3,964	21.26	9.66	--	0.89	3.23
Yes	417	13.42	6.61	-0.83	0.80	2.96
Migrant						
No	4,380	20.52	9.69	--	0.89	3.22
Yes	1	15.00	--	--	--	--
FRL						
No	2,294	24.02	10.00	--	0.89	3.25
Yes	2,087	16.67	7.67	-0.82	0.83	3.14
Title I						
No	3,795	20.87	9.87	--	0.89	3.23
Yes	586	18.24	8.02	-0.27	0.84	3.17
Accommodations						
No	4,275	20.66	9.69	--	0.89	3.23
Yes	153	14.09	6.51	-0.68	0.79	2.98

Table 10.12. Alpha Coefficients and SEMs—Biology, Fall 2016

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	3,118	31.16	11.78	--	0.91	3.43
Gender						
Female	1,442	31.89	11.55	0.11	0.91	3.43
Male	1,676	30.54	11.93	--	0.92	3.42
Ethnicity						
American Indian/Alaskan Native	12	23.25	8.38	--	--	--
Asian	82	39.67	11.02	3.11	0.54	0.92
Pacific Islander	5	29.20	5.50	--	--	--
Black (not Hispanic)	657	23.81	10.29	-0.90	0.88	3.50
Hispanic	246	28.29	10.89	-0.49	0.90	3.44
White (not Hispanic)	2,037	33.68	11.15	--	0.91	3.38
Multi-racial	79	28.81	12.58	-0.44	0.93	3.30
LEP						
No	3,027	31.50	11.69	--	0.91	3.43
Yes	90	20.06	8.74	-0.99	0.85	3.33
IEP						
No	2,811	32.02	11.56	--	0.91	3.43
Yes	306	23.30	10.76	-0.76	0.90	3.42
Migrant						
No	3,117	31.17	11.77	--	0.91	3.43
Yes	--	--	--	--	--	--
FRL						
No	1,531	36.33	10.80	--	0.91	3.30
Yes	1,586	26.18	10.45	-0.96	0.89	3.49
Title I						
No	2,609	31.82	11.88	--	0.92	3.42
Yes	508	27.82	10.58	-0.34	0.89	3.49
Accommodations						
No	2,947	31.58	11.70	--	0.91	3.43
Yes	171	23.90	10.68	-0.66	0.90	3.42

Table 10.13. Alpha Coefficients and SEMs—English I, Fall 2016

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	266	28.33	7.04	--	0.86	2.65
Gender						
Female	130	28.68	6.96	0.10	0.86	2.60
Male	136	27.99	7.13	--	0.86	2.67
Ethnicity						
American Indian/Alaskan Native	3	28.67	7.23	--	--	--
Asian	6	28.83	8.98	--	--	--
Pacific Islander	3	20.67	5.03	--	--	--
Black (not Hispanic)	22	22.18	7.57	--	--	--
Hispanic	7	26.43	7.25	--	--	--
White (not Hispanic)	217	29.16	6.64	--	0.85	2.60
Multi-racial	8	26.63	6.80	--	--	--
LEP						
No	263	28.43	6.99	--	0.86	2.64
Yes	3	19.00	6.08	--	--	--
IEP						
No	246	28.92	6.62	--	0.84	2.61
Yes	20	21.05	8.17	--	--	--
Migrant						
No	266	28.33	7.04	--	0.86	2.65
Yes	--	--	--	--	--	--
FRL						
No	159	30.45	6.13	--	0.83	2.56
Yes	107	25.17	7.15	-0.81	0.85	2.75
Title I						
No	250	28.34	7.09	--	0.86	2.64
Yes	16	28.06	6.43	--	--	--
Accommodations						
No	237	28.94	6.75	--	0.85	2.61
Yes	29	23.31	7.52	--	--	--

Table 10.14. Alpha Coefficients and SEMs—Algebra II, Fall 2016

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	836	24.52	7.92	--	0.88	2.69
Gender						
Female	446	24.11	7.63	-0.11	0.87	2.72
Male	390	24.99	8.23	--	0.90	2.65
Ethnicity						
American Indian/Alaskan Native	1	22.00	--	--	--	--
Asian	40	29.90	8.02	--	--	--
Pacific Islander	2	24.00	1.41	--	--	--
Black (not Hispanic)	93	22.25	7.43	-0.30	0.86	2.77
Hispanic	54	23.63	8.13	-0.12	0.89	2.71
White (not Hispanic)	621	24.57	7.88	--	0.88	2.69
Multi-racial	25	25.08	6.89	--	--	--
LEP						
No	828	24.55	7.95	--	0.89	2.68
Yes	8	21.75	3.37	--	--	--
IEP						
No	823	24.51	7.92	--	0.89	2.68
Yes	13	25.08	8.04	--	--	--
Migrant						
No	836	24.52	7.92	--	0.88	2.69
Yes	--	--	--	--	--	--
FRL						
No	584	25.62	7.56	--	0.88	2.66
Yes	252	21.98	8.17	-0.47	0.89	2.74
Title I						
No	777	24.44	7.97	--	0.89	2.69
Yes	59	25.53	7.28	0.14	0.87	2.65
Accommodations						
No	237	28.94	6.75	--	0.85	2.61
Yes	29	23.31	7.52	--	--	--

Table 10.15. Alpha Coefficients and SEMs—Geometry, Fall 2016

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	1,007	23.33	7.56	--	0.88	2.66
Gender						
Female	543	22.64	7.64	-0.20	0.88	2.67
Male	464	24.13	7.40	--	0.87	2.64
Ethnicity						
American Indian/Alaskan Native	1	23.00	--	--	--	--
Asian	46	27.89	6.51	--	--	--
Pacific Islander	9	16.00	8.29	--	--	--
Black (not Hispanic)	117	17.74	6.23	-0.91	0.79	2.82
Hispanic	68	21.91	7.50	-0.32	0.88	2.65
White (not Hispanic)	721	24.26	7.28	--	0.87	2.63
Multi-racial	45	21.76	7.70	--	--	--
LEP						
No	973	23.56	7.48	--	0.87	2.65
Yes	34	16.62	6.80	--	--	--
IEP						
No	949	23.74	7.38	--	0.87	2.65
Yes	58	16.52	7.24	-0.98	0.85	2.78
Migrant						
No	1,007	23.32	7.56	--	0.88	2.66
Yes	--	--	--	--	--	--
FRL						
No	730	24.87	7.28	--	0.87	2.61
Yes	277	19.26	6.73	-0.79	0.83	2.77
Title I						
No	1,007	23.32	7.56	--	0.88	2.66
Yes	1	18.00	--	--	--	--
Accommodations						
No	928	23.96	7.28	--	0.87	2.64
Yes	79	15.85	6.79	-1.12	0.83	2.79

Table 10.16. Alpha Coefficients and SEMs—Government, Fall 2016

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	13,304	26.99	7.92	--	0.89	2.62
Gender						
Female	6,622	26.66	7.70	-0.08	0.88	2.65
Male	6,682	27.32	8.13	--	0.90	2.59
Ethnicity						
American Indian/Alaskan Native	70	26.00	8.11	-0.27	0.89	2.67
Asian	363	31.07	7.33	0.39	0.90	2.31
Pacific Islander	39	22.59	8.56	--	--	--
Black (not Hispanic)	2,491	22.99	7.53	-0.66	0.86	2.83
Hispanic	653	25.28	7.80	-0.36	0.88	2.72
White (not Hispanic)	9,370	28.05	7.64	--	0.89	2.56
Multi-racial	318	26.71	8.19	-0.18	0.90	2.64
LEP						
No	13,058	27.13	7.87	--	0.89	2.61
Yes	232	19.83	7.43	-0.93	0.85	2.90
IEP						
No	12,074	27.53	7.73	--	0.89	2.59
Yes	1,216	21.67	7.80	-0.76	0.87	2.86
Migrant						
No	13,290	27.00	7.92	--	0.89	2.62
Yes	--	--	--	--	--	--
FRL						
No	7,785	29.33	7.13	--	0.88	2.48
Yes	5,505	23.70	7.82	-0.76	0.87	2.79
Title I						
No	12,276	27.27	7.88	--	0.89	2.60
Yes	1,014	23.65	7.69	-0.46	0.87	2.80
Accommodations						
No	12,648	27.30	7.82	--	0.89	2.60
Yes	656	21.04	7.61	-0.80	0.86	2.88

Table 10.17. Alpha Coefficients and SEMs—American History, Fall 2016

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	580	23.55	7.76	--	0.87	2.78
Gender						
Female	274	22.59	7.60	-0.24	0.86	2.81
Male	306	24.41	7.81	--	0.88	2.74
Ethnicity						
American Indian/Alaskan Native	--	--	--	--	--	--
Asian	10	21.90	9.41	--	--	--
Pacific Islander	1	34.00		--	--	--
Black (not Hispanic)	53	21.23	7.31	-0.37	0.85	2.85
Hispanic	31	22.06	7.32	--	--	--
White (not Hispanic)	463	24.03	7.72		0.87	2.77
Multi-racial	22	21.50	8.42	--	--	--
LEP						
No	571	23.68	7.72	--	0.87	2.78
Yes	9	15.67	6.76	--	--	--
IEP						
No	518	24.18	7.58	--	0.87	2.77
Yes	62	18.34	7.38	-0.77	0.85	2.90
Migrant						
No	580	23.55	7.76	--	0.87	2.78
Yes	--	--	--	--	--	--
FRL						
No	394	24.67	7.70	--	0.87	2.75
Yes	186	21.19	7.38	-0.46	0.85	2.86
Title I						
No	580	23.55	7.76	--	0.87	2.78
Yes	--	--	--	--	--	--
Accommodations						
No	525	24.08	7.58	--	0.87	2.77
Yes	55	18.56	7.79	-0.73	0.86	2.89

Table 10.18. Alpha Coefficients and SEMs—English II, Spring 2017

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	61,594	30.77	6.85	--	0.85	2.62
Gender						
Female	30,885	31.64	6.31	0.26	0.86	2.57
Male	30,709	29.90	7.25	--	0.87	2.68
Ethnicity						
American Indian/Alaskan Native	259	30.19	6.39	-0.20	0.83	6.39
Asian	1,263	32.73	7.41	0.19	0.89	7.41
Pacific Islander	151	28.87	6.89	-0.40	0.84	6.89
Black (not Hispanic)	8,756	27.24	7.15	-0.64	0.84	7.15
Hispanic	3,246	29.25	7.01	-0.34	0.85	7.01
White (not Hispanic)	46,384	31.51	6.53	--	0.84	6.53
Multi-racial	1,535	30.71	6.77	-0.12	0.85	6.77
LEP						
No	60,230	30.93	6.77	--	0.85	2.62
Yes	1,323	23.93	6.92	-1.03	0.82	2.92
IEP						
No	55,536	31.58	6.30	--	0.83	2.58
Yes	6,017	23.32	7.16	-1.29	0.83	2.96
Migrant						
No	61,534	30.78	6.84	--	0.85	2.62
Yes	19	21.42	7.04	--	--	--
FRL						
No	34,928	32.66	6.08	--	0.83	2.50
Yes	26,625	28.31	7.00	-0.67	0.84	2.76
Title I						
No	56,678	31.04	6.74	--	0.85	2.61
Yes	4,875	27.75	7.32	-0.48	0.86	2.78
Accommodations						
No	57,759	31.28	6.53	--	0.84	2.60
Yes	3,835	23.13	6.97	-1.24	0.82	2.94

Table 10.19. Alpha Coefficients and SEMs—Algebra I, Spring 2017

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	60,582	25.23	9.44	--	0.88	3.30
Gender						
Female	29,993	25.53	9.12	0.06	0.87	3.29
Male	30,589	24.93	9.74	--	0.89	3.30
Ethnicity						
American Indian/Alaskan Native	261	24.05	8.33	-0.23	0.85	3.27
Asian	1,325	32.47	9.93	0.67	0.90	3.20
Pacific Islander	136	22.24	8.72	-0.42	0.86	3.24
Black (not Hispanic)	9,613	20.44	7.96	-0.63	0.84	3.21
Hispanic	3,462	23.94	8.82	-0.24	0.86	3.30
White (not Hispanic)	44,176	26.16	9.38	--	0.88	3.30
Multi-racial	1,609	25.47	9.41	-0.07	0.88	3.27
LEP						
No	58,833	25.35	9.45	--	0.88	3.30
Yes	1,639	21.39	8.13	-0.42	0.84	3.21
IEP						
No	54,464	26.11	9.22	--	0.87	3.30
Yes	6,009	17.35	7.55	-0.97	0.83	3.14
Migrant						
No	60,462	25.24	9.44	--	0.88	3.30
Yes	10	20.30	6.20	--	--	--
FRL						
No	32,201	28.10	9.37	--	0.88	3.29
Yes	28,272	21.98	8.40	-0.69	0.85	3.26
Title I						
No	53,912	25.63	9.46	--	0.88	3.30
Yes	6,561	22.04	8.58	-0.38	0.86	3.26
Accommodations						
No	57,126	25.72	9.35	--	0.88	3.30
Yes	3,456	17.10	6.94	-0.93	0.80	3.13

Table 10.20. Alpha Coefficients and SEMs—Biology, Spring 2017

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	61,957	35.76	9.92	--	0.88	3.39
Gender						
Female	30,745	36.18	9.61	0.09	0.88	3.37
Male	31,212	35.34	10.19	--	0.89	3.39
Ethnicity						
American Indian/Alaskan Native	283	34.42	9.39	-0.29	0.87	3.41
Asian	1,240	39.94	10.13	0.31	0.90	3.15
Pacific Islander	146	31.05	9.92	-0.65	0.87	3.57
Black (not Hispanic)	8,537	29.16	10.02	-0.84	0.87	3.58
Hispanic	3,484	32.92	9.97	-0.44	0.88	3.50
White (not Hispanic)	46,705	37.08	9.33	--	0.87	3.33
Multi-racial	1,562	36.00	9.76	-0.12	0.88	3.39
LEP						
No	60,464	35.99	9.81	--	0.88	3.38
Yes	1,469	26.46	9.77	-0.97	0.87	3.59
IEP						
No	55,641	36.94	9.20	--	0.87	3.34
Yes	6,292	25.39	9.92	-1.24	0.87	3.52
Migrant						
No	61,919	35.77	9.91	--	0.88	3.39
Yes	14	25.29	8.53	--	--	--
FRL						
No	34,996	38.75	8.69	--	0.86	3.24
Yes	26,937	31.88	10.06	-0.74	0.88	3.52
Title I						
No	56,866	36.29	9.71	--	0.88	3.37
Yes	5,067	29.82	10.21	-0.66	0.88	3.58
Accommodations						
No	58,108	36.46	9.53	--	0.88	3.36
Yes	3,849	25.16	9.51	-1.19	0.86	3.52

Table 10.21. Alpha Coefficients and SEMs—English I, Spring 2017

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	12,870	28.24	6.67	--	0.84	2.69
Gender						
Female	6,417	29.23	6.49	0.30	0.84	2.62
Male	6,453	27.25	6.71	--	0.83	2.75
Ethnicity						
American Indian/Alaskan Native	79	27.95	6.70	-0.13	0.84	2.72
Asian	149	30.23	6.79	0.23	0.85	2.61
Pacific Islander	18	27.17	6.81	--	--	--
Black (not Hispanic)	1,134	24.25	7.08	-0.70	0.84	2.83
Hispanic	564	26.16	7.06	-0.40	0.85	2.76
White (not Hispanic)	10,631	28.77	6.42	--	0.83	2.67
Multi-racial	295	27.47	7.08	-0.20	0.85	2.74
LEP						
No	12,622	28.36	6.62	--	0.84	2.69
Yes	238	21.82	6.48	-0.99	0.80	2.88
IEP						
No	11,821	28.82	6.36	--	0.82	2.66
Yes	1,039	21.58	6.57	-1.14	0.80	2.92
Migrant						
No	12,859	28.24	6.67	--	0.84	2.69
Yes	1	25.00	--	--	--	--
FRL						
No	6,463	30.13	6.06	--	0.82	2.60
Yes	6,397	26.33	6.72	-0.59	0.83	2.77
Title I						
No	11,466	28.44	6.60	--	0.83	2.68
Yes	1,394	26.61	7.05	-0.28	0.85	2.76
Accommodations						
No	12,067	28.66	6.47	--	0.83	2.67
Yes	803	21.82	6.34	-1.06	0.79	2.91

Table 10.22. Alpha Coefficients and SEMs—Algebra II, Spring 2017

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	18,348	25.00	7.37	--	0.87	2.67
Gender						
Female	9,862	24.56	7.19	-0.13	0.86	2.68
Male	8,486	25.50	7.55	--	0.88	2.64
Ethnicity						
American Indian/Alaskan Native	69	22.84	6.87	-0.32	0.83	2.80
Asian	650	30.40	6.76	0.72	0.88	2.35
Pacific Islander	27	24.15	6.31	--	--	--
Black (not Hispanic)	1,146	20.80	7.12	-0.60	0.85	2.79
Hispanic	888	23.65	7.00	-0.21	0.85	2.73
White (not Hispanic)	15,121	25.17	7.25	--	0.87	2.66
Multi-racial	447	25.06	7.29	-0.02	0.87	2.67
LEP						
No	18,093	25.04	7.35	--	0.87	2.66
Yes	244	22.10	7.69	-0.40	0.87	2.75
IEP						
No	18,086	25.07	7.33	--	0.87	2.66
Yes	251	20.42	8.47	-0.63	0.89	2.78
Migrant						
No	18,336	25.00	7.37	--	0.87	2.67
Yes	1	23.00	--	--	--	--
FRL						
No	13,538	26.09	7.14	--	0.86	2.63
Yes	4,799	21.96	7.15	-0.58	0.85	2.77
Title I						
No	17,503	25.21	7.31	--	0.87	2.66
Yes	834	20.65	7.19	-0.63	0.85	2.79
Accommodations						
No	18,197	25.04	7.36	--	0.87	2.67
Yes	151	19.80	7.11	-0.71	0.84	2.83

Table 10.23. Alpha Coefficients and SEMs—Geometry, Spring 2017

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	7,003	21.56	7.19	--	0.85	2.74
Gender						
Female	3,647	21.08	7.14	-0.14	0.85	2.75
Male	3,356	22.07	7.20	--	0.86	2.73
Ethnicity						
American Indian/Alaskan Native	46	19.63	6.68	--	--	--
Asian	113	29.31	7.36	1.07	0.89	2.43
Pacific Islander	13	15.69	6.25	--	--	--
Black (not Hispanic)	313	18.36	6.60	-0.48	0.82	2.79
Hispanic	294	19.48	6.45	-0.32	0.81	2.81
White (not Hispanic)	6,066	21.73	7.10	--	0.85	2.74
Multi-racial	158	20.61	7.48	-0.16	0.87	2.74
LEP						
No	6,895	21.61	7.18	--	0.85	2.74
Yes	108	18.47	6.63	-0.44	0.82	2.82
IEP						
No	6,716	21.79	7.12	--	0.85	2.74
Yes	287	16.08	6.58	-0.81	0.82	2.82
Migrant						
No	7,002	21.56	7.19	--	0.85	2.74
Yes	1	18.00	--	--	--	--
FRL						
No	4,299	22.71	7.25	--	0.86	2.72
Yes	2,704	19.73	6.70	-0.42	0.83	2.79
Title I						
No	6,697	21.59	7.21	--	0.86	2.74
Yes	306	20.81	6.48	-0.11	0.82	2.78
Accommodations						
No	6,777	21.76	7.14	--	0.85	2.74
Yes	226	15.42	5.72	-0.89	0.76	2.83

Table 10.24. Alpha Coefficients and SEMs—Government, Spring 2017

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	46,661	25.98	7.16	--	0.87	2.62
Gender						
Female	22,918	25.79	6.90	-0.05	0.86	2.63
Male	23,743	26.15	7.40	--	0.88	2.60
Ethnicity						
American Indian/Alaskan Native	190	25.83	6.41	-0.16	0.83	2.67
Asian	881	27.40	7.62	0.07	0.89	2.52
Pacific Islander	102	23.36	6.91	-0.52	0.84	2.77
Black (not Hispanic)	6,847	21.58	7.04	-0.78	0.84	2.79
Hispanic	2,467	24.22	7.03	-0.39	0.85	2.70
White (not Hispanic)	35,074	26.92	6.84	--	0.86	2.57
Multi-racial	1,100	26.29	6.91	-0.09	0.86	2.60
LEP						
No	45,614	26.12	7.11	--	0.87	2.61
Yes	1,016	19.79	6.73	-0.89	0.82	2.84
IEP						
No	42,218	26.70	6.80	--	0.85	2.59
Yes	4,412	19.06	6.87	-1.12	0.83	2.85
Migrant						
No	46,622	25.98	7.16	--	0.87	2.62
Yes	8	14.00	4.78	--	--	--
FRL						
No	26,794	27.97	6.48	--	0.85	2.52
Yes	19,836	23.29	7.16	-0.69	0.85	2.74
Title I						
No	42,128	26.44	7.02	--	0.86	2.59
Yes	4,502	21.69	7.00	-0.68	0.84	2.80
Accommodations						
No	43,948	26.41	6.97	--	0.86	2.60
Yes	2,713	18.93	6.54	-1.08	0.81	2.85

Table 10.25. Alpha Coefficients and SEMs—American History, Spring 2017

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	6,498	23.28	7.66	--	0.87	2.79
Gender						
Female	3,225	22.37	7.45	-0.24	0.86	2.82
Male	3,273	24.18	7.76	--	0.87	2.76
Ethnicity						
American Indian/Alaskan Native	41	23.22	7.09	--	--	--
Asian	87	26.07	7.84	0.35	0.88	2.69
Pacific Islander	11	23.45	7.29	--	--	--
Black (not Hispanic)	310	20.73	7.86	-0.35	0.87	2.83
Hispanic	197	22.12	7.63	-0.17	0.86	2.83
White (not Hispanic)	5,712	23.41	7.62	--	0.87	2.79
Multi-racial	140	23.66	7.84	0.03	0.87	2.78
LEP						
No	6,441	23.32	7.66	--	0.87	2.79
Yes	56	18.61	5.99	-0.62	0.76	2.92
IEP						
No	6,028	23.76	7.46	--	0.86	2.79
Yes	469	17.07	7.44	-0.90	0.85	2.85
Migrant						
No	6,497	23.28	7.66	--	0.87	2.79
Yes	--	--	--	--	--	--
FRL						
No	3,787	25.04	7.35	--	0.86	2.74
Yes	2,710	20.82	7.39	-0.57	0.85	2.86
Title I						
No	6,268	23.38	7.65	--	0.87	2.79
Yes	229	20.48	7.41	-0.38	0.85	2.85
Accommodations						
No	6,163	23.65	7.50	--	0.86	2.79
Yes	335	16.54	7.43	-0.95	0.85	2.84

Table 10.26. Alpha Coefficients and SEMs—Physical Science, Spring 2017

Group	N-Count	Mean Raw Score	SD Raw Score	Effect Size	Reliability	SEM
All Students	2,940	20.41	6.40	--	0.78	2.98
Gender						
Female	1,466	19.95	6.16	-0.15	0.76	3.00
Male	1,474	20.88	6.61	--	0.80	2.96
Ethnicity						
American Indian/Alaskan Native	15	21.67	7.96	--	--	--
Asian	20	23.00	9.11	--	--	--
Pacific Islander	1	16.00	--	--	--	--
Black (not Hispanic)	169	18.15	5.64	-0.38	0.72	3.00
Hispanic	73	19.42	5.95	-0.18	0.75	3.00
White (not Hispanic)	2,618	20.56	6.39	--	0.78	2.98
Multi-racial	44	20.27	6.77	--	--	--
LEP						
No	2,914	20.43	6.40	--	0.78	2.98
Yes	23	17.57	6.41	--	--	--
IEP						
No	2,676	20.88	6.32	--	0.78	2.98
Yes	261	15.65	5.22	-0.84	0.67	3.00
Migrant						
No	2,937	20.41	6.41	--	0.78	2.99
Yes	--	--	--	--	--	--
FRL						
No	1,473	21.75	6.43	--	0.79	2.96
Yes	1,464	19.06	6.09	-0.43	0.76	3.00
Title I						
No	2,754	20.44	6.46	--	0.79	2.98
Yes	183	20.02	5.60	-0.06	0.71	2.99
Accommodations						
No	2,742	20.78	6.36	--	0.78	2.98
Yes	198	15.35	4.52	-0.87	0.56	3.00

10.3.1.3. Interpretation Considerations

The SEM approach only provides a single numerical estimate for constructing confidence intervals for examinees regardless of their score level. In reality, such confidence intervals vary according to a student's score. Consequently, care should be taken using the SEM for students with extreme scores. Because test reliabilities and standard deviations are group specific, the same is true for SEMs and CIs. For the MO EOC, the SEM approach is calculated using raw scores, and as such, the resulting confidence interval bands are in the raw-score metric.

10.3.2. Conditional Standard Error of Measurement (CSEM) for Scale Scores

10.3.2.1. CSEMs and Conditional CIs

According to the *Standards for Educational and Psychological Testing*, Standard 2.14 states:

> When possible and appropriate, conditional standard errors of measurement should be reported at several score levels unless there is evidence that the standard error is constant across score levels. Where cut scores are specified for selection or classification, the standard errors of measurement should be reported in the vicinity of each cut score. (p. 46)

This section describes the calculation of the CSEMs. As noted below, the CSEMs for each scale score are presented in Appendix D and the CSEMs at the Proficient cut are presented in Table 10.27.

Rasch-based CSEMs are also used for the MO EOC assessments. CSEMs also allow statements regarding the precision of individual test scores by helping derive reasonable limits around observed scaled scores through construction of approximate score bands, referred to as conditional confidence intervals (CIs). Any given test will have CSEMs that vary as a function of the scaled scores. This makes the CSEM especially useful in characterizing measurement precision around a score level used for decision making, such as a cut score used for identifying students who meet a given performance standard.

MO EOC CSEMs come from the Winsteps program and are based on the principle of statistical information. The CSEM at any given point on the ability (θ, theta) continuum is defined as the reciprocal of the square root of the test information function derived from the Rasch scaling model. In the formula, $CSEM(\hat{\theta})$ is the conditional standard error of measurement, and $I(\hat{\theta})$ is the test information function:

$$CSEM(\theta) = \frac{1}{\sqrt{I(\theta)}}.$$

Test information depends on the sum of the corresponding information functions for the test items. Item information depends on each item's unique conditional item score variance as determined from its difficulty parameters and conditional item score variance. The formula provides the CSEMs on the Rasch ability (θ) metric.

10.3.2.2. CSEMs at the Proficient Cut

CSEMs are 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 10.27. The CSEM values were either 5 or 6 for English II, and consistently 6 for Biology and English I; 7 for Algebra I, Geometry and Government; 8 for Algebra II and Physical Science; 9 for American History across the three administrations. CSEMs for the other scale scores are reported in Appendix D. 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).

Table 10.27. CSEMs at the Proficient Cut Score

Test Period	Content Area	SS Cut*	CSEM
Summer 2016	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
	Physical Science	200	8
Fall 2016	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 2017	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 Appendix D for the CSEM at each scale score.

10.3.3. Classification Accuracy and Consistency

In accountability testing programs, there is great interest in knowing how accurately students are classified into performance categories. Two sets of analyses are presented. Classification accuracy describes the extent to which examinees are classified in the same way as they would be on the basis of the average of all possible forms of a test. Classification consistency describes the extent to which examinees are classified in the same way as they would be on the basis of a single form of a test other than the one for which data are available. Classification accuracy and classification consistency are relevant to Standard 2.16 of the *Standards for Educational and Psychological Testing*.

> When a test or combination of measures is used to make classification decisions, estimates should be provided of the percentage of test takers who would be classified in the same way on two replications of the procedure. (p. 46)

Tables 10.28 and 10.29 illustrate the decision tables for two and four performance levels, respectively. The proportion of consistent decisions, φ, is computed by taking the sum of the diagonal entries, which indicate the proportion of students classified into the same performance level by the two forms. The results presented in this section show that, overall, the classification accuracy and consistency statistics provide additional support that the MO EOC Assessments have good measurement precision and sound psychometric properties.

Table 10.28. Decision Table for Two Performance Levels

		Test One		
		Level I	**Level II**	**Marginal**
Test Two	**Level I**	ϕ_{11}	ϕ_{12}	$\phi_{1\bullet}$
	Level II	ϕ_{21}	ϕ_{22}	$\phi_{2\bullet}$
	Marginal	$\phi_{\bullet 1}$	$\phi_{\bullet 2}$	1

Table 10.29. Decision Table for Four Performance Levels

		Test One				
		Level I	**Level II**	**Level III**	**Level IV**	**Marginal**
Test Two	**Level I**	ϕ_{11}	ϕ_{12}	ϕ_{13}	$\phi 1_4$	$\phi_{1\bullet}$
	Level II	ϕ_{21}	ϕ_{22}	ϕ_{23}	ϕ_{24}	$\phi_{2\bullet}$
	Level I	ϕ_{31}	ϕ_{32}	ϕ_{33}	ϕ_{34}	$\phi_{3\bullet}$
	Level II	ϕ_{41}	ϕ_{42}	ϕ_{43}	ϕ_{44}	$\phi_{4\bullet}$
	Marginal	$\phi_{\bullet 1}$	$\phi_{\bullet 2}$	$\phi_{\bullet 3}$	$\phi_{\bullet 4}$	1

The proportions of consistent decisions, ϕ, for two and four categories are computed by the following two formulas, respectively:

$$\phi = \phi_{11} + \phi_{22}$$

$$\phi = \phi_{11} + \phi_{22} + \phi_{33} + \phi_{44}$$

The Livingston and Lewis (1995) methodology was used to provided estimates of classification accuracy and classification consistency. The BB-CLASS software program (Brennan, 2004a) was used to compute the results.

For classification accuracy, the Livingston and Lewis procedure compares the actual observed score distribution with the true score distribution predicted from the model (Brennan, 2004b). In the classification accuracy tables, the rows represent category true scores and columns represent expected observed scores for the categories under the model. The probability of a correct classification is the sum of the diagonal. The false negative rate is calculated from the sum of the lower off-diagonal values, while the false positive rate is calculated from the sum of the upper off-diagonal values.

For classification consistency, the Livingston and Lewis procedure compares the actual observed score distribution with the observed score distribution for an alternate form predicted from the model. In the classification consistency tables, the rows and columns represent the expected observed scores for categories in the model. Three indices are provided: the proportion of consistent decisions, the chance proportion of decisions, and kappa.

10.3.3.1. Classification Accuracy Results

The results in Tables 10.30 – 10.32 show the classification accuracy for two performance levels (Below Basic and Basic vs. Proficient and Advanced) for each MO EOC Assessment by administration. The probability of correct classification results show the estimates were between 0.87 and 0.92 for the assessments, with the exception of 0.75 for the Physical Science Summer administration (n=11). The results in Tables 10.33 – 10.35 show the classification accuracy for four performance levels (Below Basic, Basic, Proficient, and Advanced) for each MO EOC Assessment by administration. The probability of correct classification estimates ranged from 0.70 for the Algebra I and American History Summer 2016 and Geometry Spring 2017 assessments to 0.81 for the Biology Summer 2016 assessment. As expected, the higher number of performance levels resulted in lower consistency because there is more opportunity for misclassification. The classification accuracy results suggest that accurate performance level classifications are being made for students taking the MO EOC Assessments.

Table 10.30. Classification Accuracy Coefficients for Two Classifications—Summer 2016

Content Area	Classification	Below Basic + Basic	Proficient + Advanced	Marginal	Prob. of Correct Classification
English II	Below Basic + Basic	0.5460	0.0549	0.6010	0.8955
	Proficient + Advanced	0.0496	0.3495	0.3990	
	Marginal	0.5956	0.4044	1.0000	
Algebra I	Below Basic + Basic	0.4690	0.0645	0.5335	0.8860
	Proficient + Advanced	0.0495	0.4170	0.4665	
	Marginal	0.5185	0.4815	1.0000	
Biology	Below Basic + Basic	0.6809	0.0461	0.7270	0.9180
	Proficient + Advanced	0.0360	0.2370	0.2730	
	Marginal	0.7169	0.2831	1.0000	
English I	Below Basic + Basic	0.5472	0.0683	0.6155	0.8790
	Proficient + Advanced	0.0528	0.3318	0.3845	
	Marginal	0.6000	0.4000	1.0000	
Algebra I	Below Basic + Basic	0.4824	0.0466	0.5290	0.9139
	Proficient + Advanced	0.0396	0.4315	0.4710	
	Marginal	0.5220	0.4780	1.0000	
Geometry	Below Basic + Basic	0.5440	0.0569	0.6009	0.9010
	Proficient + Advanced	0.0421	0.3571	0.3991	
	Marginal	0.5860	0.4140	1.0000	
Government	Below Basic + Basic	0.3839	0.0503	0.4343	0.9041
	Proficient + Advanced	0.0456	0.5202	0.5657	

Content Area	Classification	Below Basic + Basic	Proficient + Advanced	Marginal	Prob. of Correct Classification
Government	Marginal	0.4295	0.5705	1.0000	
Am. History	Below Basic + Basic	0.3826	0.0641	0.4467	0.8771
	Proficient + Advanced	0.0588	0.4946	0.5534	
	Marginal	0.4414	0.5586	1.0000	
Physical Science	Below Basic + Basic	0.5316	0.1925	0.7241	0.7546
	Proficient +Advanced	0.0529	0.2230	0.2759	
	Marginal	0.5845	0.4155	1.0000	

Table 10.31. Classification Accuracy Coefficients for Two Classifications—Fall 2016

Content Area	Classification	Below Basic + Basic	Proficient + Advanced	Marginal	Prob. of Correct Classification
English II	Below Basic + Basic	0.4408	0.0529	0.4938	0.8967
	Proficient + Advanced	0.0504	0.4558	0.5062	
	Marginal	0.4912	0.5088	1.0000	
Algebra I	Below Basic + Basic	0.4450	0.0512	0.4962	0.9052
	Proficient + Advanced	0.0436	0.4602	0.5038	
	Marginal	0.4886	0.5114	1.0000	
Biology	Below Basic + Basic	0.4611	0.0461	0.5072	0.9113
	Proficient + Advanced	0.0426	0.4502	0.4928	
	Marginal	0.5037	0.4963	1.0000	
English I	Below Basic + Basic	0.3541	0.0568	0.4109	0.8844
	Proficient + Advanced	0.0588	0.5303	0.5891	
	Marginal	0.4129	0.5871	1.0000	
Algebra I	Below Basic + Basic	0.3065	0.0482	0.3547	0.9047
	Proficient + Advanced	0.0471	0.5982	0.6453	
	Marginal	0.3536	0.6464	1.0000	
Geometry	Below Basic + Basic	0.3358	0.0533	0.3891	0.8977
	Proficient + Advanced	0.0490	0.5618	0.6109	
	Marginal	0.3848	0.6152	1.0000	
Government	Below Basic + Basic	0.3730	0.0512	0.4242	0.9044
	Proficient + Advanced	0.0444	0.5314	0.5758	
	Marginal	0.4175	0.5825	1.0000	
Am. History	Below Basic + Basic	0.4708	0.0538	0.5247	0.9018
	Proficient + Advanced	0.0444	0.4309	0.4753	
	Marginal	0.5153	0.4848	1.0000	

Table 10.32. Classification Accuracy Coefficients for Two Classifications—Spring 2017

Content Area	Classification	Below Basic + Basic	Proficient + Advanced	Marginal	Prob. of Correct Classification
English II	Below Basic + Basic	0.2767	0.0531	0.3299	0.8861
	Proficient + Advanced	0.0607	0.6094	0.6701	
	Marginal	0.3375	0.6626	1.0000	
Algebra I	Below Basic + Basic	0.3886	0.0544	0.4431	0.8983
	Proficient + Advanced	0.0473	0.5097	0.5569	
	Marginal	0.4359	0.5641	1.0000	
Biology	Below Basic + Basic	0.3181	0.0500	0.3681	0.8979
	Proficient + Advanced	0.0521	0.5798	0.6319	
	Marginal	0.3702	0.6298	1.0000	
English I	Below Basic + Basic	0.3539	0.0614	0.4153	0.8749
	Proficient + Advanced	0.0637	0.5211	0.5847	
	Marginal	0.4175	0.5825	1.0000	
Algebra I	Below Basic + Basic	0.2772	0.0554	0.3326	0.8965
	Proficient + Advanced	0.0481	0.6193	0.6674	
	Marginal	0.3253	0.6747	1.0000	
Geometry	Below Basic + Basic	0.4504	0.0680	0.5184	0.8843
	Proficient + Advanced	0.0477	0.4339	0.4816	
	Marginal	0.4981	0.5019	1.0000	
Government	Below Basic + Basic	0.3632	0.0563	0.4195	0.8925
	Proficient + Advanced	0.0513	0.5292	0.5805	
	Marginal	0.4145	0.5855	1.0000	
Am. History	Below Basic + Basic	0.4855	0.0536	0.5391	0.9025
	Proficient + Advanced	0.0440	0.4170	0.4609	
	Marginal	0.5295	0.4705	1.0000	
Physical Science	Below Basic + Basic	0.6772	0.0643	0.7415	0.8961
	Proficient + Advanced	0.0397	0.2189	0.2585	
	Marginal	0.7169	0.2832	1.0000	

Table 10.33. Classification Accuracy Coefficients for Four Classifications—Summer 2016

Content Area	Classification	Below Basic	Basic	Proficient	Advanced	Marginal	Prob. of Correct Classification
English II	Below Basic	0.1903	0.0350	0.0001	0.0000	0.2254	0.7959
	Basic	0.0462	0.2744	0.0549	0.0000	0.3755	
	Proficient	0.0001	0.0495	0.3248	0.0150	0.3894	
	Advanced	0.0000	0.0000	0.0034	0.0063	0.0097	
	Marginal	0.23662	0.3590	0.3831	0.0213	1.0000	
Algebra I	Below Basic	0.1699	0.0628	0.0028	0.0000	0.2355	0.7158
	Basic	0.0658	0.1704	0.0617	0.0000	0.2980	
	Proficient	0.0018	0.0477	0.2919	0.0265	0.3678	
	Advanced	0.0000	0.0000	0.0151	0.0836	0.0987	
	Marginal	0.2375	0.2810	0.3714	0.1101	1.0000	
Biology	Below Basic	0.2927	0.0398	0.0000	0.0000	0.3326	0.8138
	Basic	0.0467	0.3017	0.0461	0.0000	0.3944	
	Proficient	0.0000	0.0360	0.2021	0.0126	0.2507	
	Advanced	0.0000	0.0000	0.0050	0.0173	0.0223	
	Marginal	0.3394	0.3775	0.2531	0.0300	1.0000	
English I	Below Basic	0.0576	0.0311	0.0000	0.0000	0.0888	0.7646
	Basic	0.0637	0.3947	0.0682	0.0000	0.5267	
	Proficient	0.0000	0.0528	0.2999	0.0148	0.3674	
	Advanced	0.0000	0.0000	0.0048	0.0123	0.0171	
	Marginal	0.1214	0.4786	0.3729	0.0271	1.0000	
Algebra I	Below Basic	0.2654	0.0715	0.0041	0.0000	0.3410	0.6979
	Basic	0.0452	0.1004	0.0424	0.0000	0.1880	
	Proficient	0.0020	0.0375	0.2934	0.0672	0.4001	
	Advanced	0.0000	0.0000	0.0321	0.0388	0.0709	
	Marginal	0.3126	0.2094	0.3721	0.1060	1.0000	
Geometry	Below Basic	0.3221	0.0656	0.0060	0.0000	0.3936	0.7439
	Basic	0.0536	0.1027	0.0510	0.0000	0.2073	
	Proficient	0.0034	0.0386	0.2376	0.0239	0.3036	
	Advanced	0.0000	0.0000	0.0140	0.0815	0.0955	
	Marginal	0.3791	0.2069	0.3085	0.1055	1.0000	
Government	Below Basic	0.0914	0.0345	0.0002	0.0000	0.1260	0.7597
	Basic	0.0463	0.2118	0.0501	0.0000	0.3083	
	Proficient	0.0002	0.0454	0.2762	0.0379	0.3596	
	Advanced	0.0000	0.0000	0.0258	0.1804	0.2062	
	Marginal	0.1379	0.2916	0.3523	0.2182	1.0000	
Am. History	Below Basic	0.1346	0.0415	0.0022	0.0000	0.1783	0.6987
	Basic	0.0568	0.1497	0.0616	0.0002	0.2684	
	Proficient	0.0024	0.0564	0.2654	0.0507	0.3748	
	Advanced	0.0000	0.0001	0.0296	0.1489	0.1785	
	Marginal	0.1938	0.2476	0.3588	0.1998	1.0000	

Content Area	Classification	Below Basic	Basic	Proficient	Advanced	Marginal	Prob. of Correct Classification
Physical Science	Below Basic	0.0000	0.0000	0.0000	0.0000	0.0000	0.7415
	Basic	0.0001	0.5315	0.1925	0.0000	0.7241	
	Proficient	0.0000	0.0529	0.1955	0.0094	0.2578	
	Advanced	0.0000	0.0000	0.0036	0.0146	0.0182	
	Marginal	0.0001	0.5844	0.3915	0.0240	1.0000	

Table 10.34. Classification Accuracy Coefficients for Four Classifications—Fall 2016

Content Area	Classification	Below Basic	Basic	Proficient	Advanced	Marginal	Prob. of Correct Classification
English II	Below Basic	0.1201	0.0272	0.0000	0.0000	0.1474	0.7936
	Basic	0.0403	0.2532	0.0529	0.0000	0.3464	
	Proficient	0.0001	0.0504	0.3701	0.0237	0.4442	
	Advanced	0.0000	0.0000	0.0118	0.0502	0.0620	
	Marginal	0.1605	0.3307	0.4348	0.0740	1.0000	
Algebra I	Below Basic	0.2249	0.0490	0.0024	0.0000	0.2764	0.7564
	Basic	0.0490	0.1221	0.0488	0.0000	0.2199	
	Proficient	0.0019	0.0417	0.2738	0.0308	0.3482	
	Advanced	0.0000	0.0000	0.0200	0.1356	0.1556	
	Marginal	0.2758	0.2128	0.3451	0.1663	1.0000	
Biology	Below Basic	0.1459	0.0299	0.0000	0.0000	0.1758	0.7918
	Basic	0.0390	0.2463	0.0461	0.0000	0.3314	
	Proficient	0.0000	0.0426	0.2843	0.0311	0.3580	
	Advanced	0.0000	0.0000	0.0196	0.1153	0.1348	
	Marginal	0.1849	0.3188	0.3500	0.1464	1.0000	
English I	Below Basic	0.0556	0.0175	0.0000	0.0000	0.0732	0.7819
	Basic	0.0345	0.2464	0.0568	0.0000	0.3377	
	Proficient	0.0001	0.0588	0.4121	0.0339	0.5048	
	Advanced	0.0000	0.0000	0.0166	0.0678	0.0844	
	Marginal	0.0902	0.3227	0.4855	0.1016	1.0000	
Algebra I	Below Basic	0.1483	0.0348	0.0038	0.0000	0.1869	0.7449
	Basic	0.0416	0.0818	0.0443	0.0001	0.1678	
	Proficient	0.0039	0.0432	0.2448	0.0480	0.3399	
	Advanced	0.0000	0.0000	0.0353	0.2700	0.3054	
	Marginal	0.1938	0.1599	0.3282	0.3182	1.0000	
Geometry	Below Basic	0.1632	0.0414	0.0052	0.0000	0.2098	0.7422
	Basic	0.0466	0.0846	0.0482	0.0000	0.1794	
	Proficient	0.0048	0.0442	0.3013	0.0401	0.3905	
	Advanced	0.0000	0.0000	0.0273	0.1931	0.2204	
	Marginal	0.2147	0.1702	0.3819	0.2333	1.0000	
Government	Below Basic	0.0612	0.0338	0.0002	0.0000	0.0952	0.7567
	Basic	0.0518	0.2263	0.0509	0.0000	0.3290	

Content Area	Classification	Below Basic	Basic	Proficient	Advanced	Marginal	Prob. of Correct Classification
Government	Proficient	0.0002	0.0442	0.2693	0.0365	0.3502	
	Advanced	0.0000	0.0000	0.0256	0.2000	0.2256	
	Marginal	0.1131	0.3044	0.3460	0.2365	1.0000	
Am. History	Below Basic	0.2374	0.0541	0.0027	0.0000	0.2942	0.7306
	Basic	0.0519	0.1275	0.0509	0.0002	0.2305	
	Proficient	0.0019	0.0425	0.1980	0.0394	0.2818	
	Advanced	0.0000	0.0000	0.0258	0.1677	0.1935	
	Marginal	0.2912	0.2241	0.2774	0.2073	1.0000	

Table 10.35. Classification Accuracy Coefficients for Four Classifications—Spring 2017

Content Area	Classification	Below Basic	Basic	Proficient	Advanced	Marginal	Prob. of Correct Classification
English II	Below Basic	0.0401	0.0141	0.0001	0.0000	0.0542	0.7768
	Basic	0.0313	0.1913	0.0531	0.0000	0.2757	
	Proficient	0.0002	0.0605	0.4527	0.0421	0.5555	
	Advanced	0.0000	0.0000	0.0219	0.0927	0.1146	
	Marginal	0.0716	0.2659	0.5278	0.1348	1.0000	
Algebra I	Below Basic	0.1685	0.0476	0.0029	0.0000	0.2190	0.7404
	Basic	0.0512	0.1214	0.0516	0.0000	0.2241	
	Proficient	0.0024	0.0449	0.2903	0.0356	0.3732	
	Advanced	0.0000	0.0000	0.0235	0.1603	0.1838	
	Marginal	0.2221	0.2139	0.3682	0.1959	1.0000	
Biology	Below Basic	0.0436	0.0155	0.0000	0.0000	0.0592	0.7823
	Basic	0.0306	0.2283	0.0499	0.0000	0.3089	
	Proficient	0.0000	0.0521	0.3630	0.0427	0.4578	
	Advanced	0.0000	0.0000	0.0268	0.1474	0.1742	
	Marginal	0.0743	0.2959	0.4397	0.1901	1.0000	
English I	Below Basic	0.0450	0.0157	0.0000	0.0000	0.0607	0.7784
	Basic	0.0348	0.2584	0.0614	0.0000	0.3546	
	Proficient	0.0001	0.0636	0.4242	0.0322	0.5200	
	Advanced	0.0000	0.0000	0.0140	0.0508	0.0648	
	Marginal	0.0798	0.3377	0.4995	0.0830	1.0000	
Algebra I	Below Basic	0.0896	0.0403	0.0048	0.0000	0.1347	0.7263
	Basic	0.0506	0.0968	0.0505	0.0001	0.1979	
	Proficient	0.0040	0.0441	0.2437	0.0457	0.3374	
	Advanced	0.0000	0.0000	0.0337	0.2962	0.3300	
	Marginal	0.1441	0.1812	0.3327	0.3420	1.0000	
Geometry	Below Basic	0.2056	0.0744	0.0096	0.0000	0.2895	0.6982
	Basic	0.0626	0.1078	0.0585	0.0000	0.2289	
	Proficient	0.0048	0.0429	0.2578	0.0302	0.3357	
	Advanced	0.0000	0.0000	0.0189	0.1270	0.1459	

Content Area	Classification	Below Basic	Basic	Proficient	Advanced	Marginal	Prob. of Correct Classification
Geometry	Marginal	0.2730	0.2251	0.3447	0.1573	1.0000	
Government	Below Basic	0.0481	0.0251	0.0001	0.0000	0.0733	0.7559
	Basic	0.0480	0.2421	0.0561	0.0000	0.3462	
	Proficient	0.0002	0.0511	0.3145	0.0388	0.4046	
	Advanced	0.0000	0.0000	0.0247	0.1512	0.1759	
	Marginal	0.0962	0.3183	0.3955	0.1900	1.0000	
Am. History	Below Basic	0.2458	0.0539	0.0024	0.0000	0.3021	0.7349
	Basic	0.0519	0.1339	0.0510	0.0002	0.2369	
	Proficient	0.0016	0.0423	0.2018	0.0376	0.2834	
	Advanced	0.0000	0.0000	0.0241	0.1534	0.1776	
	Marginal	0.2994	0.2301	0.2793	0.1912	1.0000	
Physical Science	Below Basic	0.0000	0.0000	0.0000	0.0000	0.0000	0.7967
	Basic	0.0772	0.6000	0.0643	0.0000	0.7415	
	Proficient	0.0000	0.0397	0.1727	0.0159	0.2282	
	Advanced	0.0000	0.0000	0.0063	0.0240	0.0304	
	Marginal	0.0772	0.6396	0.2433	0.0399	1.0000	

10.3.3.2. Classification Consistency Results

Tables 10.36 – 10.38 display the classification consistency for two performance levels (Below Basic and Basic vs. Proficient and Advanced) for each MO EOC Assessment by administration. The proportions of consistent decisions are between 0.83 and 0.88 across the content areas and administrations, with the exception of the Physical Science Summer assessment (n=11) which had an estimate of 0.66. The chance proportions of consistent decision classification were in the 0.50 to 0.59 range. Since there are only two classifications, the chance of correctly classifying students is quite high. All kappa values were between 0.64 and 0.75, with the exception of the Physical Science Summer assessment which had an estimate of 0.29.

Tables 10.39 – 10.41 display the classification consistency results for four performance levels (Below Basic, Basic, Proficient, and Advanced) for each MO EOC Assessment by administration. The proportions of consistent decision classification ranged from 0.60 to 0.74. With four performance levels, the chance proportions of consistent decisions were lower, with estimates between 0.25 and 0.50. All kappa values were between 0.44 and 0.61, with the exception of the Physical Science Summer assessment which had an estimate of 0.28. Consistent with the classification accuracy results, the results for the two performance levels demonstrated greater precision in classifying students compared to the results for the four performance levels because there is greater opportunity for misclassification. The classification consistency results suggest that consistent performance level classifications are being made for students taking the MO EOC Assessments.

Table 10.36. Classification Consistency Coefficients for Two Classifications—Summer 2016

Content Area	Classification	Below Basic + Basic	Proficient + Advanced	Marginal	Prob. of Consistent Decisions	Chance Prob. Of Consistent Decisions	Kappa
English II	Below Basic + Basic	0.5223	0.0733	0.5956	0.8535	0.5183	0.6958
	Proficient + Advanced	0.0733	0.3311	0.4044			
	Marginal	0.5956	0.4044	1.0000			
Algebra I	Below Basic + Basic	0.4380	0.0805	0.5185	0.8391	0.5007	0.6777
	Proficient + Advanced	0.0805	0.4011	0.4815			
	Marginal	0.5185	0.4815	1.0000			
Biology	Below Basic + Basic	0.6592	0.0577	0.7169	0.8846	0.5941	0.7158
	Proficient + Advanced	0.0577	0.2254	0.2831			
	Marginal	0.7169	0.2831	1.0000			
English I	Below Basic + Basic	0.5149	0.0851	0.6000	0.8299	0.5200	0.6456
	Proficient + Advanced	0.0851	0.3150	0.4000			
	Marginal	0.6000	0.4000	1.0000			
Algebra I	Below Basic + Basic	0.4603	0.0617	0.5220	0.8767	0.5010	0.7529
	Proficient + Advanced	0.0617	0.4164	0.4780			
	Marginal	0.5220	0.4780	1.0000			
Geometry	Below Basic + Basic	0.5159	0.0701	0.5860	0.8598	0.5148	0.7110
	Proficient + Advanced	0.0701	0.3439	0.4140			
	Marginal	0.5860	0.4140	1.0000			
Government	Below Basic + Basic	0.3620	0.0675	0.4295	0.8650	0.5099	0.7246
	Proficient + Advanced	0.0675	0.5030	0.5705			
	Marginal	0.4295	0.5705	1.0000			
Am. History	Below Basic + Basic	0.3554	0.0860	0.4414	0.8280	0.5069	0.6513
	Proficient + Advanced	0.0860	0.4726	0.5586			
	Marginal	0.4414	0.5586	1.0000			
Physical Science	Below Basic + Basic	0.4125	0.1720	0.5845	0.6560	0.5143	0.2918
	Proficient + Advanced	0.1720	0.2435	0.4155			
	Marginal	0.5845	0.4155	1.0000			

Table 10.37. Classification Consistency Coefficients for Two Classifications—Fall 2016

Content Area	Classification	Below Basic + Basic	Proficient + Advanced	Marginal	Prob. of Consistent Decisions	Chance Prob. Of Consistent Decisions	Kappa
English II	Below Basic + Basic	0.4188	0.0725	0.4912	0.8551	0.5002	0.7101
	Proficient + Advanced	0.0648	0.4805	0.5454			
	Marginal	0.4397	0.5603	1.0000			
Algebra I	Below Basic + Basic	0.4218	0.0668	0.4886	0.8664	0.5003	0.7326
	Proficient + Advanced	0.0668	0.4445	0.5114			
	Marginal	0.4886	0.5114	1.0000			
Biology	Below Basic + Basic	0.4413	0.0624	0.5037	0.8752	0.5000	0.7504
	Proficient + Advanced	0.0624	0.4339	0.4963			
	Marginal	0.5037	0.4963	1.0000			
English I	Below Basic + Basic	0.2751	0.0906	0.3657	0.8425	0.5424	0.6557
	Proficient + Advanced	0.0670	0.5673	0.6343			
	Marginal	0.3421	0.6579	1.0000			
Algebra I	Below Basic + Basic	0.2866	0.0670	0.3536	0.8660	0.5429	0.7069
	Proficient + Advanced	0.0670	0.5794	0.6464			
	Marginal	0.3536	0.6464	1.0000			
Geometry	Below Basic + Basic	0.3129	0.0720	0.3848	0.8561	0.5265	0.6961
	Proficient + Advanced	0.0720	0.5432	0.6152			
	Marginal	0.3848	0.6152	1.0000			
Government	Below Basic + Basic	0.3500	0.0674	0.4175	0.8652	0.5136	0.7228
	Proficient + Advanced	0.0674	0.5151	0.5825			
	Marginal	0.4175	0.5825	1.0000			
Am. History	Below Basic + Basic	0.4460	0.0693	0.5153	0.8614	0.5005	0.7226
	Proficient + Advanced	0.0693	0.4155	0.4848			
	Marginal	0.5153	0.4848	1.0000			

Table 10.38. Classification Consistency Coefficients for Two Classifications—Spring 2017

Content Area	Classification	Below Basic + Basic	Proficient + Advanced	Marginal	Prob. of Consistent Decisions	Chance Prob. Of Consistent Decisions	Kappa
English II	Below Basic + Basic	0.2579	0.0796	0.3375	0.8409	0.5528	0.6441
	Proficient + Advanced	0.0796	0.5830	0.6626			
	Marginal	0.3375	0.6626	1.0000			
Algebra I	Below Basic + Basic	0.3643	0.0716	0.4359	0.8567	0.5082	0.7087
	Proficient + Advanced	0.0716	0.4925	0.5641			
	Marginal	0.4359	0.5641	1.0000			
Biology	Below Basic + Basic	0.2987	0.0715	0.3702	0.8569	0.5337	0.6932
	Proficient + Advanced	0.0715	0.5582	0.6298			
	Marginal	0.3702	0.6298	1.0000			
English I	Below Basic + Basic	0.3303	0.0873	0.4175	0.8255	0.5136	0.6412
	Proficient + Advanced	0.0873	0.4952	0.5825			
	Marginal	0.4175	0.5825	1.0000			
Algebra I	Below Basic + Basic	0.2523	0.0730	0.3253	0.8540	0.5610	0.6674
	Proficient + Advanced	0.0730	0.6017	0.6747			
	Marginal	0.3253	0.6747	1.0000			
Geometry	Below Basic + Basic	0.4157	0.0824	0.4981	0.8352	0.5000	0.6705
	Proficient + Advanced	0.0824	0.4195	0.5019			
	Marginal	0.4981	0.5019	1.0000			
Government	Below Basic + Basic	0.3390	0.0755	0.4145	0.8490	0.5146	0.6888
	Proficient + Advanced	0.0755	0.5100	0.5855			
	Marginal	0.4145	0.5855	1.0000			
Am. History	Below Basic + Basic	0.4607	0.0688	0.5295	0.8625	0.5017	0.7240
	Proficient + Advanced	0.0688	0.4017	0.4705			
	Marginal	0.5295	0.4705	1.0000			
Physical Science	Below Basic + Basic	0.6431	0.0738	0.7169	0.8524	0.5940	0.6365
	Proficient + Advanced	0.0738	0.2094	0.2832			
	Marginal	0.7169	0.2832	1.0000			

Table 10.39. Classification Consistency Coefficients for Four Classifications—Summer 2016

Content Area	Classification	Below Basic	Basic	Proficient	Advanced	Marginal	Prob. of Consistent Decisions	Chance Prob. Of Consistent Decisions	Kappa
English II	Below Basic	0.1793	0.0560	0.0013	0.0000	0.2366	0.7144	0.3321	0.5724
	Basic	0.0560	0.2309	0.0720	0.0000	0.3590			
	Proficient	0.0013	0.0720	0.2964	0.0135	0.3831			
	Advanced	0.0000	0.0000	0.0135	0.0078	0.0213			
	Marginal	0.2366	0.3590	0.3831	0.0213	1.0000			
Algebra I	Below Basic	0.1462	0.0801	0.0112	0.0000	0.2375	0.6198	0.2854	0.4680
	Basic	0.0801	0.1316	0.0692	0.0001	0.2810			
	Proficient	0.0112	0.0692	0.2616	0.0295	0.3714			
	Advanced	0.0000	0.0001	0.0295	0.0805	0.1101			
	Marginal	0.2375	0.2810	0.3714	0.1101	1.0000			
Biology	Below Basic	0.2786	0.0603	0.0005	0.0000	0.3394	0.7386	0.3227	0.6141
	Basic	0.0603	0.2601	0.0571	0.0000	0.3775			
	Proficient	0.0005	0.0571	0.1828	0.0127	0.2531			
	Advanced	0.0000	0.0000	0.0127	0.0172	0.0300			
	Marginal	0.3394	0.3775	0.2531	0.0300	1.0000			
English I	Below Basic	0.0562	0.0640	0.0012	0.0000	0.1214	0.6734	0.3836	0.4701
	Basic	0.0640	0.3307	0.0838	0.0000	0.4786			
	Proficient	0.0012	0.0838	0.2737	0.0142	0.3729			
	Advanced	0.0000	0.0000	0.0142	0.0128	0.0271			
	Marginal	0.1214	0.4786	0.3729	0.0271	1.0000			
Algebra I	Below Basic	0.2252	0.0764	0.0110	0.0000	0.3126	0.6009	0.2912	0.4370
	Basic	0.0764	0.0823	0.0501	0.0006	0.2094			
	Proficient	0.0110	0.0501	0.2495	0.0615	0.3721			
	Advanced	0.0000	0.0006	0.0615	0.0439	0.1060			
	Marginal	0.3126	0.2094	0.3721	0.1060	1.0000			
Geometry	Below Basic	0.2886	0.0745	0.0160	0.0000	0.3791	0.6571	0.2928	0.5151
	Basic	0.0745	0.0783	0.0539	0.0002	0.2069			
	Proficient	0.0160	0.0539	0.2118	0.0268	0.3085			
	Advanced	0.0000	0.0002	0.0268	0.0785	0.1055			
	Marginal	0.3791	0.2069	0.3085	0.1055	1.0000			
Gov't	Below Basic	0.0816	0.0538	0.0025	0.0000	0.1379	0.6683	0.2758	0.5420
	Basic	0.0538	0.1729	0.0646	0.0004	0.2916			
	Proficient	0.0025	0.0646	0.2406	0.0446	0.3523			
	Advanced	0.0000	0.0004	0.0446	0.1733	0.2182			
	Marginal	0.1379	0.2916	0.3523	0.2182	1.0000			
Am. History	Below Basic	0.1222	0.0603	0.0112	0.0001	0.1938	0.5979	0.2675	0.4510
	Basic	0.0603	0.1126	0.0727	0.0020	0.2476			
	Proficient	0.0112	0.0727	0.2201	0.0548	0.3588			
	Advanced	0.0001	0.0020	0.0548	0.1430	0.1998			
	Marginal	0.1938	0.2476	0.3588	0.1998	1.0000			

Content Area	Classification	Below Basic	Basic	Proficient	Advanced	Marginal	Prob. of Consistent Decisions	Chance Prob. Of Consistent Decisions	Kappa
Physical Science	Below Basic	0.0000	0.0001	0.0000	0.0000	0.0001	0.6369	0.4954	0.2804
	Basic	0.0001	0.4123	0.1719	0.0001	0.5844			
	Proficient	0.0000	0.1719	0.2101	0.0095	0.3915			
	Advanced	0.0000	0.0001	0.0095	0.0144	0.0240			
	Marginal	0.0001	0.5844	0.3915	0.0240	1.0000			

Table 10.40. Classification Consistency Coefficients for Four Classifications—Fall 2016

Content Area	Classification	Below Basic	Basic	Proficient	Advanced	Marginal	Prob. of Consistent Decisions	Chance Prob. Of Consistent Decisions	Kappa
English II	Below Basic	0.1129	0.0465	0.0012	0.0000	0.1605	0.7114	0.3297	0.5695
	Basic	0.0465	0.2129	0.0713	0.0000	0.3307			
	Proficient	0.0012	0.0713	0.3370	0.0254	0.4348			
	Advanced	0.0000	0.0000	0.0254	0.0486	0.0740			
	Marginal	0.1605	0.3307	0.4348	0.0740	1.0000			
Algebra I	Below Basic	0.2041	0.0620	0.0098	0.0000	0.2758	0.6708	0.2681	0.5502
	Basic	0.0620	0.0938	0.0569	0.0002	0.2128			
	Proficient	0.0098	0.0569	0.2426	0.0358	0.3451			
	Advanced	0.0000	0.0002	0.0358	0.1303	0.1663			
	Marginal	0.2758	0.2128	0.3451	0.1663	1.0000			
Biology	Below Basic	0.1365	0.0477	0.0008	0.0000	0.1849	0.7085	0.2797	0.5953
	Basic	0.0477	0.2095	0.0615	0.0001	0.3188			
	Proficient	0.0008	0.0615	0.2520	0.0357	0.3500			
	Advanced	0.0000	0.0001	0.0357	0.1105	0.1464			
	Marginal	0.1849	0.3188	0.3500	0.1464	1.0000			
English I	Below Basic	0.0532	0.0359	0.0011	0.0000	0.0902	0.6947	0.3583	0.5242
	Basic	0.0359	0.2071	0.0796	0.0001	0.3227			
	Proficient	0.0011	0.0796	0.3688	0.0359	0.4855			
	Advanced	0.0000	0.0001	0.0359	0.0656	0.1016			
	Marginal	0.0902	0.3227	0.4855	0.1016	1.0000			
Algebra I	Below Basic	0.1349	0.0455	0.0133	0.0001	0.1938	0.6601	0.2721	0.5331
	Basic	0.0455	0.0607	0.0523	0.0013	0.1599			
	Proficient	0.0133	0.0523	0.2052	0.0574	0.3282			
	Advanced	0.0001	0.0013	0.0574	0.2594	0.3182			
	Marginal	0.1938	0.1599	0.3282	0.3182	1.0000			
Geometry	Below Basic	0.1463	0.0521	0.0163	0.0000	0.2147	0.6574	0.2753	0.5273
	Basic	0.0521	0.0624	0.0553	0.0004	0.1702			
	Proficient	0.0163	0.0553	0.2631	0.0473	0.3819			
	Advanced	0.0000	0.0004	0.0473	0.1856	0.2333			
	Marginal	0.2147	0.1702	0.3819	0.2333	1.0000			
Gov't	Below Basic	0.0552	0.0553	0.0026	0.0000	0.1131	0.6674	0.2811	0.5373
	Basic	0.0553	0.1842	0.0645	0.0004	0.3044			
	Proficient	0.0026	0.0645	0.2354	0.0436	0.3460			

Content Area	Classification	Below Basic	Basic	Proficient	Advanced	Marginal	Prob. of Consistent Decisions	Chance Prob. Of Consistent Decisions	Kappa
Gov't	Advanced	0.0000	0.0004	0.0436	0.1926	0.2365			
	Marginal	0.1131	0.3044	0.3460	0.2365	1.0000			
Am. History	Below Basic	0.2135	0.0672	0.0104	0.0001	0.2912	0.6379	0.2549	0.5139
	Basic	0.0672	0.0980	0.0573	0.0016	0.2241			
	Proficient	0.0104	0.0573	0.1653	0.0446	0.2774			
	Advanced	0.0001	0.0016	0.0446	0.1611	0.2073			
	Marginal	0.2912	0.2241	0.2774	0.2073	1.0000			

Table 10.41. Classification Consistency Coefficients for Four Classifications—Spring 2017

Content Area	Classification	Below Basic	Basic	Proficient	Advanced	Marginal	Prob. of Consistent Decisions	Chance Prob. Of Consistent Decisions	Kappa
English II	Below Basic	0.0389	0.0307	0.0019	0.0000	0.0716	0.6888	0.3725	0.5041
	Basic	0.0307	0.1576	0.0775	0.0001	0.2659			
	Proficient	0.0019	0.0775	0.4030	0.0453	0.5278			
	Advanced	0.0000	0.0001	0.0453	0.0894	0.1348			
	Marginal	0.0716	0.2659	0.5278	0.1348	1.0000			
Algebra I	Below Basic	0.1496	0.0612	0.0113	0.0000	0.2221	0.6512	0.2690	0.5229
	Basic	0.0612	0.0923	0.0601	0.0003	0.2139			
	Proficient	0.0113	0.0601	0.2553	0.0416	0.3682			
	Advanced	0.0000	0.0003	0.0416	0.1540	0.1959			
	Marginal	0.2221	0.2139	0.3682	0.1959	1.0000			
Biology	Below Basic	0.0416	0.0319	0.0008	0.0000	0.0743	0.6954	0.3225	0.5503
	Basic	0.0319	0.1933	0.0705	0.0002	0.2959			
	Proficient	0.0008	0.0705	0.3195	0.0489	0.4397			
	Advanced	0.0000	0.0002	0.0489	0.1410	0.1901			
	Marginal	0.0743	0.2959	0.4397	0.1901	1.0000			
English I	Below Basic	0.0437	0.0349	0.0012	0.0000	0.0798	0.6897	0.3768	0.5021
	Basic	0.0349	0.2168	0.0859	0.0001	0.3377			
	Proficient	0.0012	0.0859	0.3794	0.0330	0.4995			
	Advanced	0.0000	0.0001	0.0330	0.0499	0.0830			
	Marginal	0.0798	0.3377	0.4995	0.0830	1.0000			
Algebra I	Below Basic	0.0769	0.0518	0.0154	0.0001	0.1441	0.6407	0.2812	0.5001
	Basic	0.0518	0.0718	0.0563	0.0012	0.1812			
	Proficient	0.0154	0.0563	0.2061	0.0548	0.3327			
	Advanced	0.0001	0.0012	0.0548	0.2859	0.3420			
	Marginal	0.1441	0.1812	0.3327	0.3420	1.0000			
Geometry	Below Basic	0.1698	0.0813	0.0219	0.0000	0.2730	0.6035	0.2687	0.4578
	Basic	0.0813	0.0832	0.0602	0.0003	0.2251			
	Proficient	0.0219	0.0602	0.2280	0.0346	0.3447			
	Advanced	0.0000	0.0003	0.0346	0.1224	0.1573			
	Marginal	0.2730	0.2251	0.3447	0.1573	1.0000			

Content Area	Classification	Below Basic	Basic	Proficient	Advanced	Marginal	Prob. of Consistent Decisions	Chance Prob. Of Consistent Decisions	Kappa
Gov't	Below Basic	0.0457	0.0482	0.0023	0.0000	0.0962	0.6633	0.3031	0.5168
	Basic	0.0482	0.1969	0.0729	0.0003	0.3183			
	Proficient	0.0023	0.0729	0.2756	0.0447	0.3955			
	Advanced	0.0000	0.0003	0.0447	0.1451	0.1900			
	Marginal	0.0962	0.3183	0.3955	0.1900	1.0000			
Am. History	Below Basic	0.2223	0.0676	0.0095	0.0000	0.2994	0.6426	0.2572	0.5188
	Basic	0.0676	0.1033	0.0579	0.0014	0.2301			
	Proficient	0.0095	0.0579	0.1696	0.0424	0.2793			
	Advanced	0.0000	0.0014	0.0424	0.1474	0.1912			
	Marginal	0.2994	0.2301	0.2793	0.1912	1.0000			
Physical Science	Below Basic	0.0192	0.0576	0.0004	0.0000	0.0772	0.7056	0.4759	0.4384
	Basic	0.0576	0.5086	0.0731	0.0003	0.6396			
	Proficient	0.0004	0.0731	0.1540	0.0158	0.2433			
	Advanced	0.0000	0.0003	0.0158	0.0238	0.0399			
	Marginal	0.0772	0.6396	0.2433	0.0399	1.0000			

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). According to the *Standards for Educational and Psychological Testing*,

> Ultimately, the validity of an intended interpretation of test scores relies on all the available evidence relevant to the technical quality of a testing system…[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 test takers, as appropriate to the test interpretation in question. (p. 22)

This chapter summarizes the validity evidence as it relates to the purpose and intended use of the MO EOC test results (refer to Section 1.3 of this technical report). It begins with validity evidence related to test content in terms of the adequacy and appropriateness of the MO EOC Assessments for measuring progress on the Missouri Learning Standards. Validity evidence based on the internal structure of the MO EOC Assessments is then provided through a correlational analysis of MO EOC Assessment content clusters. References to specific standards are provided where appropriate.

While this chapter summarizes evidence that supports claims about the validity and uses of the MO EOC Assessment scores, this entire technical report provides evidence related to the validity argument. Some of this evidence is cross-referenced. The procedural and empirical evidence available, along with the rationale presented in this chapter, provide support for the standards-based interpretations of the MO EOC Assessments.

Since test forms used in the 2016–2017 testing year were intact forms that had been previously administered, relevant information documented in previous technical reports is included in this chapter to provide historical information and to assist with the construction of the validity argument for the MO EOC Assessment scores.

11.2. Validity Evidence

11.2.1. Content 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 4.12[13], which specifically relates to the definition and development of test content.

[13] **Standard 4.12:** Test developers should document the extent to which the content domain of a test represents the domain defined in the test specifications (p. 89).

11.2.1.1. 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.

11.2.1.2. Adequacy of Content Representation

Adequacy of the content representation of the MO EOC Assessments is important because the tests must provide an indication of student progress toward achieving the knowledge and skills identified in the Missouri Learning Standards and they must fulfill the requirements of the Every Student Succeeds Act (ESSA).

The MO EOC Assessments assess students' progress toward the Missouri Learning Standards, which are Missouri's content standards. Adequate representation of the content domains defined in the content standards is assured through the use of a test blueprint and a documented test construction process. The content standards were taken into consideration in the writing of SR items. Evidence to support the content validity of the MO EOC Assessments was provided in Chapter 2 through the documentation of the test specifications and blueprints, item-writing processes, and item-review processes. Specific efforts to ensure content validity are summarized below.

- Items were developed to include a wide array of contexts and cultures.
- Detailed test and item/passage development specifications were established; tests included sufficient numbers of items; and items were adequately distributed across content, levels of cognitive complexity, and difficulty.
- Qualified item writers were provided training.
- Each newly developed item was first reviewed by content specialists and editors to make sure that all items were aligned with the content standards. Appropriateness for the intended grade was also considered, as well as depth of knowledge, graphics, grammar/punctuation, language demand, and distractor reasonableness.

- Missouri teachers from diverse ethnic and geographical backgrounds reviewed the items to ensure all items were accessible to as many students as possible.
- Missouri teachers were trained to create clear and simple instructions.
- Content and bias review committees reviewed the items following specific criteria.

Additional evidence to support the content validity of the MO EOC Assessments was provided in Chapter 2. Chapter 2 outlines the target strand and content standard point distributions on the English II, Algebra I, Biology, English I, Algebra II, Geometry, Government, American History and Physical Science operational forms.

11.2.1.3. Summary of Alignment Studies

Each assessment must align with and proportionally represent the subdomains of the test blueprint. Following development of all MO EOC Assessments prior to 2014–2015, 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.

To summarize, the alignment studies evaluated whether the assessments represent the full range of content standards and measure student knowledge in the manner and at the level of complexity specified by the content standards. Both studies investigated alignment for English II, Algebra I and Biology.

The first study evaluated the alignment of a single form for the Spring and Summer 2009 Assessments (Taylor, Webb, Koger, Koger, & Thacker, 2009). The results indicated that the forms were fully aligned for most criteria. All content area tests fell short of achieving the cognitive complexity specified in the standards on one or both forms. In addition, the Biology forms were partially aligned for the range of knowledge that is represented on the form.

The second study evaluated the alignment of a single form for the Fall 2009, Summer 2010, and Spring 2011 assessments (Taylor, Campbell, Deatz, Dvorak, Koger, & Thacker, 2011). The results indicated that the 2009 forms were partially or fully aligned to the standards for all criteria. When considering the multiple-choice items only, the Biology forms were partially aligned for all criteria. The Algebra I forms were fully aligned for all criteria with the exception of partial alignment for DOK on two of the three forms. The English II forms were partially aligned for all criterial with the exception of weak alignment for DOK on two of the three forms.

11.2.2. Internal Structure

The item analyses shown in Appendix C revealed that the MO EOC Assessments have sound psychometric properties. The *p*-value ranges were sufficiently broad, indicating that the items measure achievement across a broad range of difficulty. Item-test correlations, indicators of item discrimination, are also provided. Almost all items had acceptable discrimination values (i.e., discrimination values > 0.15). Some extremely difficult items had low discrimination values that were likely attenuated by their difficulty.

Empirical investigation of DIF strengthens the validity evidence related to score interpretations for students in particular groups by evaluating potential sources of construct-irrelevant variance.

DIF results might be better considered as internal—structure validity evidence. Statistical analyses results are provided in Chapter 4. The results indicated that none of the PE/WP items were flagged for DIF and that either no or very few SR items were flagged for DIF across subjects and administrations.

Standard 1.13[14] 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.

Tables 11.1 – 11.8 summarize correlation coefficients among test domains and clusters for English II, Algebra I, Biology, Algebra II, Geometry, Government, and Physical Science.[15] Because the correlation coefficients will be affected by the limited number of items measuring each domain, the correlation coefficient between two content standard clusters may be artificially low because of measurement error. Therefore, the correlations are corrected for attenuation. The formula for the correlation coefficient statistically corrected for attenuation (r_{ca}) is Spearman's formula

$$r_{ca} = \frac{r_{xy}}{\sqrt{r_{xx} r_{yy}}}$$

Where r_{xy} is the correlation between content clusters, r_{xx} is the reliability of one content cluster, and r_{yy} is the reliability of the other content cluster.

The tables report the Pearson correlations below the diagonal, the correlations corrected for attenuation above the diagonal, and Cronbach's coefficient alpha of the cluster scores on the diagonal in bolded text.

The corrected correlations between clusters within each assessment are strong (> 0.70), with many correlations approaching or exceeding 0.90. The corrected correlations for the English Reading and Writing clusters tended to be lower, ranging from 0.49 for Summer 2016 to 0.78 for Fall 2016 assessment. The uncorrected correlations were observed to be in the moderate (0.30 to 0.70) to strong range, indicating the expected relationships between the clusters.

Each content area test is comprised of two or more content clusters measuring a single construct or dimension. These results suggest that the cluster scores are appropriately related to each other. Therefore, the results provide evidence that a unidimensional construct is measured on each of the MO EOC Assessments supporting the validity of the test construct.

[14] **Standard 1.13:** If the rationale for a test score interpretation for a given use depends on premises about the relationships among test items or among parts of the test, evidence concerning the internal structure of the test should be provided (p. 26–27).

[15] Because American History has only one content cluster, correlation coefficients were not calculated.

Table 11.1. Correlation Coefficients Between Domains and Clusters—English II

		#Points	Reading	Writing
Summer 2016	**Reading**	35	**0.85**	0.74
	Writing	10	0.65	**0.91**
Fall 2016	**Reading**	35	**0.87**	0.76
	Writing	10	0.67	**0.88**
Spring 2017	**Reading**	35	**0.83**	0.61
	Writing	10	0.49	**0.82**

Table 11.2. Correlation Coefficients Between Domains and Clusters—Algebra I

		#Points	Number and Quantity	Algebra	Functions	Statistics and Probability
Summer 2016	**Number and Quantity**	3	**0.29**	0.84	0.83	0.68
	Algebra	27	0.39	**0.75**	0.97	0.88
	Functions	15	0.36	0.67	**0.64**	0.89
	Statistics and Probability	5	0.26	0.54	0.52	**0.52**
Fall 2016	**Number and Quantity**	3	**0.32**	0.86	0.82	0.77
	Algebra	27	0.44	**0.80**	1.01	0.96
	Functions	15	0.39	0.77	**0.72**	0.98
	Statistics and Probability	5	0.32	0.64	0.62	**0.56**
Spring 2017	**Number and Quantity**	3	**0.47**	0.87	0.87	0.87
	Algebra	23	0.52	**0.77**	1.00	0.92
	Functions	19	0.51	0.75	**0.72**	1.04
	Statistics and Probability	5	0.37	0.50	0.55	**0.39**

Table 11.3. Correlation Coefficients Between Domains and Clusters—Biology

		#Points	Characteristics and Interactions	Changes in Ecosystems	Scientific Inquiry
Summer 2016	**Characteristics and Interactions**	22	**0.75**	1.00	0.87
	Changes in Ecosystems	13	0.76	**0.77**	0.86
	Scientific Inquiry	20	0.68	0.69	**0.83**
Fall 2016	**Characteristics and Interactions**	22	**0.81**	0.94	0.91
	Changes in Ecosystems	13	0.75	**0.79**	0.90
	Scientific Inquiry	20	0.74	0.72	**0.81**
Spring 2017	**Characteristics and Interactions**	22	**0.77**	0.88	0.87
	Changes in Ecosystems	13	0.67	**0.76**	0.88
	Scientific Inquiry	20	0.65	0.65	**0.72**

Table 11.4. Correlation Coefficients Between Domains and Clusters—Algebra II

		#Points	Algebra	Functions
Summer 2016	**Algebra**	16	**0.79**	0.79
	Functions	24	0.58	**0.69**
Fall 2016	**Algebra**	16	**0.76**	0.96
	Functions	24	0.76	**0.82**
Spring 2017	**Algebra**	18	**0.75**	0.93
	Functions	22	0.72	**0.79**

Table 11.5. Correlation Coefficients Between Domains and Clusters—English I

		#Points	Reading	Writing
Summer 2016	**Reading**	35	**0.79**	0.49
	Writing	10	0.39	**0.79**
Fall 2016	**Reading**	35	**0.82**	0.78
	Writing	10	0.65	**0.83**
Spring 2017	**Reading**	35	**0.81**	0.62
	Writing	10	0.48	**0.81**

Table 11.6. Correlation Coefficients Between Domains and Clusters—Geometry

		#Points	Geometry	Statistics and Probability
Summer 2016	**Geometry**	33	**0.83**	1.07
	Statistics and Probability	7	0.70	**0.51**
Fall 2016	**Geometry**	33	**0.84**	0.99
	Statistics and Probability	7	0.73	**0.64**
Spring 2017	**Geometry**	33	**0.82**	0.99
	Statistics and Probability	7	0.56	**0.56**

Table 11.7. Correlation Coefficients Between Domains and Clusters—Government

		#Points	Principles and Processes of Governance Systems	Principles in Constitutional Democracy
Summer 2016	**Principles and Processes of Governance Systems**	20	**0.81**	1.01
	Principles in Constitutional Democracy	20	0.81	**0.81**
Fall 2016	**Principles and Processes of Governance Systems**	20	**0.79**	1.01
	Principles in Constitutional Democracy	20	0.81	**0.81**
Spring 2017	**Principles and Processes of Governance Systems**	20	**0.79**	1.00
	Principles in Constitutional Democracy	20	0.76	**0.74**

Table 11.8. Correlation Coefficients Between Domains and Clusters—Physical Science

		#Points	Properties and Principles of Matter and Energy	Properties and Principles of Force and Motion
Spring 2017	Properties and Principles of Matter and Energy	16	**0.51**	0.95
	Properties and Principles of Force and Motion	29	0.58	**0.73**

11.2.3. Convergent and Divergent Validity

Convergent validity examines the extent to which theoretically related constructs are empirically related, whereas divergent validity examines the extent to which theoretically unrelated constructs are empirically unrelated. The Standards state the following regarding convergent and divergent validity: "Relationships between test scores and other measures intended to assess the same or similar constructs provide convergent evidence, whereas relationships between test scores and measures purportedly of different constructs provide discriminant evidence" (AERA, APA, & NCME, 2014, p. 16–17). 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.

11.2.3.1. Pearson Correlations Among Assessments

Table 11.9 shows evidence of divergent validity for the content areas with both SRs and PE/WPs. The data sets used for the analysis were drawn from the Spring 2017 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 11.9 shows the Pearson correlation coefficients between scale scores for Spring 2017. 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 (0.58) 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 (0.74). This correlation value 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 11.9. Pearson Correlation Among Assessments with PEs—Spring 2017

	English II	Algebra I	Biology	English I
English II	1.00	0.58	0.74	0.78
Algebra I	0.58	1.00	0.69	0.55
Biology	0.74	0.69	1.00	0.73
English I	0.78	0.55	0.73	1.00

The data presented in Table 11.10 show evidence of divergent validity for the content areas with only SR items. The data sets used for the analysis were drawn from the Spring 2017 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 11.10 shows the Pearson correlation coefficients between scale scores.

Table 11.10. Pearson Correlation Coefficients Among Assessments with only SRs—Spring 2017

	Algebra II	Geometry	Government	Am. History	Physical Science
Algebra II	1.00	0.75	0.56	0.46	0.58
Geometry	0.75	1.00	0.53	0.53	0.61
Government	0.56	0.53	1.00	0.85	0.82
Am. History	0.46	0.53	0.85	1.00	0.65
Physical Science	0.58	0.61	0.82	0.65	1.00

The results shown in Table 11.10 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 (0.75), and Government and American History (0.85) are higher than the correlations between the dissimilar constructs of Algebra II and American History (0.46).

Table 11.11 provides more evidence of discriminant validity with correlations between content areas with PE/WPs (rows) and content areas with only SR items (columns). Evidence of discriminant validity emerges when comparing correlations between the similar contents of Algebra I and Geometry (0.82), Algebra I and Algebra II (0.62), and Biology and Physical Science (0.78), as well as the dissimilar contents of English II and Algebra II (0.47) and English II and Geometry (0.52).

Table 11.11. Pearson Correlation Among Assessments

	Algebra II	Geometry	Government	Am. History	Physical Science
English II	0.47	0.52	0.75	0.65	0.65
Algebra I	0.62	0.82	0.62	0.47	0.59
Biology	0.60	0.63	0.76	0.67	0.78
English I	0.50	0.52	0.71	0.64	0.59

11.2.3.2. Convergent and Divergent Study

To gather validity evidence for the MO EOC assessments, DESE commissioned a full convergent and divergent study. The relationships between the MO EOC Assessments across the

2009, 2010, and 2011 administrations were examined using correlational data. Eight tests and three major groups comprised the Missouri EOC Assessments: English (English I, English II), mathematics (Algebra I, Algebra II, Geometry), and social studies (Government, American History). Biology was the only science subject.

The findings from the convergent validity evidence showed that the assessments within the major groupings were strongly related to each other. That is, strong correlations were found between the English I and English II test scores, and likewise for the mathematics and the social studies tests.

The findings from the divergent validity evidence showed that that assessments from other groupings were moderately related to each other. For example, the mathematics assessments were moderately related to the English and social studies assessments. There were a couple of exceptions. For example, the English and Government assessments showed strong relationships for some administrations, likely because both content areas involve a fair amount of reading. 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.

For the full report on this study, see the *2011–2012 MO EOC Technical Report*, Appendix B, at http://dese.mo.gov/college-career-readiness/assessment/assessment-technical-support-materials.

11.2.4. Additional Validity Evidence

Validity evidence related to other standards is described below.

- Standard 1.8[16] relates to the characteristics of the sample of test takers from which validity evidence is inferred. The sample of examinees from which the validity evidence for the MO EOC Assessments was referred to in Chapter 9 of this report. Section 10.3 report provides the raw score mean and standard deviation by demographic group Appendix E summarizes the descriptive statistics of scale scores, and Appendix F summarizes the percentage distributions of students' achievement levels by demographic group.

- Standard 1.9[17] 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 and cutpoint validation processes. When cut scores are critical to the interpretation of test results, the procedural validity of the processes used to establish those scores also should be addressed. Chapter 3 contains summary information about the standard setting procedures used for the MO EOC Assessments.

[16] **Standard 1.8:** The composition of any sample of test takers from which validity evidence is obtained should be described in as much detail as is practical and permissible, including major relevant sociodemographic and developmental characteristics (p. 25).

[17] **Standard 1.9:** 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. 25).

Overall, the panelists' feedback from both workshops indicated that they understood the process and were comfortable with their cut score recommendations. Human judgment is also a component of handscoring. From Spring 2008 through Spring 2010 and again in 2014-2015 and 2015–2016, PE/WPs were handscored. Chapter 6 contains detailed information about the processes involved with Questar's handscoring of the 2015–2016 PE/WPs, including scorer selection and training.

- Standard 1.10[18] 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.

11.3. Summary

The validation process involves the ongoing collection of a variety of evidence to support the proposed test-score interpretations and uses. It is not an all-or-nothing property of a test; rather, 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 validity evidence for the MO EOC Assessments' stated purposes. This chapter provided a summary of the evidence presented elsewhere in the technical report and provided 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 2009 standalone field tests, the Spring 2009 and 2010 embedded field tests produced pools of technically sound items with more than a 90% retention rate after psychometric and content criteria were applied. From those pools, the intent was to construct forms that were psychometrically similar which 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 cut scores. However, it was evident from the Spring 2017 administration that there were form comparability issues for English II and Algebra I. Following the TAC's recommendation, DESE chose not to use the English II and Algebra I results for accountability purposes in 2016-17. New forms are being developed for the 2017-2018 administration year and subsequent years for English I, English II, Algebra I, Algebra II, and Geometry. During this process, steps are being taken to ensure form comparability.

Post-administration test analyses supported the technical quality of the MO EOC Assessments. Validity of score inferences is bolstered when test scores are consistent. Here, the reliabilities of the total test scores are very good, ranging from 0.78 to 0.91 across the content areas and administrations for the 2016–2017 test forms. CSEMs were between 5 and 9 scale score points at

[18] **Standard 1.10:** 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. Attention should be drawn to any features of validation data collection that are likely to differ from typical operational testing conditions and that could plausibly influence test performance (p. 26).

the Proficient cut scores. Additionally, DIF analyses conducted on gender and ethnicity help address construct-irrelevant variance, which presents a serious threat to the validity of inferences made from achievement test scores.

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Appendix A: Target Point Distributions

Table A.1. Target Point Distributions—English II

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	

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	

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 A.2. Target Point Distributions—Algebra I

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	

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

Table A.3. Target Point Distributions—Biology I

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

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 next through reproductive processes	Chromosomes are components of cells that occur in pairs and carry hereditary information from one cell to daughter cells and from parent to offspring during reproduction	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
		Recognize that during meiosis, the formation of sex cells, chromosomes are reduced to half the number present in the parent cell	1	1–2

Big Idea	Concept	CLE	DOK Limit	Range of Points per CLE
		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

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 A.4. Target Point Distributions—English I

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	

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	

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	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
	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 A.5. Target Point Distributions—Algebra II

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.		

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.		
Stats & Probability				
Stats & Probability	Interpreting Categorical and Quantitative Data	• 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 A.6. Target Point Distributions—Geometry

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

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			

Table A.7. Target Point Distributions—Government

NOTE: Some Big Ideas are not represented in this table because they are not assessed at this course level.

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

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 A.8. Target Distributions—American History

NOTE: Some Big Ideas are not represented in this table because they are not assessed at this course level.

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

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

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

Appendix B: Actual Point Distributions

English II

Table B.1. Actual Point Distributions—English II, Summer 2016

	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	**35**	**3**	**35**	**10**	**35**	**3**	**35**	**10**

Table B.2. Actual Point Distributions—English II, Fall 2016

	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	**35**	**3**	**35**	**10**	**35**	**3**	**35**	**10**

Table B.3. Actual Point Distributions—English II, Spring 2017

	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	**35**	**3**	**35**	**10**	**35**	**3**	**35**	**10**

Algebra I

Table B.4. Actual Point Distributions—Algebra I, Summer 2016

	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	4	17	10
Function	14		14		15		15	
Stats and Probability	5		5		5		5	
Total	**40**	**4**	**40**	**10**	**40**	**4**	**40**	**10**

Table B.5. Actual Point Distributions—Algebra I, Fall 2016

	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	4	17	10
Function	14		14		15		15	
Stats and Probability	5		5		5		5	
Total	**40**	**4**	**40**	**10**	**40**	**4**	**40**	**10**

Table B.6. Actual Point Distributions—Algebra I, Spring 2017

	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	**40**	**4**	**40**	**10**	**40**	**3**	**40**	**10**

Biology

Table B.7. Actual Point Distributions—Biology, Summer 2016 Biology

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

Table B.8. Actual Point Distributions—Biology, Fall 2016 Biology

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

Table B.9. Actual Point Distributions—Biology, Spring 2017

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

English I

Table B.10. Actual Point Distributions—English I, Summer 2016

	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	**35**	**3**	**35**	**10**	**35**	**3**	**35**	**10**

Table B.11. Actual Point Distributions—English I, Fall 2016

	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	**35**	**3**	**35**	**10**	**35**	**3**	**35**	**10**

Table B.12. Actual Point Distributions—English I, Spring 2017

	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	**35**	**3**	**35**	**10**	**35**	**3**	**35**	**10**

Algebra II

Table B.13. Actual Point Distributions—Algebra II, Summer 2016

	Target	Actual
Reporting Category	**#Items/Points (SR)**	**#Items/Points (SR)**
Number and Quantity	0–4	0
Algebra	16–22	16
Function	18–24	24
Stats and Probability	0–6	0
Total	**40**	**40**

Table B.14. Actual Point Distributions—Algebra II, Fall 2016

	Target	Actual
Reporting Category	**#Items/Points (SR)**	**#Items/Points (SR)**
Number and Quantity	0–4	0
Algebra	16–22	17
Function	18–24	23
Stats and Probability	0–6	0
Total	**40**	**40**

Table B.15. Actual Point Distributions—Algebra II, Spring 2017

	Target	Actual
Reporting Category	**#Items/Points (SR)**	**#Items/Points (SR)**
Number and Quantity	0–4	0
Algebra	16–22	18
Function	18–24	22
Stats and Probability	0–6	0
Total	**40**	**40**

Geometry

Table B.16. Actual Point Distributions—Geometry, Summer 2016

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

Table B.17. Actual Point Distributions—Geometry, Fall 2016

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

Table B.18. Actual Point Distributions—Geometry, Spring 2017

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

Government

Table B.19. Actual Point Distributions—Government, Summer 2016

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	**40**	**40**

Table B.20. Actual Point Distributions—Government, Fall 2016

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	**40**	**40**

Table B.21. Actual Point Distributions—Government, Spring 2017

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	**40**	**40**

American History

Table B.22. Actual Point Distributions—American History, Summer 2016

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	**40**	**40**

Table B.23. Actual Point Distributions—American History, Fall 2016

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	**40**	**40**

Table B.24. Actual Point Distributions—American History, Spring 2017

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	**40**	**40**

Physical Science

Table B.25. Actual Point Distributions—Physical Science, Summer 2016

Reporting Category	Target	Actual
	#Items/Points (SR)	#Items/Points (SR)
Properties and Principles of Matter and Energy	25–30	29
Properties and Principles of Force and Motion	15–20	16
Total	**40**	**45**

Table B.26. Actual Point Distributions—Physical Science, Spring 2017

Reporting Category	Target	Actual
	#Items/Points (SR)	#Items/Points (SR)
Properties and Principles of Matter and Energy	25–30	29
Properties and Principles of Force and Motion	15–20	16
Total	**40**	**45**

Appendix C: Item Statistics

Table C.1. Item Statistics—English II, Summer 2016

N-Count: 321

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.72	0.43	1
2	0.32	0.21	1
3	0.65	0.42	1
4	0.35	0.17	1
5	0.65	0.36	1
6	0.80	0.47	1
7	0.56	0.43	1
14	0.51	0.27	2
15	0.40	0.29	1
16	0.65	0.43	1
17	0.56	0.40	1
18	0.24	0.15	1
19	0.57	0.50	2
20	0.28	0.23	1
21	0.44	0.30	1
22	0.57	0.44	1
23	0.28	0.15	1
24	0.59	0.39	2
31	0.70	0.57	1
32	0.57	0.48	1
33	0.48	0.23	1
34	0.65	0.48	1
35	0.47	0.24	1
36	0.66	0.49	1
37	0.49	0.30	1
38	0.61	0.52	1
39	0.38	0.17	1
40	0.73	0.62	1
41	0.53	0.52	1
42	0.46	0.33	1
43	0.50	0.38	1
44	0.40	0.39	1
45	0.38	0.14	1
46	0.25	-0.11	1
47	0.74	0.55	1
PE1*	2.32	0.70	1
PE2	2.33	0.70	1
PE3	1.49	0.65	1

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

Table C.2. Item Statistics—Algebra I, Summer 2016

N-Count: 828

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.29	0.30	0
2	0.34	0.35	0
4	0.33	0.21	0
5	0.60	0.34	0

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
6	0.84	0.37	0
8	0.40	0.16	0
10	0.22	0.03	0
11	0.09	0.18	0
12	0.46	0.28	0
13	0.71	0.44	0
14	0.54	0.42	0
16	0.29	0.15	0
17	0.27	0.10	0
18	0.73	0.41	0
20	0.34	0.35	0
21	0.63	0.39	0
22	0.42	0.26	0
23	0.57	0.39	0
24	0.62	0.34	0
25	0.36	0.40	0
26	0.26	0.22	0
27	0.42	0.42	0
28	0.34	0.23	0
29	0.39	0.21	0
31	0.66	0.34	0
32	0.43	0.51	0
33	0.33	0.09	0
34	0.43	0.14	0
36	0.36	0.33	0
37	0.19	0.30	0
38	0.44	0.23	0
40	0.21	0.07	0
41	0.32	0.12	0
42	0.48	0.41	0
43	0.59	0.42	0
44	0.26	0.13	0
45	0.48	0.31	0
48	0.39	0.26	0
49	0.46	0.37	0
50	0.75	0.33	0
PE1*	0.97	0.53	1
PE2	0.54	0.55	1
PE3	0.37	0.53	1
PE4	0.71	0.58	1

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

Table C.3. Item Statistics for Biology, Summer 2016

N-Count: 245

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.64	0.46	0
2	0.56	0.37	1
3	0.69	0.53	0
4	0.64	0.51	1
5	0.57	0.42	0
10	0.52	0.45	0

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
11	0.28	0.17	0
12	0.52	0.33	0
13	0.54	0.35	0
14	0.31	0.11	0
15	0.42	0.31	0
16	0.57	0.53	0
17	0.37	0.21	1
18	0.64	0.59	0
19	0.42	0.27	0
20	0.51	0.23	0
21	0.22	-0.05	0
26	0.53	0.57	0
27	0.68	0.60	1
28	0.51	0.38	0
29	0.40	0.44	0
30	0.58	0.51	1
31	0.64	0.39	1
32	0.49	0.31	0
33	0.33	0.22	1
34	0.39	0.19	0
35	0.34	0.24	0
36	0.43	0.44	0
37	0.62	0.51	1
38	0.48	0.43	0
43	0.49	0.37	0
44	0.30	0.14	0
45	0.49	0.40	0
46	0.39	0.31	0
47	0.51	0.20	1
PE1*	0.62	0.48	1
PE2	0.58	0.52	1
PE3	0.71	0.52	1
PE4	0.49	0.54	1
PE5	0.66	0.53	1
PE6	1.22	0.66	1
PE7	0.60	0.58	1
PE8	0.28	0.42	1
PE9	0.62	0.67	1
PE10	0.53	0.37	1
PE11	0.35	0.46	1
PE12	0.43	0.32	1
PE13	0.42	0.55	1

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

Table C.4. Item Statistics—English I, Summer 2016

N-Count: 23

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.83	0.36	0
2	0.57	0.18	0
3	0.35	0.28	0
4	0.70	-0.14	0
5	0.65	0.34	0
6	0.91	0.39	0
7	0.74	0.40	0
8	0.65	0.29	0
9	0.78	0.33	0
10	0.70	0.27	0
11	0.57	0.44	4
12	0.65	0.39	4
13	0.39	0.46	0
14	0.09	-0.17	0
15	0.17	0.04	0
16	0.04	0.05	0
17	0.61	0.43	0
18	0.61	0.62	0
19	0.44	0.55	0
20	0.35	0.16	0
21	0.74	0.15	0
22	0.57	0.41	0
23	0.83	0.55	0
24	0.35	0.49	0
25	0.22	0.28	0
26	0.48	0.16	0
27	0.65	0.69	0
28	0.30	0.12	0
29	0.57	0.06	0
30	0.87	0.32	0
31	0.35	-0.02	0
32	0.65	0.05	0
33	0.39	0.34	0
34	0.52	0.42	0
35	0.57	-0.11	0
PE1*	2.65	0.16	0
PE2	2.57	0.53	0
PE3	1.57	0.54	0

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

Table C.5. Item Statistics—Algebra II, Summer 2016

N-Count: 19

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.63	0.46	0
2	0.79	0.19	0
3	0.42	0.50	0
4	0.42	0.55	0
5	0.79	0.37	0
6	0.42	0.18	0

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
8	0.37	0.53	0
10	0.68	0.27	0
11	0.68	0.50	0
12	0.74	0.15	0
13	0.37	0.53	0
14	0.68	0.36	0
15	0.74	0.28	0
16	0.32	-0.20	0
17	0.32	-0.10	0
18	0.37	0.38	0
19	0.63	0.01	0
20	0.32	0.54	0
21	0.32	0.59	0
22	0.58	0.45	0
23	0.58	0.35	0
24	0.37	0.32	0
27	0.68	0.40	0
28	0.37	-0.04	0
29	0.58	0.40	0
30	0.58	0.52	0
31	0.79	0.59	0
34	0.16	0.07	0
37	0.37	0.66	0
39	0.74	0.06	0
40	0.74	0.39	0
41	0.63	0.50	0
42	0.58	0.02	0
44	0.37	0.06	0
45	0.47	-0.07	0
46	0.58	0.52	0
47	0.84	0.07	0
48	0.21	0.27	0
49	0.32	0.13	0
50	0.47	0.33	0

Table C.6. Item Statistics—Geometry, Summer 2016

N-Count: 59

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.78	0.32	0
2	0.56	0.42	0
3	0.27	0.26	0
4	0.36	0.16	0
5	0.63	0.25	0
6	0.44	0.25	0
7	0.32	0.46	0
8	0.22	0.49	0
9	0.85	0.42	2
10	0.61	0.29	2
11	0.24	0.17	2
12	0.80	0.31	2
13	0.39	0.37	2
14	0.27	0.42	2

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
15	0.81	0.29	2
16	0.59	0.35	2
17	0.44	0.39	2
18	0.37	0.28	2
19	0.59	0.49	2
20	0.64	0.42	2
21	0.53	0.23	2
22	0.49	0.31	2
23	0.76	0.27	2
24	0.27	0.48	2
25	0.48	0.54	2
26	0.68	0.17	2
27	0.48	0.25	3
28	0.66	0.41	2
29	0.24	0.05	2
30	0.53	0.34	2
31	0.53	0.36	2
32	0.78	0.43	2
33	0.48	0.44	2
34	0.51	0.54	2
35	0.63	0.20	2
36	0.25	0.47	2
37	0.25	0.19	2
38	0.32	0.33	2
39	0.56	0.44	2
40	0.15	0.30	2

Table C.7. Item Statistics—Government, Summer 2016

N-Count: 760

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.68	0.43	0
2	0.57	0.01	0
3	0.41	0.26	0
4	0.85	0.53	0
5	0.62	0.36	0
6	0.87	0.39	0
7	0.79	0.37	0
8	0.62	0.34	0
9	0.69	0.38	0
10	0.80	0.46	0
16	0.59	0.44	0
17	0.41	0.22	0
18	0.68	0.24	0
19	0.74	0.55	0
20	0.82	0.32	0
21	0.69	0.41	0
22	0.68	0.42	0
23	0.54	0.33	0
24	0.57	0.38	0
25	0.67	0.46	0
26	0.68	0.48	0
27	0.67	0.48	0

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
28	0.48	0.16	0
29	0.75	0.52	0
30	0.77	0.56	0
31	0.80	0.48	0
32	0.62	0.50	0
33	0.61	0.42	0
34	0.71	0.52	0
35	0.80	0.40	0
41	0.62	0.43	0
42	0.58	0.33	0
43	0.83	0.51	0
44	0.53	0.32	0
45	0.80	0.42	0
46	0.58	0.46	0
47	0.49	0.31	0
48	0.72	0.49	0
49	0.66	0.49	0
50	0.53	0.49	0

Table C.8. Item Statistics—American History, Summer 2016

N-Count: 69

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.96	0.18	0
2	0.88	0.26	0
3	0.59	0.37	0
4	0.75	0.49	0
5	0.77	0.23	0
6	0.78	0.18	0
7	0.77	0.35	0
8	0.58	0.14	0
9	0.78	0.26	0
10	0.58	0.32	0
16	0.58	0.22	0
17	0.62	0.28	0
18	0.39	0.41	0
19	0.61	0.32	0
20	0.67	0.41	0
21	0.71	0.43	0
22	0.86	0.26	0
23	0.44	0.07	0
24	0.68	0.46	0
25	0.45	0.12	0
26	0.49	0.57	0
27	0.48	0.36	0
28	0.36	0.04	0
29	0.67	0.59	0
30	0.33	0.06	0
31	0.80	0.17	0
32	0.36	0.30	0
33	0.46	-0.02	0
34	0.49	0.20	0
35	0.55	0.34	0

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
41	0.32	0.34	0
42	0.71	0.42	0
43	0.39	0.32	0
44	0.91	0.39	0
45	0.25	0.37	0
46	0.75	0.59	0
47	0.83	0.49	0
48	0.87	0.35	0
49	0.46	0.38	0
50	0.67	0.36	0

Table C.9. Item Statistics—Physical Science, Summer 2016

N-Count: 11

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.91	0.31	0
2	0.91	0.22	0
3	1.00	--	0
4	0.91	-0.02	0
5	0.91	-0.02	0
6	0.73	-0.12	0
7	0.36	0.35	0
8	0.64	0.00	0
9	0.46	-0.27	0
10	0.27	0.79	0
16	0.64	0.30	0
17	0.73	-0.07	0
18	0.91	0.31	0
19	0.27	0.55	0
20	0.36	0.09	0
21	0.46	-0.22	0
22	0.18	0.07	0
23	0.55	0.63	0
24	1.00	--	0
25	0.64	0.15	0
26	0.82	-0.31	0
27	0.82	0.04	0
28	0.73	0.20	0
29	0.36	0.45	0
30	0.64	0.20	0
31	0.00	--	0
32	1.00	--	0
33	0.46	0.29	0
34	0.64	0.35	0
35	0.18	-0.05	0
41	0.82	0.35	0
42	0.73	0.42	0
43	0.46	-0.18	0
44	0.27	0.15	0
45	0.09	0.62	0

Table C.10. Item Statistics—English II, Fall 2016

N-Count: 3,191

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.73	0.37	0
2	0.36	0.12	0
3	0.76	0.32	0
4	0.41	0.29	0
5	0.69	0.37	0
6	0.87	0.37	0
7	0.62	0.42	0
14	0.56	0.28	0
15	0.49	0.21	0
16	0.74	0.44	0
17	0.65	0.36	0
18	0.35	0.25	0
19	0.65	0.50	0
20	0.30	0.27	0
21	0.53	0.32	0
22	0.68	0.52	1
23	0.32	0.22	1
24	0.65	0.52	1
31	0.77	0.49	0
32	0.67	0.56	1
33	0.47	0.21	1
34	0.71	0.51	1
35	0.51	0.44	1
36	0.79	0.50	1
37	0.52	0.36	1
38	0.69	0.57	1
39	0.36	0.28	1
40	0.79	0.55	1
41	0.63	0.52	1
42	0.51	0.33	1
43	0.57	0.49	0
44	0.45	0.37	0
45	0.43	0.27	1
46	0.25	-0.01	0
47	0.82	0.52	1
PE1*	2.42	0.70	2
PE2	2.42	0.70	2
PE3	1.59	0.61	2

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

Table C.11. Item Statistics—Algebra I, Fall 2016

N-Count: 4,428

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.26	0.34	0
2	0.33	0.42	0
4	0.31	0.26	0
5	0.62	0.39	0
6	0.86	0.35	0

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
8	0.41	0.21	0
10	0.24	-0.01	0
11	0.11	0.25	0
12	0.43	0.31	0
13	0.72	0.47	0
14	0.55	0.45	0
16	0.35	0.25	0
17	0.27	0.11	0
18	0.64	0.49	0
20	0.34	0.49	1
21	0.63	0.42	0
22	0.44	0.17	1
23	0.57	0.46	0
24	0.59	0.38	0
25	0.38	0.51	0
26	0.25	0.41	0
27	0.38	0.52	1
28	0.33	0.23	0
29	0.47	0.29	0
31	0.67	0.36	1
32	0.43	0.54	0
33	0.29	0.09	0
34	0.45	0.23	0
36	0.41	0.41	0
37	0.27	0.43	1
38	0.45	0.40	1
40	0.24	0.15	0
41	0.32	0.14	0
42	0.43	0.53	1
43	0.60	0.40	1
44	0.29	0.12	1
45	0.49	0.36	1
48	0.40	0.36	0
49	0.45	0.48	1
50	0.74	0.34	1
PE1*	1.00	0.62	1
PE2	0.74	0.68	1
PE3	0.43	0.60	1
PE4	0.91	0.64	1

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

Table C.12. Item Statistics—Biology, Fall 2016

N-Count: 3,118

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.79	0.50	0
2	0.63	0.43	0
3	0.75	0.44	0
4	0.75	0.45	0
5	0.68	0.32	0
10	0.64	0.44	0
11	0.40	0.31	0
12	0.64	0.24	0

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
13	0.62	0.32	0
14	0.41	0.37	0
15	0.53	0.45	0
16	0.72	0.42	0
17	0.49	0.46	0
18	0.82	0.55	0
19	0.58	0.40	0
20	0.58	0.38	0
21	0.25	0.21	0
26	0.67	0.54	0
27	0.79	0.56	0
28	0.63	0.53	0
29	0.51	0.45	0
30	0.76	0.51	0
31	0.69	0.31	0
32	0.55	0.30	0
33	0.49	0.24	0
34	0.46	0.21	0
35	0.45	0.40	0
36	0.63	0.50	0
37	0.78	0.53	0
38	0.63	0.31	0
43	0.62	0.46	0
44	0.45	0.41	0
45	0.61	0.35	0
46	0.52	0.41	0
47	0.56	0.30	0
PE1*	0.70	0.55	1
PE2	0.71	0.52	1
PE3	0.83	0.42	1
PE4	0.67	0.45	2
PE5	0.89	0.53	3
PE6	1.78	0.71	2
PE7	0.78	0.39	1
PE8	0.47	0.45	2
PE9	0.79	0.49	2
PE10	0.91	0.45	3
PE11	0.51	0.50	3
PE12	0.70	0.37	3
PE13	0.63	0.57	3

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

Table C.13. Item Statistics—English I, Fall 2016

N-Count: 266

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.83	0.40	0
2	0.66	0.40	0
3	0.41	0.01	0
4	0.66	0.30	0
5	0.73	0.48	0
6	0.96	0.36	0

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
7	0.84	0.46	0
8	0.85	0.56	0
9	0.87	0.54	0
10	0.68	0.41	0
11	0.66	0.45	0
12	0.86	0.46	0
13	0.61	0.18	0
14	0.20	-0.03	0
15	0.34	0.16	0
16	0.28	0.19	0
17	0.69	0.26	0
18	0.73	0.45	0
19	0.53	0.34	0
20	0.28	0.13	0
21	0.72	0.14	0
22	0.77	0.30	0
23	0.83	0.41	0
24	0.46	0.48	0
25	0.32	0.29	0
26	0.35	0.10	0
27	0.58	0.38	0
28	0.26	0.07	0
29	0.52	0.21	0
30	0.82	0.40	0
31	0.55	0.40	0
32	0.65	0.37	0
33	0.53	0.40	0
34	0.61	0.46	0
35	0.62	0.34	0
PE1*	2.70	0.63	1
PE2	2.77	0.65	1
PE3	1.71	0.57	1

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

Table C.14. Item Statistics—Algebra II, Fall 2016

N-Count: 836

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.77	0.51	0
2	0.83	0.28	0
3	0.47	0.48	0
4	0.65	0.27	0
5	0.77	0.54	0
6	0.55	0.40	0
8	0.73	0.50	0
10	0.80	0.41	0
11	0.86	0.34	0
12	0.75	0.38	0
13	0.52	0.38	0
14	0.50	0.37	0
15	0.75	0.42	0
16	0.35	0.18	0
17	0.55	0.29	0

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
18	0.37	0.22	0
19	0.56	0.48	0
20	0.77	0.41	0
21	0.55	0.17	0
22	0.68	0.32	0
23	0.72	0.45	0
24	0.61	0.39	0
27	0.67	0.34	0
28	0.44	0.47	0
29	0.63	0.40	0
30	0.65	0.32	0
31	0.79	0.54	0
34	0.37	0.33	0
37	0.47	0.48	0
39	0.55	0.35	0
40	0.78	0.46	0
41	0.69	0.36	0
42	0.44	0.44	0
44	0.52	0.40	0
45	0.56	0.46	0
46	0.66	0.45	0
47	0.85	0.33	0
48	0.28	0.27	0
49	0.44	0.39	0
50	0.63	0.25	0

Table C.15. Item Statistics—Geometry, Fall 2016

N-Count: 1,007

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.85	0.43	0
2	0.56	0.35	0
3	0.32	0.27	0
4	0.52	0.36	0
5	0.70	0.23	0
6	0.62	0.34	0
7	0.43	0.41	0
8	0.27	0.31	0
9	0.83	0.22	0
10	0.76	0.39	0
11	0.42	0.18	0
12	0.80	0.44	0
13	0.54	0.46	0
14	0.38	0.40	0
15	0.89	0.30	0
16	0.62	0.42	0
17	0.51	0.38	0
18	0.51	0.43	0
19	0.72	0.45	0
20	0.56	0.29	0
21	0.65	0.52	0
22	0.69	0.40	0
23	0.81	0.31	0

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
24	0.47	0.42	0
25	0.70	0.39	0
26	0.82	0.40	0
27	0.57	0.34	0
28	0.80	0.36	0
29	0.20	0.34	0
30	0.64	0.38	0
31	0.65	0.40	0
32	0.85	0.30	0
33	0.47	0.50	0
34	0.55	0.36	0
35	0.72	0.31	0
36	0.42	0.45	0
37	0.39	0.21	0
38	0.28	0.39	0
39	0.67	0.45	0
40	0.17	0.25	0

Table C.16. Item Statistics—Government, Fall 2016

N-Count: 13,304

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.69	0.41	0
2	0.60	0.08	0
3	0.46	0.25	0
4	0.87	0.45	0
5	0.61	0.37	0
6	0.88	0.37	0
7	0.81	0.36	0
8	0.69	0.32	0
9	0.74	0.40	0
10	0.79	0.53	0
16	0.51	0.40	0
17	0.39	0.27	0
18	0.73	0.27	0
19	0.76	0.47	0
20	0.83	0.29	0
21	0.73	0.44	0
22	0.66	0.42	0
23	0.51	0.36	0
24	0.54	0.34	0
25	0.72	0.44	0
26	0.70	0.50	0
27	0.70	0.45	0
28	0.59	0.16	0
29	0.74	0.52	0
30	0.77	0.50	0
31	0.79	0.48	0
32	0.65	0.45	0
33	0.62	0.41	0
34	0.72	0.49	0
35	0.77	0.28	0
41	0.63	0.42	0

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
42	0.61	0.33	0
43	0.81	0.48	0
44	0.55	0.36	0
45	0.78	0.35	0
46	0.59	0.48	0
47	0.46	0.33	0
48	0.74	0.49	0
49	0.67	0.47	0
50	0.59	0.53	0

Table C.17. Item Statistics—American History, Fall 2016

N-Count: 580

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.84	0.28	0
2	0.60	0.44	0
3	0.83	0.32	0
4	0.51	0.51	0
5	0.56	0.31	0
6	0.79	0.45	0
7	0.72	0.42	0
8	0.55	0.46	0
9	0.40	0.34	0
10	0.71	0.30	0
16	0.55	0.32	0
17	0.82	0.36	0
18	0.55	0.42	0
19	0.71	0.36	0
20	0.51	0.52	0
21	0.57	0.36	0
22	0.61	0.43	0
23	0.40	0.22	0
24	0.59	0.19	0
25	0.58	0.30	0
26	0.56	0.23	0
27	0.47	0.21	0
28	0.51	0.45	0
29	0.70	0.37	0
30	0.44	0.47	0
31	0.26	0.37	0
32	0.41	0.34	0
33	0.52	0.32	0
34	0.59	0.43	1
35	0.70	0.34	0
41	0.62	0.41	0
42	0.73	0.36	0
43	0.58	0.13	0
44	0.51	0.42	0
45	0.46	0.27	0
46	0.68	0.37	0
47	0.74	0.39	0
48	0.60	0.30	0
49	0.51	0.35	0

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
50	0.61	0.41	0

Table C.18. Item Statistics—English II, Spring 2017

N-Count: 61,594

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.57	0.08	0
2	0.79	0.39	0
3	0.90	0.38	0
4	0.60	0.22	0
5	0.93	0.32	0
6	0.79	0.36	0
7	0.87	0.40	0
8	0.71	0.45	0
9	0.83	0.24	0
10	0.81	0.45	0
11	0.35	0.14	0
12	0.74	0.31	0
25	0.61	0.34	0
26	0.72	0.40	0
27	0.51	0.22	0
28	0.64	0.29	0
29	0.57	0.37	0
30	0.37	0.21	0
31	0.82	0.33	0
32	0.64	0.24	0
33	0.62	0.43	0
34	0.35	0.13	0
35	0.62	0.12	0
36	0.42	0.18	0
37	0.59	0.36	0
38	0.60	0.37	0
39	0.58	0.31	0
40	0.74	0.51	0
41	0.68	0.51	0
42	0.79	0.52	0
43	0.44	0.36	0
44	0.80	0.40	0
45	0.71	0.48	0
46	0.63	0.32	0
47	0.87	0.40	0
PE1*	2.89	0.52	0
PE2	2.89	0.53	0
PE3	1.88	0.44	0

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

Table C.19. Item Statistics—Algebra I, Spring 2017

N-Count: 60,406

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.59	0.32	0
2	0.49	0.12	0
4	0.41	0.33	0
5	0.95	0.23	0
6	0.57	0.50	0
8	0.42	0.26	0
10	0.76	0.45	0
11	0.54	0.35	0
12	0.19	0.41	0
13	0.58	0.44	0
14	0.53	0.30	0
16	0.61	0.50	0
17	0.45	0.41	0
18	0.52	0.42	0
20	0.61	0.45	0
21	0.65	0.37	0
22	0.28	0.20	0
23	0.75	0.41	0
24	0.35	0.14	0
25	0.54	0.16	0
26	0.45	0.25	0
27	0.90	0.23	0
28	0.83	0.39	0
29	0.48	0.43	0
31	0.58	0.33	0
32	0.41	0.29	0
33	0.59	0.44	0
34	0.64	0.44	0
36	0.53	0.43	0
37	0.74	0.42	0
38	0.53	0.48	0
40	0.40	0.22	0
41	0.53	0.26	0
42	0.72	0.48	0
43	0.52	0.32	0
44	0.49	0.13	0
45	0.47	0.39	0
48	0.62	0.37	0
49	0.62	0.55	0
50	0.40	0.35	0
*PE1	1.25	0.62	1
PE2	1.03	0.41	1
PE3	0.79	0.55	1

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

Table C.20. Item Statistics—Biology, Spring 2017

N-Count: 61,957

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.93	0.37	0
2	0.92	0.27	0
3	0.85	0.26	0
4	0.80	0.44	0
5	0.83	0.38	0
10	0.84	0.39	0
11	0.78	0.53	0
12	0.82	0.47	0
13	0.75	0.26	0
14	0.62	0.39	0
15	0.61	0.27	0
16	0.79	0.35	0
17	0.65	0.34	0
18	0.64	0.54	0
19	0.72	0.38	0
20	0.82	0.44	0
21	0.59	0.37	0
26	0.67	0.37	0
27	0.73	0.31	0
28	0.76	0.51	0
29	0.68	0.47	0
30	0.76	0.49	0
31	0.64	0.39	0
32	0.40	0.17	0
33	0.54	0.34	0
34	0.63	0.35	0
35	0.47	0.07	0
36	0.59	0.39	0
37	0.57	0.36	0
38	0.44	0.19	0
43	0.55	0.39	0
44	0.60	0.40	0
45	0.39	0.33	0
46	0.42	0.22	0
47	0.42	0.24	0
PE1*	0.76	0.42	0
PE2	0.70	0.43	0
PE3	0.66	0.45	0
PE4	1.72	0.57	0
PE5	0.97	0.39	1
PE6	2.15	0.46	0
PE7	2.55	0.61	0
PE8	1.15	0.48	1
PE9	0.98	0.19	1
PE10	0.97	0.15	1

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

Table C.21. Item Statistics—English I, Spring 2017

N-Count: 12,870

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.84	0.37	0
2	0.66	0.31	0
3	0.41	0.00	0
4	0.64	0.27	0
5	0.70	0.40	0
6	0.96	0.29	0
7	0.83	0.43	0
8	0.81	0.45	0
9	0.87	0.44	0
10	0.68	0.34	0
11	0.68	0.40	0
12	0.83	0.41	0
13	0.57	0.25	0
14	0.20	0.00	0
15	0.34	0.17	0
16	0.25	0.23	0
17	0.68	0.28	0
30	0.70	0.33	0
31	0.53	0.32	0
32	0.30	0.14	0
33	0.70	0.20	0
34	0.67	0.32	0
35	0.83	0.39	0
36	0.38	0.45	0
37	0.31	0.28	0
38	0.35	0.12	0
39	0.63	0.36	0
40	0.27	0.13	0
41	0.51	0.22	0
42	0.81	0.37	0
43	0.54	0.42	0
44	0.65	0.37	0
45	0.53	0.37	0
46	0.57	0.44	0
47	0.55	0.31	0
PE1*	2.85	0.53	0
PE2	2.85	0.54	0
PE3	1.83	0.43	0

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

Table C.22. Item Statistics—Algebra II, Spring 2017

N-Count: 18,348

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.43	0.38	0
2	0.66	0.36	0
3	0.47	0.26	0
4	0.71	0.34	0
5	0.68	0.46	0
6	0.37	0.26	0

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
8	0.41	0.45	0
10	0.48	0.36	0
11	0.78	0.46	0
12	0.81	0.45	0
13	0.89	0.32	0
14	0.78	0.36	0
15	0.80	0.43	0
16	0.44	0.35	0
17	0.92	0.23	0
18	0.70	0.33	0
19	0.80	0.33	0
20	0.80	0.36	0
21	0.73	0.47	0
22	0.70	0.27	0
23	0.72	0.36	0
24	0.78	0.36	0
27	0.35	0.28	0
28	0.76	0.44	0
29	0.35	0.18	0
30	0.44	0.45	0
31	0.56	0.22	0
34	0.69	0.38	0
37	0.73	0.44	0
39	0.39	0.33	0
40	0.70	0.36	0
41	0.58	0.43	0
42	0.62	0.40	0
44	0.40	0.33	0
45	0.39	0.33	0
46	0.50	0.29	0
47	0.82	0.38	0
48	0.68	0.26	0
49	0.68	0.41	0
50	0.52	0.29	0

Table C.23. Item Statistics—Geometry, Spring 2017

N-Count: 7,003

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.83	0.35	0
2	0.53	0.33	0
3	0.35	0.31	0
4	0.47	0.31	0
6	0.72	0.19	0
7	0.56	0.34	0
8	0.36	0.34	0
10	0.22	0.32	0
11	0.83	0.29	0
12	0.65	0.39	0
14	0.37	0.16	0
15	0.78	0.35	0
16	0.50	0.39	0
18	0.34	0.39	0

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
19	0.89	0.25	0
20	0.56	0.35	0
22	0.48	0.33	0
23	0.46	0.40	0
24	0.68	0.41	0
25	0.55	0.27	0
26	0.61	0.38	0
27	0.65	0.38	0
28	0.78	0.28	0
30	0.42	0.40	0
31	0.61	0.38	0
32	0.69	0.35	0
34	0.53	0.29	0
35	0.73	0.37	0
36	0.19	0.29	0
38	0.50	0.33	0
39	0.59	0.32	0
40	0.78	0.40	0
42	0.42	0.45	0
43	0.49	0.32	0
44	0.63	0.25	0
46	0.42	0.38	0
47	0.32	0.13	0
48	0.27	0.39	0
49	0.63	0.42	0
50	0.16	0.23	0

Table C.24. Item Statistics—Government, Spring 2017

N-Count: 46,661

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.82	0.45	0
2	0.92	0.29	0
3	0.75	0.44	0
4	0.86	0.29	0
5	0.72	0.29	0
6	0.79	0.29	0
7	0.68	0.44	0
8	0.86	0.29	0
9	0.80	0.38	0
10	0.62	0.26	0
16	0.29	0.25	0
17	0.61	0.15	0
18	0.43	0.27	0
19	0.56	0.22	0
20	0.38	0.36	0
21	0.69	0.17	0
22	0.42	0.34	0
23	0.35	0.23	0
24	0.47	0.34	0
25	0.47	0.43	0
26	0.27	0.19	0
27	0.70	0.35	0

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
28	0.78	0.34	0
29	0.63	0.39	0
30	0.63	0.47	0
31	0.45	0.34	0
32	0.53	0.19	0
33	0.61	0.49	0
34	0.66	0.54	0
35	0.48	0.32	0
41	0.80	0.42	0
42	0.87	0.43	0
43	0.75	0.51	0
44	0.83	0.43	0
45	0.68	0.50	0
46	0.84	0.38	0
47	0.77	0.41	0
48	0.70	0.35	0
49	0.75	0.47	0
50	0.78	0.34	0

Table C.25. Item Statistics—American History, Spring 2017

N-Count: 6,498

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.82	0.33	0
2	0.59	0.41	0
3	0.79	0.36	0
4	0.59	0.50	0
5	0.57	0.21	0
6	0.82	0.37	0
7	0.78	0.42	0
8	0.53	0.45	0
9	0.43	0.37	0
10	0.72	0.31	0
16	0.57	0.28	0
17	0.81	0.40	0
18	0.63	0.37	0
19	0.67	0.36	0
20	0.45	0.46	0
21	0.61	0.41	0
22	0.50	0.44	0
23	0.44	0.18	0
24	0.52	0.28	0
25	0.58	0.34	0
26	0.54	0.28	0
27	0.46	0.24	0
28	0.59	0.44	0
29	0.68	0.34	0
30	0.41	0.43	0
31	0.26	0.31	0
32	0.40	0.28	0
33	0.45	0.36	0
34	0.61	0.36	0
35	0.66	0.38	0

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
41	0.58	0.42	0
42	0.74	0.34	0
43	0.58	0.08	0
44	0.53	0.37	0
45	0.44	0.27	0
46	0.59	0.35	0
47	0.70	0.39	0
48	0.59	0.30	0
49	0.42	0.39	0
50	0.64	0.42	0

Table C.25. Item Statistics—Physical Science, Spring 2017

N-Count: 2,940

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
1	0.83	0.31	0
2	0.70	0.31	0
3	0.65	0.32	0
4	0.73	0.22	0
5	0.74	0.23	0
6	0.62	0.29	0
7	0.57	0.21	0
8	0.52	0.43	0
9	0.60	0.35	0
10	0.20	0.08	0
11	0.52	0.05	0
12	0.69	0.35	0
13	0.56	0.30	0
14	0.52	0.37	0
15	0.42	0.24	0
16	0.42	0.17	0
17	0.49	0.13	0
18	0.57	0.31	0
19	0.60	0.29	0
20	0.38	0.30	0
21	0.74	0.20	0
22	0.43	0.29	0
23	0.53	0.32	0
24	0.41	0.36	0
25	0.63	0.27	0
26	0.07	0.09	0
27	0.40	0.36	0
28	0.39	0.31	0
29	0.43	0.37	0
30	0.37	0.11	0
31	0.57	0.31	0
32	0.55	0.25	0
33	0.46	0.37	0
34	0.28	0.14	0
35	0.27	0.25	0
36	0.29	0.12	0
37	0.17	0.14	0
38	0.17	0.04	0

Item #	*P*-Value/Mean	Corrected Point-Biserial Correlation	Omit Rate (%)
39	0.53	0.37	0
40	0.20	0.04	0
41	0.42	0.21	0
42	0.23	0.15	0
43	0.27	0.31	0
44	0.15	-0.07	0
45	0.15	0.01	0

Appendix D: Raw-to-Scale Score (RSS) Conversions

Table D.1. RSS Conversions—English II, Summer 2016

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

Raw Score	Scale Score	CSEM
41	236	9
42	242	10
43	249	12
44	250	16
45	250	29

Table D.2. RSS Conversions—Algebra I, Summer 2016

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

Raw Score	Scale Score	CSEM
36	234	7
37	236	7
38	239	7
39	241	8
40	244	8
41	247	8
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

Table D.3. RSS Conversions—Biology, Summer 2016

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

Raw Score	Scale Score	CSEM
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
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

Table D.4. RSS Conversions—English I, Summer 2016

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

Raw Score	Scale Score	CSEM
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

Table D.5. RSS Conversions—Algebra II, Summer 2016

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

Table D.6. RSS Conversions—Geometry, Summer 2016

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

Table D.7. RSS Conversions—Government, Summer 2016

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

Table D.8. RSS Conversions—American History, Summer 2016

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

Table D.9. RSS Conversions—Physical Science, Summer 2016

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

Raw Score	Scale Score	CSEM
43	250	17
44	250	24
45	250	43

Table D.10. RSS Conversions—English II, Fall 2016

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

Raw Score	Scale Score	CSEM
38	225	7
39	228	7
40	232	8
41	236	9
42	242	10
43	249	12
44	250	16
45	250	29

Table D.11. RSS Conversions—Algebra I, Fall 2016

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

Raw Score	Scale Score	CSEM
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
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

Table D.12. RSS Conversions—Biology, Fall 2016

Raw Score	Scale Score	CSEM
0	100	36
1	107	20
2	121	14
3	130	12
4	136	10
5	141	9
6	145	9
7	149	8
8	152	8
9	155	8
10	158	7
11	161	7
12	163	7
13	166	7
14	168	7
15	170	6
16	172	6
17	174	6
18	176	6
19	178	6
20	180	6
21	181	6
22	183	6

Raw Score	Scale Score	CSEM
23	185	6
24	187	6
25	188	6
26	190	6
27	192	6
28	193	6
29	195	6
30	196	6
31	198	6
32	200	6
33	201	6
34	203	6
35	205	6
36	206	6
37	208	6
38	210	6
39	212	6
40	214	6
41	216	6
42	218	7
43	220	7
44	223	7
45	225	7
46	228	7
47	231	8
48	234	8
49	238	9
50	242	10
51	247	11
52	250	12
53	250	14
54	250	20
55	250	36

Table D.13. RSS Conversions—English I, Fall 2016

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

Raw Score	Scale Score	CSEM
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

Table D.14. RSS Conversions—Algebra II, Fall 2016

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

Table D.15. RSS Conversions—Geometry, Fall 2016

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

Table D.16. RSS Conversions—Government, Fall 2016

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

Table D.17. RSS Conversions—American History, Fall 2016

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

Table D.18. RSS Conversions—English II, Spring 2017

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

Raw Score	Scale Score	CSEM
43	250	12
44	250	16
45	250	29

Table D.19. RSS Conversions—Algebra I, Spring 2017

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

Raw Score	Scale Score	CSEM
38	231	7
39	234	7
40	236	8
41	239	8
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

Table D.20. RSS Conversions—Biology, Spring 2017

Raw Score	Scale Score	CSEM
0	100	36
1	100	20
2	114	15
3	124	13
4	131	11
5	137	10
6	142	9
7	146	9
8	150	8
9	153	8
10	156	8
11	159	7
12	162	7
13	164	7
14	167	7
15	169	7
16	171	6
17	173	6
18	175	6
19	177	6
20	179	6
21	180	6
22	182	6
23	184	6
24	185	6
25	187	6
26	189	6
27	190	6

Raw Score	Scale Score	CSEM
28	192	6
29	194	6
30	195	6
31	197	6
32	198	6
33	200	6
34	202	6
35	203	6
36	205	6
37	207	6
38	209	6
39	210	6
40	212	6
41	214	6
42	216	6
43	218	7
44	221	7
45	225	7
46	226	7
47	229	8
48	232	8
49	235	9
50	239	9
51	244	10
52	250	12
53	250	14
54	250	20
55	250	36

Table D.21. RSS Conversions—English I, Spring 2017

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

Raw Score	Scale Score	CSEM
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

Table D.22. RSS Conversions—Algebra II, Spring 2017

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

Table D.23. RSS Conversions—Geometry, Spring 2017

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

Table D.24. RSS Conversions—Government, Spring 2017

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

Table D.25. RSS Conversions—American History, Spring 2017

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

Table D.26. RSS Conversions—Physical Science, Spring 2017

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

Appendix E: Descriptive Statistics by Demographic Group

Table E.1. Scale Score Descriptive Statistics by Demographic Group—Gender, Summer 2016

Test Period	Content Area	Gender	N-Count	Min.	Max.	Mean	SD
Summer 2016	English II	Female	135	156	228	195.89	17.64
		Male	186	152	242	193.71	16.62
	Algebra I	Female	410	164	250	202.15	17.77
		Male	418	153	250	199.97	17.27
	Biology	Female	109	100	250	185.53	24.28
		Male	136	137	228	186.51	20.36
	English I	Female	12	178	228	201.42	14.79
		Male	11	171	211	191.73	13.10
	Algebra II	Female	10	170	222	191.50	18.21
		Male	9	--	--	--	--
	Geometry	Female	26	173	239	198.31	17.78
		Male	33	148	250	197.30	20.85
	Government	Female	441	152	250	204.22	21.22
		Male	319	128	250	206.15	23.45
	Am. History	Female	44	151	250	201.52	21.33
		Male	25	146	250	207.00	25.58
	Physical Science	Female	4	--	--	--	--
		Male	7	--	--	--	--

Table E.2. Scale Score Descriptive Statistics by Demographic Group—Gender, Fall 2016

Test Period	Content Area	Gender	N-Count	Min.	Max.	Mean	SD
Fall 2016	English II	Female	1,465	156	249	203.59	16.58
		Male	1,726	111	249	196.90	17.42
	Algebra I	Female	2,052	100	250	202.13	19.96
		Male	2,376	100	250	201.90	21.91
	Biology	Female	1,442	100	250	200.68	22.33
		Male	1,676	100	250	198.01	23.10
	English I	Female	130	164	242	204.25	16.66
		Male	136	162	248	202.64	16.99
	Algebra II	Female	446	151	250	208.65	23.35
		Male	390	100	250	211.22	25.46
	Geometry	Female	543	148	250	205.71	20.66
		Male	464	100	250	209.68	20.64
	Government	Female	6,622	143	250	205.34	20.99
		Male	6,682	100	250	207.60	22.69
	Am. History	Female	274	132	250	196.54	25.42
		Male	306	132	250	202.61	26.63

Table E.3. Scale Score Descriptive Statistics by Demographic Group—Gender, Spring 2017

Test Period	Content Area	Gender	N-Count	Min.	Max.	Mean	SD
Spring 2017	English II	Female	30,885	105	250	208.63	15.27
		Male	30,709	105	250	204.74	16.77
	Algebra I	Female	29,993	100	250	205.67	19.76
		Male	30,589	100	250	204.23	21.34
	Biology	Female	30,745	100	250	207.22	18.87
		Male	31,212	100	250	205.73	19.92
	English I	Female	6,417	147	250	205.47	15.70
		Male	6,453	137	250	200.68	15.64
	Algebra II	Female	9,862	100	250	211.33	22.19
		Male	8,486	139	250	214.25	23.27
	Geometry	Female	3,647	148	250	201.61	19.03
		Male	3,356	154	250	204.31	19.44
	Government	Female	22,918	100	250	204.81	19.01
		Male	23,743	100	250	206.11	20.67
	Am. History	Female	3,225	105	250	195.69	24.84
		Male	3,273	100	250	201.82	26.29
	Physical Science	Female	1,466	145	249	189.49	16.68
		Male	1,474	100	250	191.99	18.18

Table E.4. Scale Score Descriptive Statistics by Demographic Group—Ethnicity, Summer 2016

Test Period	Content Area	Ethnicity	N-Count	Min.	Max.	Mean	SD
Summer 2016	English II	American Indian/ Alaskan Native	3	--	--	--	--
		Asian	3	--	--	--	--
		Pacific Islander	1	--	--	--	--
		Black (not Hispanic)	141	152	228	191.15	16.87
		Hispanic	17	178	216	196.53	11.62
		White (not Hispanic)	150	152	225	197.31	16.89
		Multi-racial	6	--	--	--	--
	Algebra I	American Indian/ Alaskan Native	2	--	--	--	--
		Asian	9	--	--	--	--
		Pacific Islander	3	--	--	--	--
		Black (not Hispanic)	244	153	244	192.00	14.61
		Hispanic	34	172	218	196.59	10.98
		White (not Hispanic)	521	159	250	205.42	17.50
		Multi-racial	15	179	223	197.20	13.65
	Biology	American Indian/ Alaskan Native	1	--	--	--	--
		Asian	2	--	--	--	--
		Pacific Islander	2	--	--	--	--
		Black (not Hispanic)	108	100	228	180.25	21.95
		Hispanic	12	156	226	190.92	19.03
		White (not Hispanic)	118	137	250	190.25	21.81
		Multi-racial	2	--	--	--	--
	English I	American Indian/ Alaskan Native	--	--	--	--	--
		Asian	2	--	--	--	--
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	12	171	222	197.33	14.80
		Hispanic	3	--	--	--	--
		White (not Hispanic)	6	--	--	--	--
		Multi-racial	--	--	--	--	--
	Algebra II	American Indian/ Alaskan Native	--	--	--	--	--
		Asian	1	--	--	--	--
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	3	--	--	--	--
		Hispanic	1	--	--	--	--
		White (not Hispanic)	14	173	237	204.36	18.29
		Multi-racial	--	--	--	--	--

Table E.4 (continued). Scale Score Descriptive Statistics by Demographic Group—Ethnicity, Summer 2016

Test Period	Content Area	Ethnicity	N-Count	Min.	Max.	Mean	SD
Summer 2016	Geometry	American Indian/ Alaskan Native	--	--	--	--	--
		Asian	1	--	--	--	--
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	17	166	216	191.65	12.93
		Hispanic	16	169	239	199.69	21.36
		White (not Hispanic)	25	148	250	198.56	19.23
		Multi-racial	--	--	--	--	--
	Government	American Indian/ Alaskan Native	3	--	--	--	--
		Asian	29	168	250	215.76	22.54
		Pacific Islander	3	--	--	--	--
		Black (not Hispanic)	126	128	247	189.10	20.46
		Hispanic	48	168	250	203.67	18.41
		White (not Hispanic)	540	148	250	208.22	21.31
		Multi-racial	11	181	239	209.36	19.45
	Am. History	American Indian/ Alaskan Native	--	--	--	--	--
		Asian	1	--	--	--	--
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	11	173	250	204.27	21.95
		Hispanic	2	--	--	--	--
		White (not Hispanic)	55	146	250	202.87	23.53
		Multi-racial	--	--	--	--	--
	Physical Science	American Indian/ Alaskan Native	--	--	--	--	--
		Asian	--	--	--	--	--
		Pacific Islander	--	--	--	--	--
		Black (not Hispanic)	10	187	222	199.90	11.35
		Hispanic	1	--	--	--	--
		White (not Hispanic)	--	--	--	--	--
		Multi-racial	--	--	--	--	--

Table E.5. Scale Score Descriptive Statistics by Demographic Group—Ethnicity, Fall 2016

Test Period	Content Area	Ethnicity	N-Count	Min.	Max.	Mean	SD
Fall 2016	English II	American Indian/ Alaskan Native	12	176	225	199.58	16.63
		Asian	43	169	249	208.51	18.27
		Pacific Islander	7	--	--	--	--
		Black (not Hispanic)	1,282	111	236	196.57	16.21
		Hispanic	268	152	242	200.82	16.13
		White (not Hispanic)	1,481	147	249	202.42	17.93
		Multi-racial	98	152	242	201.86	18.50
	Algebra I	American Indian/ Alaskan Native	10	172	232	202.20	21.18
		Asian	86	153	250	222.95	25.03
		Pacific Islander	5	--	--	--	--
		Black (not Hispanic)	881	100	250	189.82	16.75
		Hispanic	327	100	250	196.67	18.46
		White (not Hispanic)	3,029	100	250	205.52	20.54
		Multi-racial	90	146	250	203.22	23.09
	Biology	American Indian/ Alaskan Native	12	158	208	184.42	15.19
		Asian	82	155	250	216.62	22.68
		Pacific Islander	5	--	--	--	--
		Black (not Hispanic)	657	100	242	185.23	19.56
		Hispanic	246	145	250	193.63	20.35
		White (not Hispanic)	2,037	141	250	204.01	21.76
		Multi-racial	79	149	247	195.00	24.27
	English I	American Indian/ Alaskan Native	3	--	--	--	--
		Asian	6	--	--	--	--
		Pacific Islander	3	--	--	--	--
		Black (not Hispanic)	22	164	222	189.27	17.01
		Hispanic	7	--	--	--	--
		White (not Hispanic)	217	162	248	205.37	16.12
		Multi-racial	8	--	--	--	--
	Algebra II	American Indian/ Alaskan Native	1	--	--	--	--
		Asian	40	155	250	227.03	25.21
		Pacific Islander	2	--	--	--	--
		Black (not Hispanic)	93	100	250	202.29	23.64
		Hispanic	54	155	250	207.30	24.69
		White (not Hispanic)	621	151	250	210.07	24.10
		Multi-racial	25	173	250	211.12	20.33

Table E.5 (continued). Scale Score Descriptive Statistics by Demographic Group—Ethnicity, Fall 2016

Test Period	Content Area	Ethnicity	N-Count	Min.	Max.	Mean	SD
Fall 2016	Geometry	American Indian/ Alaskan Native	1	--	--	--	--
		Asian	46	184	250	220.52	19.04
		Pacific Islander	9	--	--	--	--
		Black (not Hispanic)	117	154	250	192.83	16.20
		Hispanic	68	148	243	203.40	20.24
		White (not Hispanic)	721	100	250	209.97	20.16
		Multi-racial	45	169	249	203.69	21.14
	Government	American Indian/ Alaskan Native	70	162	250	203.83	21.58
		Asian	363	156	250	218.89	22.29
		Pacific Islander	39	156	228	194.56	21.08
		Black (not Hispanic)	2,491	137	250	195.44	18.71
		Hispanic	653	152	250	201.60	20.67
		White (not Hispanic)	9,370	100	250	209.35	21.61
		Multi-racial	318	152	250	205.91	22.59
	Am. History	American Indian/ Alaskan Native	--	--	--	--	--
		Asian	10	152	250	194.90	32.07
		Pacific Islander	1	--	--	--	--
		Black (not Hispanic)	53	143	250	191.87	24.04
		Hispanic	31	156	250	194.61	23.82
		White (not Hispanic)	463	132	250	201.32	26.23
		Multi-racial	22	156	250	193.32	27.72

Table E.6. Scale Score Descriptive Statistics by Demographic Group—Ethnicity, Spring 2017

Test Period	Content Area	Ethnicity	N-Count	Min.	Max.	Mean	SD
Spring 2017	English II	American Indian/ Alaskan Native	259	169	236	205.11	14.65
		Asian	1,263	105	250	212.12	18.55
		Pacific Islander	151	165	242	202.23	15.69
		Black (not Hispanic)	8,756	105	250	198.46	15.56
		Hispanic	3,246	146	250	203.08	15.90
		White (not Hispanic)	46,384	105	250	208.37	15.68
		Multi-racial	1,535	150	250	206.53	15.93
	Algebra I	American Indian/ Alaskan Native	261	162	250	202.64	17.95
		Asian	1,325	100	250	220.33	21.60
		Pacific Islander	136	148	249	198.50	19.52
		Black (not Hispanic)	9,613	100	250	194.48	18.03
		Hispanic	3,462	100	250	202.24	19.28
		White (not Hispanic)	44,176	100	250	206.98	20.33
		Multi-racial	1,609	134	250	205.48	20.41
	Biology	American Indian/ Alaskan Native	283	146	250	203.69	17.96
		Asian	1,240	146	250	215.67	21.34
		Pacific Islander	146	146	250	197.27	18.30
		Black (not Hispanic)	8,537	100	250	193.91	18.56
		Hispanic	3,484	114	250	200.88	18.84
		White (not Hispanic)	46,705	100	250	208.98	18.53
		Multi-racial	1,562	100	250	206.84	19.11
	English I	American Indian/ Alaskan Native	79	162	225	202.25	15.32
		Asian	149	162	242	208.07	16.60
		Pacific Islander	18	169	232	200.39	15.85
		Black (not Hispanic)	1,134	137	242	193.83	16.16
		Hispanic	564	157	248	198.30	16.43
		White (not Hispanic)	10,631	137	250	204.30	15.36
		Multi-racial	295	150	242	201.34	16.80
	Algebra II	American Indian/ Alaskan Native	69	160	250	206.04	21.07
		Asian	650	160	250	229.20	20.79
		Pacific Islander	27	177	250	209.89	19.26
		Black (not Hispanic)	1,146	131	250	199.85	21.63
		Hispanic	888	146	250	208.38	21.28
		White (not Hispanic)	15,121	100	250	213.22	22.44
		Multi-racial	447	146	250	212.78	22.57

Table E.6 (continued). Scale Score Descriptive Statistics by Demographic Group—Ethnicity, Spring 2017

Test Period	Content Area	Ethnicity	N-Count	Min.	Max.	Mean	SD
Spring 2017	Geometry	American Indian/ Alaskan Native	46	154	235	197.63	17.60
		Asian	113	173	250	224.89	21.29
		Pacific Islander	13	169	239	188.00	17.19
		Black (not Hispanic)	313	154	250	194.38	17.41
		Hispanic	294	162	250	197.36	16.92
		White (not Hispanic)	6,066	148	250	203.33	19.04
		Multi-racial	158	166	250	200.49	19.84
	Government	American Indian/ Alaskan Native	190	165	250	204.76	17.66
		Asian	881	155	250	210.03	21.89
		Pacific Islander	102	159	250	198.31	18.43
		Black (not Hispanic)	6,847	127	250	193.64	18.03
		Hispanic	2,467	142	250	200.51	18.73
		White (not Hispanic)	35,074	100	250	208.02	19.36
		Multi-racial	1,100	147	250	206.29	19.40
	Am. History	American Indian/ Alaskan Native	41	156	237	198.27	22.84
		Asian	87	143	250	208.72	27.52
		Pacific Islander	11	160	227	198.45	23.12
		Black (not Hispanic)	310	132	250	190.51	26.17
		Hispanic	197	138	250	194.85	25.48
		White (not Hispanic)	5,712	100	250	199.18	25.63
		Multi-racial	140	143	250	200.23	26.30
	Physical Science	American Indian/ Alaskan Native	15	158	232	194.00	21.66
		Asian	20	158	235	197.65	24.94
		Pacific Islander	1	--	--	--	--
		Black (not Hispanic)	169	145	228	184.56	15.41
		Hispanic	73	140	219	187.75	16.27
		White (not Hispanic)	2,618	100	250	191.17	17.46
		Multi-racial	44	150	239	190.23	18.53

Table E.7. Scale Score Descriptive Statistics by Demographic Group—Migrant Status, Summer 2016

Test Period	Content Area	Migrant	N-Count	Min.	Max.	Mean	SD
Summer 2016	English II	No	311	152	242	195.04	16.99
		Yes	--	--	--	--	--
	Algebra I	No	815	153	250	201.21	17.53
		Yes	--	--	--	--	--
	Biology	No	237	100	250	186.53	22.23
		Yes	--	--	--	--	--
	English I	No	23	171	228	196.78	14.55
		Yes	--	--	--	--	--
	Algebra II	No	18	170	237	200.44	19.79
		Yes	--	--	--	--	--
	Geometry	No	59	148	250	197.75	19.40
		Yes	--	--	--	--	--
	Government	No	747	128	250	205.35	22.15
		Yes	--	--	--	--	--
	Am. History	No	69	146	250	203.51	22.92
		Yes	--	--	--	--	--
	Physical Science	No	11	187	222	199.18	11.03
		Yes	--	--	--	--	--

Table E.8. Scale Score Descriptive Statistics by Demographic Group—Migrant Status, Fall 2016

Test Period	Content Area	Migrant	N-Count	Min.	Max.	Mean	SD
Fall 2016	English II	No	3,183	111	249	199.98	17.37
		Yes	4	--	--	--	--
	Algebra I	No	4,380	100	250	202.18	21.06
		Yes	1	--	--	--	--
	Biology	No	3,117	100	250	199.25	22.78
		Yes	--	--	--	--	--
	English I	No	266	162	248	203.42	16.82
		Yes	--	--	--	--	--
	Algebra II	No	836	100	250	209.85	24.38
		Yes	--	--	--	--	--
	Geometry	No	1,007	100	250	207.54	20.73
		Yes	--	--	--	--	--
	Government	No	13,290	100	250	206.49	21.89
		Yes	--	--	--	--	--
	Am. History	No	580	132	250	199.74	26.22
		Yes	--	--	--	--	--

Table E.9. Scale Score Descriptive Statistics by Demographic Group—Migrant Status, Spring 2017

Test Period	Content Area	Migrant	N-Count	Min.	Max.	Mean	SD
Spring 2017	English II	No	61,534	105	250	206.70	16.14
		Yes	19	167	221	186.26	14.55
	Algebra I	No	60,462	100	250	204.97	20.58
		Yes	10	172	215	194.60	13.86
	Biology	No	61,919	100	250	206.49	19.41
		Yes	14	167	214	187.14	14.53
	English I	No	12,859	137	250	203.07	15.85
		Yes	1	--	--	--	--
	Algebra II	No	18,336	100	250	212.70	22.72
		Yes	1	--	--	--	--
	Geometry	No	7,002	148	250	202.90	19.27
		Yes	1	--	--	--	--
	Government	No	46,622	100	250	205.49	19.87
		Yes	8	--	--	--	--
	Am. History	No	6,497	100	250	198.77	25.76
		Yes	--	--	--	--	--
	Physical Science	No	2,937	100	250	190.74	17.49
		Yes	--	--	--	--	--

Table E.10. Scale Score Descriptive Statistics by Demographic Group—Free and Reduced Lunch, Summer 2016

Test Period	Content Area	FRL	N-Count	Min.	Max.	Mean	SD
Summer 2016	English II	No	114	152	225	200.40	12.38
		Yes	197	152	242	191.93	18.49
	Algebra I	No	408	159	250	206.87	16.47
		Yes	407	153	250	195.55	16.73
	Biology	No	104	153	250	196.61	18.67
		Yes	133	100	214	178.65	21.65
	English I	No	6	--	--	--	--
		Yes	17	171	228	197.53	15.53
	Algebra II	No	7	--	--	--	--
		Yes	11	170	222	198.73	17.96
	Geometry	No	20	148	221	195.45	17.17
		Yes	39	166	250	198.92	20.57
	Government	No	439	152	250	211.93	20.06
		Yes	308	128	250	195.97	21.65
	Am. History	No	44	151	250	204.84	22.43
		Yes	25	146	250	201.16	24.04
	Physical Science	No	3	--	--	--	--
		Yes	8	--	--	--	--

Table E.11. Scale Score Descriptive Statistics by Demographic Group—Free and Reduced Lunch, Fall 2016

Test Period	Content Area	FRL	N-Count	Min.	Max.	Mean	SD
Fall 2016	English II	No	981	111	249	205.27	17.63
		Yes	2,206	147	249	197.64	16.72
	Algebra I	No	2,294	100	250	209.68	20.87
		Yes	2,087	100	250	193.92	17.95
	Biology	No	1,531	141	250	209.20	21.47
		Yes	1,586	100	250	189.65	19.69
	English I	No	158	167	248	208.52	15.23
		Yes	108	162	242	195.97	16.31
	Algebra II	No	584	151	250	213.23	23.17
		Yes	252	100	250	202.00	25.32
	Geometry	No	729	148	250	211.69	20.11
		Yes	278	100	249	196.65	18.27
	Government	No	7,783	148	250	212.92	20.90
		Yes	5,507	100	250	197.39	19.95
	Am. History	No	394	132	250	203.52	26.40
		Yes	186	143	250	191.74	24.01

Table E.12. Scale Score Descriptive Statistics by Demographic Group—Free and Reduced Lunch, Spring 2017

Test Period	Content Area	FRL	N-Count	Min.	Max.	Mean	SD
Spring 2017	English II	No	34,925	105	250	211.14	15.13
		Yes	26,628	105	250	200.86	15.57
	Algebra I	No	32,200	100	250	211.17	20.17
		Yes	28,273	100	250	197.90	18.67
	Biology	No	34,990	100	250	212.28	17.77
		Yes	26,943	100	250	198.95	18.86
	English I	No	6,465	150	250	207.55	14.87
		Yes	6,395	137	250	198.54	15.52
	Algebra II	No	13,539	100	250	216.02	22.13
		Yes	4,798	131	250	203.33	21.73
	Geometry	No	4,299	148	250	205.96	19.61
		Yes	2,704	154	250	198.03	17.66
	Government	No	26,791	136	250	210.93	18.84
		Yes	19,839	100	250	198.12	18.84
	Am. History	No	3,787	117	250	204.65	25.11
		Yes	2,710	100	250	190.56	24.37
	Physical Science	No	1,473	150	250	194.42	17.51
		Yes	1,464	100	250	187.04	16.68

Table E.13. Scale Score Descriptive Statistics by Demographic Group—Limited English Proficient, Summer 2016

Test Period	Content Area	LEP	N-Count	Min.	Max.	Mean	SD
Summer 2016	English II	No	306	152	242	194.93	17.07
		Yes	5	--	--	--	--
	Algebra I	No	800	153	250	201.37	17.61
		Yes	15	179	218	192.87	9.73
	Biology	No	235	100	250	186.73	22.21
		Yes	2	--	--	--	--
	English I	No	20	171	228	198.35	14.35
		Yes	3	--	--	--	--
	Algebra II	No	18	170	237	200.44	19.79
		Yes	--	--	--	--	--
	Geometry	No	55	148	250	197.18	19.71
		Yes	4	--	--	--	--
	Government	No	730	128	250	205.78	22.11
		Yes	17	168	220	186.65	15.33
	Am. History	No	69	146	250	203.51	22.92
		Yes	--	--	--	--	--
	Physical Science	No	11	187	222	199.18	11.03
		Yes	--	--	--	--	--

Table E.14. Scale Score Descriptive Statistics by Demographic Group—Limited English Proficient, Fall 2016

Test Period	Content Area	LEP	N-Count	Min.	Max.	Mean	SD
Fall 2016	English II	No	3,058	111	249	200.34	17.42
		Yes	129	164	225	191.51	13.49
	Algebra I	No	4,232	100	250	202.53	21.08
		Yes	149	164	250	192.22	17.61
	Biology	No	3,027	100	250	199.87	22.65
		Yes	90	149	234	178.42	16.63
	English I	No	263	162	248	203.67	16.72
		Yes	3	--	--	--	--
	Algebra II	No	828	100	250	209.93	24.46
		Yes	8	--	--	--	--
	Geometry	No	973	100	250	208.17	20.55
		Yes	34	154	231	189.59	17.92
	Government	No	13,058	100	250	206.82	21.81
		Yes	232	152	239	187.88	17.71
	Am. History	No	571	132	250	200.15	26.10
		Yes	9	--	--	--	--

Table E.15. Scale Score Descriptive Statistics by Demographic Group—Limited English Proficient, Spring 2017

Test Period	Content Area	LEP	N-Count	Min.	Max.	Mean	SD
Spring 2017	English II	No	60,230	105	250	207.03	16.02
		Yes	1,323	105	236	191.36	14.51
	Algebra I	No	58,832	100	250	205.20	20.60
		Yes	1,640	142	250	196.73	18.00
	Biology	No	60,463	100	250	206.91	19.25
		Yes	1,470	114	250	189.04	18.12
	English I	No	12,622	137	250	203.35	15.74
		Yes	238	157	242	188.44	14.69
	Algebra II	No	18,093	100	250	212.82	22.69
		Yes	244	151	250	203.84	23.42
	Geometry	No	6,895	148	250	203.03	19.27
		Yes	108	162	250	194.93	17.82
	Government	No	45,614	100	250	205.84	19.79
		Yes	1,016	147	250	189.16	16.87
	Am. History	No	6,441	100	250	198.91	25.77
		Yes	56	143	227	183.30	18.67
	Physical Science	No	2,914	100	250	190.80	17.49
		Yes	23	161	213	182.87	17.15

Table E.16. Scale Score Descriptive Statistics by Demographic Group—Title I, Summer 2016

Test Period	Content Area	Title I	N-Count	Min.	Max.	Mean	SD
Summer 2016	English II	No	289	152	242	194.62	16.85
		Yes	22	152	228	200.59	18.23
	Algebra I	No	699	153	250	200.42	17.33
		Yes	116	176	250	206.03	18.07
	Biology	No	209	100	250	184.61	22.37
		Yes	28	156	228	200.86	14.92
	English I	No	11	171	228	200.73	16.72
		Yes	12	174	211	193.17	11.82
	Algebra II	No	9	--	--	--	--
		Yes	9	--	--	--	--
	Geometry	No	33	148	250	193.82	19.52
		Yes	26	169	250	202.73	18.41
	Government	No	699	128	250	205.72	22.56
		Yes	48	168	250	199.98	14.05
	Am. History	No	69	146	250	203.51	22.92
		Yes	--	--	--	--	--
	Physical Science	No	1	--	--	--	--
		Yes	10	187	222	199.90	11.35

Table E.17. Scale Score Descriptive Statistics by Demographic Group—Title I, Fall 2016

Test Period	Content Area	Title I	N-Count	Min.	Max.	Mean	SD
Fall 2016	English II	No	2,678	111	249	199.94	17.51
		Yes	509	167	242	200.25	16.56
	Algebra I	No	3,795	100	250	202.86	21.46
		Yes	586	100	250	197.74	17.58
	Biology	No	2,609	100	250	200.51	23.17
		Yes	508	145	242	192.81	19.46
	English I	No	250	162	248	203.46	16.90
		Yes	16	176	242	202.88	15.95
	Algebra II	No	777	100	250	209.63	24.53
		Yes	59	155	250	212.73	22.17
	Geometry	No	1,007	100	250	207.54	20.73
		Yes	--	--	--	--	--
	Government	No	12,277	100	250	207.26	21.92
		Yes	1,013	152	250	197.15	19.25
	Am. History	No	580	132	250	199.74	26.22
		Yes	--	--	--	--	--

Table E.18. Scale Score Descriptive Statistics by Demographic Group—Title I, Spring 2017

Test Period	Content Area	Title I	N-Count	Min.	Max.	Mean	SD
Spring 2017	English II	No	56,675	105	250	207.29	16.01
		Yes	4,878	146	250	199.73	16.07
	Algebra I	No	53,909	100	250	205.82	20.59
		Yes	6,564	100	250	198.00	19.10
	Biology	No	56,867	100	250	207.50	19.12
		Yes	5,066	100	250	195.07	18.94
	English I	No	11,464	137	250	203.54	15.72
		Yes	1,396	137	248	199.22	16.37
	Algebra II	No	17,503	131	250	213.33	22.56
		Yes	834	100	250	199.39	22.00
	Geometry	No	6,697	148	250	203.00	19.36
		Yes	306	162	250	200.70	17.02
	Government	No	42,126	100	250	206.71	19.68
		Yes	4,504	147	250	193.95	17.93
	Am. History	No	6,268	100	250	199.11	25.73
		Yes	229	117	250	189.47	24.70
	Physical Science	No	2,754	100	250	190.81	17.64
		Yes	183	150	244	189.67	15.14

Table E.19. Scale Score Descriptive Statistics by Demographic Group—Students with IEPs, Summer 2016

Test Period	Content Area	IEP	N-Count	Min.	Max.	Mean	SD
Summer 2016	English II	No	287	152	242	194.98	17.46
		Yes	24	182	219	195.71	10.05
	Algebra I	No	742	153	250	201.81	17.65
		Yes	73	164	250	195.21	15.20
	Biology	No	212	100	250	186.30	22.68
		Yes	25	153	226	188.52	18.20
	English I	No	21	171	228	197.81	14.84
		Yes	2	--	--	--	--
	Algebra II	No	18	170	237	200.44	19.79
		Yes	--	--	--	--	--
	Geometry	No	58	148	250	197.57	19.52
		Yes	1	--	--	--	--
	Government	No	713	128	250	206.19	22.08
		Yes	34	148	220	187.79	15.63
	Am. History	No	67	151	250	204.93	21.63
		Yes	2	--	--	--	--
	Physical Science	No	11	187	222	199.18	11.03
		Yes	--	--	--	--	--

Table E.20. Scale Score Descriptive Statistics by Demographic Group—Students with IEPs, Fall 2016

Test Period	Content Area	IEP	N-Count	Min.	Max.	Mean	SD
Fall 2016	English II	No	2,794	111	249	201.88	16.96
		Yes	393	159	228	186.53	13.92
	Algebra I	No	3,964	100	250	203.85	20.83
		Yes	417	100	250	186.30	16.05
	Biology	No	2,811	100	250	200.89	22.38
		Yes	306	100	247	184.20	20.90
	English I	No	246	164	248	204.76	15.98
		Yes	20	162	228	187.00	18.58
	Algebra II	No	823	100	250	209.82	24.39
		Yes	13	179	250	211.77	24.51
	Geometry	No	949	100	250	208.65	20.29
		Yes	58	154	250	189.31	19.51
	Government	No	12,074	100	250	207.90	21.62
		Yes	1,216	137	250	192.48	19.50
	Am. History	No	518	132	250	201.79	25.74
		Yes	62	132	243	182.69	24.05

Table E.21. Scale Score Descriptive Statistics by Demographic Group—Students with IEPs, Spring 2017

Test Period	Content Area	IEP	N-Count	Min.	Max.	Mean	SD
Spring 2017	English II	No	55,536	105	250	208.48	15.22
		Yes	6,017	105	250	190.21	15.07
	Algebra I	No	54,464	100	250	206.92	19.92
		Yes	6,009	100	250	187.24	17.75
	Biology	No	55,641	100	250	208.67	18.27
		Yes	6,292	100	250	187.17	18.49
	English I	No	11,821	137	250	204.42	15.23
		Yes	1,039	137	237	187.80	14.72
	Algebra II	No	18,086	100	250	212.89	22.62
		Yes	251	139	250	198.57	25.59
	Geometry	No	6,716	154	250	203.52	19.10
		Yes	287	148	250	188.43	17.52
	Government	No	42,218	100	250	207.37	19.15
		Yes	4,412	127	250	187.40	17.49
	Am. History	No	6,028	100	250	200.36	25.15
		Yes	469	105	250	178.35	24.72
	Physical Science	No	2,676	100	250	192.02	17.23
		Yes	261	140	222	177.62	14.63

Table E.22. Scale Score Descriptive Statistics by Demographic Group—Students with Accommodations, Summer 2016

Test Period	Content Area	Accom.	N-Count	Min.	Max.	Mean	SD
Summer 2016	English II	No	312	152	242	194.66	17.27
		Yes	9	--	--	--	--
	Algebra I	No	806	153	250	201.31	17.56
		Yes	22	164	225	191.55	14.23
	Biology	No	241	100	250	186.08	22.24
		Yes	4	--	--	--	--
	English I	No	23	171	228	196.78	14.55
		Yes	--	--	--	--	--
	Algebra II	No	19	170	237	199.00	20.24
		Yes	--	--	--	--	--
	Geometry	No	59	148	250	197.75	19.40
		Yes	--	--	--	--	--
	Government	No	755	128	250	205.13	22.21
		Yes	5	--	--	--	--
	Am. History	No	69	146	250	203.51	22.92
		Yes	--	--	--	--	--
	Physical Science	No	11	187	222	199.18	11.03
		Yes	--	--	--	--	--

Table E.23. Scale Score Descriptive Statistics by Demographic Group—Students with Accommodations, Fall 2016

Test Period	Content Area	Accom.	N-Count	Min.	Max.	Mean	SD
Fall 2016	English II	No	3,015	111	249	200.61	17.29
		Yes	176	162	228	189.06	14.65
	Algebra I	No	4,264	100	250	202.55	21.05
		Yes	164	153	250	187.94	14.68
	Biology	No	2,938	100	250	200.11	22.64
		Yes	180	100	234	185.14	20.53
	English I	No	237	162	248	204.84	16.29
		Yes	29	167	228	191.90	16.93
	Algebra II	No	827	100	250	209.92	24.46
		Yes	9	--	--	--	--
	Geometry	No	928	100	250	209.23	20.05
		Yes	79	154	243	187.62	18.20
	Government	No	12,627	100	250	207.32	21.73
		Yes	677	137	250	190.64	18.61
	Am. History	No	525	132	250	201.43	25.71
		Yes	55	132	250	183.64	25.78

Table E.24. Scale Score Descriptive Statistics by Demographic Group—Students with Accommodations, Spring 2017

Test Period	Content Area	Accom.	N-Count	Min.	Max.	Mean	SD
Spring 2017	English II	No	57,313	105	250	207.87	15.62
		Yes	4,281	146	250	190.79	14.73
	Algebra I	No	56,659	100	250	206.14	20.27
		Yes	3,923	100	250	187.57	16.88
	Biology	No	57,309	100	250	207.97	18.75
		Yes	4,648	100	250	188.02	18.04
	English I	No	12,056	137	250	204.08	15.44
		Yes	814	147	237	188.13	14.25
	Algebra II	No	18,184	100	250	212.82	22.70
		Yes	164	146	250	197.42	21.49
	Geometry	No	6,740	148	250	203.48	19.17
		Yes	263	148	250	188.10	15.53
	Government	No	43,498	100	250	206.74	19.47
		Yes	3,163	136	250	188.00	16.96
	Am. History	No	6,154	100	250	200.04	25.23
		Yes	344	105	250	176.31	24.86
	Physical Science	No	2,738	100	250	191.78	17.34
		Yes	202	140	213	176.71	12.84

Appendix F: Achievement-Level Distributions by Demographic Group

Table F.1. Achievement-Level Distributions—Gender, Summer 2016

Test Period	Content Area	Gender	Achievement Level	Freq.	%
Summer 2016	English II	Female	Below Basic	29	21.48
			Basic	38	28.15
			Proficient	65	48.15
			Advanced	--	--
			Proficient + Advanced	68	50.37
			Total	135	100.00
		Male	Below Basic	36	19.35
			Basic	79	42.47
			Proficient	66	35.48
			Advanced	--	--
			Proficient + Advanced	71	38.17
			Total	186	100.00
	Algebra I	Female	Below Basic	81	19.76
			Basic	94	22.93
			Proficient	186	45.37
			Advanced	49	11.95
			Proficient + Advanced	235	57.32
			Total	410	100.00
		Male	Below Basic	86	20.57
			Basic	130	31.10
			Proficient	159	38.04
			Advanced	43	10.29
			Proficient + Advanced	202	48.33
			Total	418	100.00
	Biology	Female	Below Basic	40	36.70
			Basic	33	30.28
			Proficient	30	27.52
			Advanced	--	--
			Proficient + Advanced	36	33.02
			Total	109	100.00
		Male	Below Basic	44	32.35
			Basic	51	37.50
			Proficient	38	27.94
			Advanced	--	--
			Proficient + Advanced	41	30.15
			Total	136	100.00
	English I	Female	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	10	90.91
			Total	11	100.00
		Male	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	11	100.00

Test Period	Content Area	Gender	Achievement Level	Freq.	%
Summer 2016	Algebra II	Female	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	10	100.00
		Male	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	9	100.00
	Geometry	Female	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	12	46.15
			Total	26	100.00
		Male	Below Basic	10	30.30
			Basic	--	--
			Proficient	15	45.45
			Advanced	--	--
			Proficient + Advanced	17	51.52
			Total	33	100.00
	Government	Female	Below Basic	52	11.79
			Basic	117	26.53
			Proficient	184	41.72
			Advanced	88	19.95
			Proficient + Advanced	272	61.68
			Total	441	100.00
		Male	Below Basic	35	10.97
			Basic	76	23.82
			Proficient	124	38.87
			Advanced	84	26.33
			Proficient + Advanced	208	65.20
			Total	319	100.00
	Am. History	Female	Below Basic	--	--
			Basic	10	22.73
			Proficient	18	40.91
			Advanced	--	--
			Proficient + Advanced	25	56.82
			Total	44	100.00
		Male	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	14	56.00
			Total	25	100.00
	Physical Science	Female	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--

Test Period	Content Area	Gender	Achievement Level	Freq.	%
Summer 2016	Physical Science	Female	Proficient + Advanced	--	--
			Total	4	100.00
		Male	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	7	100.00

Table F.2. Achievement-Level Distributions—Gender, Fall 2016

Test Period	Content Area	Gender	Achievement Level	Freq.	%
Fall 2016	English II	Female	Below Basic	154	10.51
			Basic	378	25.80
			Proficient	765	52.22
			Advanced	168	11.47
			Proficient + Advanced	933	63.69
			Total	1,465	100.00
		Male	Below Basic	355	20.57
			Basic	516	29.90
			Proficient	747	43.28
			Advanced	108	6.26
			Proficient + Advanced	855	49.54
			Total	1,726	100.00
	Algebra I	Female	Below Basic	439	21.39
			Basic	522	25.44
			Proficient	774	37.72
			Advanced	317	15.45
			Proficient + Advanced	1,091	53.17
			Total	2,052	100.00
		Male	Below Basic	603	25.38
			Basic	578	24.33
			Proficient	782	32.91
			Advanced	413	17.38
			Proficient + Advanced	1,195	50.29
			Total	2,376	100.00
	Biology	Female	Below Basic	232	16.09
			Basic	435	30.17
			Proficient	538	37.31
			Advanced	237	16.44
			Proficient + Advanced	775	53.74
			Total	1,442	100.00
		Male	Below Basic	344	20.53
			Basic	496	29.59
			Proficient	605	36.10
			Advanced	231	13.78
			Proficient + Advanced	836	49.88
			Total	1,676	100.00
	English I	Female	Below Basic	11	8.46
			Basic	34	26.15
			Proficient	74	56.92
			Advanced	11	8.46

Test Period	Content Area	Gender	Achievement Level	Freq.	%
Fall 2016	English I	Female	Proficient + Advanced	85	65.38
			Total	130	100.00
		Male	Below Basic	16	11.76
			Basic	30	22.06
			Proficient	73	53.68
			Advanced	17	12.50
			Proficient + Advanced	90	66.18
			Total	136	100.00
	Algebra II	Female	Below Basic	65	14.57
			Basic	76	17.04
			Proficient	187	41.93
			Advanced	118	26.46
			Proficient + Advanced	305	68.39
			Total	446	100.00
		Male	Below Basic	59	15.13
			Basic	57	14.62
			Proficient	146	37.44
			Advanced	128	32.82
			Proficient + Advanced	274	70.26
			Total	390	100.00
	Geometry	Female	Below Basic	112	20.63
			Basic	86	15.84
			Proficient	234	43.09
			Advanced	111	20.44
			Proficient + Advanced	345	63.54
			Total	543	100.00
		Male	Below Basic	69	14.87
			Basic	61	13.15
			Proficient	213	45.91
			Advanced	121	26.08
			Proficient + Advanced	334	71.98
			Total	464	100.00
	Government	Female	Below Basic	656	9.91
			Basic	1,805	27.26
			Proficient	2,664	40.23
			Advanced	1,497	22.61
			Proficient + Advanced	4,161	62.84
			Total	6,622	100.00
		Male	Below Basic	721	10.79
			Basic	1,573	23.54
			Proficient	2,541	38.03
			Advanced	1,847	27.64
			Proficient + Advanced	4,388	65.67
			Total	6,682	100.00
	Am. History	Female	Below Basic	74	27.01
			Basic	72	26.28
			Proficient	82	29.93
			Advanced	46	16.79
			Proficient + Advanced	128	46.72
			Total	274	100.00
		Male	Below Basic	63	20.59
			Basic	69	22.55

Test Period	Content Area	Gender	Achievement Level	Freq.	%
Fall 2016	Am. History	Male	Proficient	99	32.35
			Advanced	75	24.51
			Proficient + Advanced	174	56.86
			Total	306	100.00

Table F.3. Achievement-Level Distributions—Gender, Spring 2017

Test Period	Content Area	Gender	Achievement Level	Freq.	%
Spring 2017	English II	Female	Below Basic	1,085	3.51
			Basic	6,224	20.15
			Proficient	18,175	58.85
			Advanced	5,401	17.49
			Proficient + Advanced	23,576	76.33
			Total	30,885	100.00
		Male	Below Basic	2,491	8.11
			Basic	7,874	25.64
			Proficient	15,973	52.01
			Advanced	4,371	14.23
			Proficient + Advanced	20,344	66.25
			Total	30,709	100.00
	Algebra I	Female	Below Basic	5,396	17.99
			Basic	5,846	19.49
			Proficient	13,112	43.72
			Advanced	5,639	18.80
			Proficient + Advanced	18,751	62.52
			Total	29,993	100.00
		Male	Below Basic	6,996	22.87
			Basic	5,755	18.81
			Proficient	11,957	39.09
			Advanced	5,881	19.23
			Proficient + Advanced	17,838	58.32
			Total	30,589	100.00
	Biology	Female	Below Basic	1,648	5.36
			Basic	8,269	26.90
			Proficient	14,249	46.35
			Advanced	6,579	21.40
			Proficient + Advanced	20,828	67.74
			Total	30,745	100.00
		Male	Below Basic	2,299	7.37
			Basic	8,922	28.59
			Proficient	13,582	43.52
			Advanced	6,409	20.53
			Proficient + Advanced	19,991	64.05
			Total	31,212	100.00
	English I	Female	Below Basic	347	5.41
			Basic	1,692	26.37
			Proficient	3,567	55.59
			Advanced	811	12.64
			Proficient + Advanced	4,378	68.23
			Total	6,417	100.00
		Male	Below Basic	582	9.02
			Basic	2,154	33.38
			Proficient	3,308	51.26

Test Period	Content Area	Gender	Achievement Level	Freq.	%
Spring 2017	English I	Male	Advanced	409	6.34
			Proficient + Advanced	3,717	57.60
			Total	6,453	100.00
	Algebra II	Female	Below Basic	1,207	12.24
			Basic	1,666	16.89
			Proficient	3,810	38.63
			Advanced	3,179	32.23
			Proficient + Advanced	6,989	70.87
			Total	9,862	100.00
		Male	Below Basic	967	11.40
			Basic	1,295	15.26
			Proficient	2,951	34.77
			Advanced	3,273	38.57
			Proficient + Advanced	6,224	73.34
			Total	8,486	100.00
	Geometry	Female	Below Basic	906	24.84
			Basic	717	19.66
			Proficient	1,521	41.71
			Advanced	503	13.79
			Proficient + Advanced	2,024	55.50
			Total	3,647	100.00
		Male	Below Basic	683	20.35
			Basic	626	18.65
			Proficient	1,450	43.21
			Advanced	597	17.79
			Proficient + Advanced	2,047	61.00
			Total	3,356	100.00
	Government	Female	Below Basic	1,533	6.69
			Basic	6,663	29.07
			Proficient	10,446	45.58
			Advanced	4,276	18.66
			Proficient + Advanced	14,722	64.24
			Total	22,918	100.00
		Male	Below Basic	1,951	8.22
			Basic	6,184	26.05
			Proficient	10,219	43.04
			Advanced	5,389	22.70
			Proficient + Advanced	15,608	65.74
			Total	23,743	100.00
	Am. History	Female	Below Basic	930	28.84
			Basic	848	26.29
			Proficient	939	29.12
			Advanced	508	15.75
			Proficient + Advanced	1,447	44.87
			Total	3,225	100.00
		Male	Below Basic	724	22.12
			Basic	744	22.73
			Proficient	1,004	30.68
			Advanced	801	24.47
			Proficient + Advanced	1,805	55.15
			Total	3,273	100.00

Test Period	Content Area	Gender	Achievement Level	Freq.	%
Spring 2017	Physical Science	Female	Below Basic	86	5.87
			Basic	999	68.14
			Proficient	323	22.03
			Advanced	58	3.96
			Proficient + Advanced	381	25.99
			Total	1,466	100.00
		Male	Below Basic	92	6.24
			Basic	909	61.67
			Proficient	388	26.32
			Advanced	85	5.77
			Proficient + Advanced	473	32.09
			Total	1,474	100.00

Table F.4. Achievement-Level Distribution—Ethnicity, Summer 2016

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Summer 2016	English II	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	3	100.00
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	3	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	1	100.00
		Black (not Hispanic)	Below Basic	38	26.95
			Basic	58	41.13
			Proficient	41	29.08
			Advanced	--	--
			Proficient + Advanced	45	32.85
			Total	137	100.00
		Hispanic	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	16	94.12
			Total	17	100.00
		White (not Hispanic)	Below Basic	23	15.33
			Basic	46	30.67
			Proficient	79	52.67
			Advanced	--	--
			Proficient + Advanced	81	54.00
			Total	150	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	6	100.00
	Algebra I	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	2	100.00
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Summer 2016	Algebra I	Asian	Advanced	--	--
			Proficient + Advanced	--	--
			Total	9	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	3	100.00
		Black (not Hispanic)	Below Basic	85	34.84
			Basic	93	38.11
			Proficient	59	24.18
			Advanced	--	--
			Proficient + Advanced	66	27.05
			Total	244	100.00
		Hispanic	Below Basic	--	--
			Basic	12	35.29
			Proficient	16	47.06
			Advanced	--	--
			Proficient + Advanced	16	47.06
			Total	34	100.00
		White (not Hispanic)	Below Basic	72	13.82
			Basic	111	21.31
			Proficient	255	48.94
			Advanced	83	15.93
			Proficient + Advanced	338	64.88
			Total	521	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	15	100.00
	Biology	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	1	100.00
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	2	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	2	100.00

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Summer 2016	Biology	Black (not Hispanic)	Below Basic	48	44.44
			Basic	34	31.48
			Proficient	24	22.22
			Advanced	--	--
			Proficient + Advanced	26	24.07
			Total	108	100.00
		Hispanic	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	12	100.00
		White (not Hispanic)	Below Basic	33	27.97
			Basic	40	33.90
			Proficient	39	33.05
			Advanced	--	--
			Proficient + Advanced	45	38.14
			Total	118	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	2	100.00
	English I	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	2	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
		Black (not Hispanic)	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	12	100.00
		Hispanic	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Summer 2016	English I	Hispanic	Proficient + Advanced	--	--
			Total	3	100.00
		White (not Hispanic)	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	6	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
	Algebra II	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	1	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
		Black (not Hispanic)	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	3	100.00
		Hispanic	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	1	100.00
		White (not Hispanic)	Below Basic	--	--
			Basic	--	--
			Proficient	10	71.43
			Advanced	--	--
			Proficient + Advanced	11	78.57
			Total	14	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Summer 2016	Algebra II	Multi-racial	Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
	Geometry	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	1	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
		Black (not Hispanic)	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	17	100.00
		Hispanic	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	16	100.00
		White (not Hispanic)	Below Basic	--	--
			Basic	--	--
			Proficient	12	48.00
			Advanced	--	--
			Proficient + Advanced	13	52.00
			Total	25	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	11	100.00
	Government	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	3	100.00
	Government	Asian	Below Basic	--	--

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Summer 2016			Basic	--	--
			Proficient	12	41.38
			Advanced	11	37.93
			Proficient + Advanced	23	79.31
			Total	29	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	3	100.00
		Black (not Hispanic)	Below Basic	41	32.54
			Basic	41	32.54
			Proficient	36	28.57
			Advanced	--	--
			Proficient + Advanced	44	34.92
			Total	126	100.00
		Hispanic	Below Basic	--	--
			Basic	14	29.17
			Proficient	23	47.92
			Advanced	--	--
			Proficient + Advanced	30	62.50
			Total	48	100.00
		White (not Hispanic)	Below Basic	39	7.22
			Basic	128	23.70
			Proficient	230	42.59
			Advanced	143	26.48
			Proficient + Advanced	373	69.07
			Total	540	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	11	100.00
	Am. History	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	1	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
	Am. History	Pacific Islander	Proficient + Advanced	--	--

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Summer 2016			Total	--	--
		Black (not Hispanic)	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	7	100.00
		Hispanic	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	2	100.00
		White (not Hispanic)	Below Basic	10	18.18
			Basic	12	21.82
			Proficient	22	40.00
			Advanced	11	20.00
			Proficient + Advanced	33	60.00
			Total	55	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
	Physical Science	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
		Black (not Hispanic)	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	10	100.00
		Hispanic	Below Basic	--	--
			Basic	--	--
		Hispanic	Proficient	--	--

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Summer 2016	Physical Science		Advanced	--	--
			Proficient + Advanced	--	--
			Total	1	100.00
		White (not Hispanic)	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--

Table F.5. Achievement-Level Distributions—Ethnicity, Fall 2016

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Fall 2016	English II	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced		
			Total	12	100.00
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	25	58.14
			Advanced	--	--
			Proficient + Advanced	32	74.42
			Total	43	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	7	100.00
		Black (not Hispanic)	Below Basic	238	18.56
			Basic	439	34.24
			Proficient	540	42.12
			Advanced	65	5.07
			Proficient + Advanced	605	47.19
			Total	1,282	100.00
		Hispanic	Below Basic	33	12.31
			Basic	78	29.10
			Proficient	138	51.49
			Advanced	19	7.09
			Proficient + Advanced	157	58.58
			Total	268	100.00
		White (not Hispanic)	Below Basic	216	14.58
			Basic	343	23.16
			Proficient	747	50.44
Fall 2016	English II	White	Advanced	175	11.82

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
		(not Hispanic)	Proficient + Advanced	922	62.26
			Total	1,481	100.00
		Multi-racial	Below Basic	13	13.27
			Basic	21	21.43
			Proficient	55	56.12
			Advanced	9	9.18
			Proficient + Advanced	64	65.31
			Total	98	100.00
	Algebra I	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	10	100.00
		Asian	Below Basic	--	--
			Basic	11	12.79
			Proficient	25	29.07
			Advanced	45	52.33
			Proficient + Advanced	70	81.40
			Total	86	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	5	100.00
		Black (not Hispanic)	Below Basic	389	44.15
			Basic	283	32.12
			Proficient	169	19.18
			Advanced	40	4.54
			Proficient + Advanced	209	23.72
			Total	881	100.00
		Hispanic	Below Basic	92	28.13
			Basic	100	30.58
			Proficient	109	33.33
			Advanced	26	7.95
			Proficient + Advanced	135	41.28
			Total	327	100.00
		White (not Hispanic)	Below Basic	530	17.50
			Basic	679	22.42
			Proficient	1,218	40.21
			Advanced	602	19.87
			Proficient + Advanced	1,820	
			Total	3,029	100.00
		Multi-racial	Below Basic	21	23.33
			Basic	25	27.78
			Proficient	28	31.11
			Advanced	16	17.78
			Proficient + Advanced	44	48.89
			Total	90	100.00
Fall 2016	Biology	American Indian/	Below Basic	--	--

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
		Alaskan Native	Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	12	100.00
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	29	35.37
			Advanced	38	46.34
			Proficient + Advanced	67	81.71
			Total	82	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	5	100.00
		Black (not Hispanic)	Below Basic	238	36.23
			Basic	265	40.33
			Proficient	136	20.70
			Advanced	18	2.74
			Proficient + Advanced	154	23.44
			Total	657	100.00
		Hispanic	Below Basic	60	24.39
			Basic	87	35.37
			Proficient	77	31.30
			Advanced	22	8.94
			Proficient + Advanced	99	40.24
			Total	246	100.00
		White (not Hispanic)	Below Basic	247	12.13
			Basic	540	26.51
			Proficient	871	42.76
			Advanced	379	18.61
			Proficient + Advanced	1,250	61.36
			Total	2,037	100.00
		Multi-racial	Below Basic	21	26.58
			Basic	21	26.58
			Proficient	26	32.91
			Advanced	11	13.92
			Proficient + Advanced	37	46.84
			Total	79	100.00
	English I	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	3	100.00
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
Fall 2016	English I	Asian	Proficient + Advanced	--	--

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
			Total	6	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	3	100.00
		Black (not Hispanic)	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	22	100.00
		Hispanic	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	7	100.00
		White (not Hispanic)	Below Basic	16	7.37
			Basic	47	21.66
			Proficient	128	58.99
			Advanced	26	11.98
			Proficient + Advanced	154	70.97
			Total	217	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	8	100.00
	Algebra II	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	1	100.00
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	25	62.50
			Proficient + Advanced	34	85.00
			Total	40	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	2	100.00
		Black (not Hispanic)	Below Basic	19	20.43
			Basic	13	13.98
Fall 2016	Algebra II	Black	Proficient	49	52.69

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
		(not Hispanic)	Advanced	12	12.90
			Proficient + Advanced	61	65.59
			Total	93	100.00
		Hispanic	Below Basic	--	--
			Basic	11	20.37
			Proficient	21	38.89
			Advanced	13	24.07
			Proficient + Advanced	34	62.96
			Total	54	100.00
		White (not Hispanic)	Below Basic	92	14.81
			Basic	99	15.94
			Proficient	241	38.81
			Advanced	189	30.43
			Proficient + Advanced	430	69.24
			Total	621	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	10	40.00
			Proficient + Advanced	17	73.91
			Total	25	100.00
	Geometry	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	1	100.00
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	20	43.48
			Advanced	20	43.48
			Proficient + Advanced	40	86.96
			Total	46	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	9	100.00
		Black (not Hispanic)	Below Basic	50	42.74
			Basic	30	25.64
			Proficient	32	27.35
			Advanced	5	4.27
			Proficient + Advanced	37	31.62
			Total	117	100.00
		Hispanic	Below Basic	17	25.00
			Basic	--	--
			Proficient	29	42.65
			Advanced	13	19.12
			Proficient + Advanced	42	61.76
			Total	68	100.00
Fall 2016	Geometry	White	Below Basic	96	13.31

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
		(not Hispanic)	Basic	95	13.18
			Proficient	346	47.99
			Advanced	184	25.52
			Proficient + Advanced	530	73.51
			Total	721	100.00
		Multi-racial	Below Basic	10	22.22
			Basic	--	--
			Proficient	17	37.78
			Advanced	--	--
			Proficient + Advanced	26	57.78
			Total	45	100.00
	Government	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	22	31.43
			Proficient	22	31.43
			Advanced	17	24.29
			Proficient + Advanced	39	55.71
			Total	70	100.00
		Asian	Below Basic	22	6.06
			Basic	44	12.12
			Proficient	123	33.88
			Advanced	174	47.93
			Proficient + Advanced	297	81.82
			Total	363	100.00
		Pacific Islander	Below Basic	11	28.21
			Basic	10	25.64
			Proficient	11	28.21
			Advanced	--	--
			Proficient + Advanced	18	46.15
			Total	39	100.00
		Black (not Hispanic)	Below Basic	464	18.63
			Basic	954	38.30
			Proficient	846	33.96
			Advanced	227	9.11
			Proficient + Advanced	1,073	43.08
			Total	2,491	100.00
		Hispanic	Below Basic	80	12.25
			Basic	214	32.77
			Proficient	250	38.28
			Advanced	109	16.69
			Proficient + Advanced	359	54.98
			Total	653	100.00
		White (not Hispanic)	Below Basic	753	8.04
			Basic	2,059	21.97
			Proficient	3,823	40.80
			Advanced	2,735	29.19
			Proficient + Advanced	6,558	69.99
			Total	9,370	100.00
		Multi-racial	Below Basic	38	11.95
			Basic	75	23.58
			Proficient	130	40.88
			Advanced	75	23.58
Fall 2016	Government	Multi-racial	Proficient + Advanced	205	64.47

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
			Total	318	100.00
	Am. History	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	10	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	1	100.00
		Black (not Hispanic)	Below Basic	18	33.96
			Basic	15	28.30
			Proficient	15	28.30
			Advanced	--	--
			Proficient + Advanced	20	37.73
			Total	53	100.00
		Hispanic	Below Basic	12	38.71
			Basic	--	--
			Proficient	14	45.16
			Advanced	--	--
			Proficient + Advanced	17	54.84
			Total	31	100.00
		White (not Hispanic)	Below Basic	95	20.52
			Basic	118	25.49
			Proficient	144	31.10
			Advanced	106	22.89
			Proficient + Advanced	250	54.00
			Total	463	100.00
		Multi-racial	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	22	100.00

Table F.6. Achievement-Level Distributions—Ethnicity, Spring 2017

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
Spring 2017	English II	American Indian/ Alaskan Native	Below Basic	14	5.41
			Basic	77	29.73
			Proficient	133	51.35
			Advanced	35	13.51
Spring 2017	English II	American Indian/	Proficient + Advanced	168	64.86

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
		Alaskan Native	Total	259	100.00
		Asian	Below Basic	73	5.78
			Basic	202	15.99
			Proficient	596	47.19
			Advanced	392	31.04
			Proficient + Advanced	988	78.23
			Total	1,263	100.00
		Pacific Islander	Below Basic	13	8.61
			Basic	44	29.14
			Proficient	76	50.33
			Advanced	18	11.92
			Proficient + Advanced	94	62.25
			Total	151	100.00
		Black (not Hispanic)	Below Basic	1,100	12.56
			Basic	3,062	34.97
			Proficient	4,123	47.09
			Advanced	471	5.38
			Proficient + Advanced	4,594	52.47
			Total	8,756	100.00
		Hispanic	Below Basic	272	8.38
			Basic	933	28.74
			Proficient	1,702	52.43
			Advanced	339	10.44
			Proficient + Advanced	2,041	62.88
			Total	3,246	100.00
		White (not Hispanic)	Below Basic	2,021	4.36
			Basic	9,428	20.33
			Proficient	26,656	57.47
			Advanced	8,279	17.85
			Proficient + Advanced	34,935	75.32
			Total	46,384	100.00
		Multi-racial	Below Basic	83	5.41
			Basic	352	22.93
			Proficient	862	56.16
			Advanced	238	15.50
			Proficient + Advanced	1,100	71.66
			Total	1,535	100.00
	Algebra I	American Indian/ Alaskan Native	Below Basic	51	19.54
			Basic	62	23.75
			Proficient	117	44.83
			Advanced	31	11.88
			Proficient + Advanced	148	56.70
			Total	261	100.00
		Asian	Below Basic	114	8.60
			Basic	100	7.55
			Proficient	485	36.60
			Advanced	626	47.25
			Proficient + Advanced	1,111	83.85
			Total	1,325	100.00
		Pacific Islander	Below Basic	38	27.94
			Basic	35	25.74
Spring 2017	Algebra I	Pacific Islander	Proficient	50	36.76

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
			Advanced	13	9.56
			Proficient + Advanced	63	46.32
			Total	136	100.00
		Black (not Hispanic)	Below Basic	3,474	36.14
			Basic	2,402	24.99
			Proficient	3,110	32.35
			Advanced	627	6.52
			Proficient + Advanced	3,737	38.87
			Total	9,613	100.00
		Hispanic	Below Basic	792	22.88
			Basic	716	20.68
			Proficient	1,489	43.01
			Advanced	465	13.43
			Proficient + Advanced	1,954	56.44
			Total	3,462	100.00
		White (not Hispanic)	Below Basic	7,597	17.20
			Basic	7,992	18.09
			Proficient	19,158	43.37
			Advanced	9,429	21.34
			Proficient + Advanced	28,587	64.71
			Total	44,176	100.00
		Multi-racial	Below Basic	326	20.26
			Basic	294	18.27
			Proficient	660	41.02
			Advanced	329	20.45
			Proficient + Advanced	989	61.47
			Total	1,609	100.00
	Biology	American Indian/ Alaskan Native	Below Basic	18	6.36
			Basic	94	33.22
			Proficient	127	44.88
			Advanced	44	15.55
			Proficient + Advanced	171	60.42
			Total	283	100.00
		Asian	Below Basic	61	4.92
			Basic	211	17.02
			Proficient	452	36.45
			Advanced	516	41.61
			Proficient + Advanced	968	78.06
			Total	1,240	100.00
		Pacific Islander	Below Basic	19	13.01
			Basic	54	36.99
			Proficient	62	42.47
			Advanced	11	7.53
			Proficient + Advanced	73	50.00
			Total	146	100.00
		Black (not Hispanic)	Below Basic	1,417	16.60
			Basic	3,760	44.04
			Proficient	2,810	32.92
			Advanced	550	6.44
			Proficient + Advanced	3,360	39.36
			Total	8,537	100.00
Spring 2017	Biology	Hispanic	Below Basic	319	9.16

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
			Basic	1,232	35.36
			Proficient	1,525	43.77
			Advanced	408	11.71
			Proficient + Advanced	1,933	55.48
			Total	3,484	100.00
		White (not Hispanic)	Below Basic	2,024	4.33
			Basic	11,424	24.46
			Proficient	22,123	47.37
			Advanced	11,134	23.84
			Proficient + Advanced	33,257	71.21
			Total	46,705	100.00
		Multi-racial	Below Basic	89	5.70
			Basic	416	26.63
			Proficient	732	46.86
			Advanced	325	20.81
			Proficient + Advanced	1,057	67.67
			Total	1,562	100.00
	English I	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	19	24.05
			Proficient	47	59.49
			Advanced	--	--
			Proficient + Advanced	52	65.82
			Total	79	100.00
		Asian	Below Basic	11	7.38
			Basic	25	16.78
			Proficient	87	58.39
			Advanced	26	17.45
			Proficient + Advanced	113	75.84
			Total	149	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	10	55.56
			Advanced	--	--
			Proficient + Advanced	11	61.11
			Total	18	100.00
		Black (not Hispanic)	Below Basic	221	19.49
			Basic	469	41.36
			Proficient	402	35.45
			Advanced	42	3.70
			Proficient + Advanced	444	39.15
			Total	1,134	100.00
		Hispanic	Below Basic	70	12.41
			Basic	215	38.12
			Proficient	237	42.02
			Advanced	42	7.45
			Proficient + Advanced	279	49.47
			Total	564	100.00
		White (not Hispanic)	Below Basic	593	5.58
			Basic	3,007	28.29
			Proficient	5,956	56.02
			Advanced	1,075	10.11
Spring 2017	English I	White	Proficient + Advanced	7,031	66.14

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
		(not Hispanic)	Total	10,631	100.00
		Multi-racial	Below Basic	24	8.14
			Basic	106	35.93
			Proficient	136	46.10
			Advanced	29	9.83
			Proficient + Advanced	165	55.93
			Total	295	100.00
	Algebra II	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	17	24.64
			Proficient	28	40.58
			Advanced	15	21.74
			Proficient + Advanced	43	62.32
			Total	69	100.00
		Asian	Below Basic	26	4.00
			Basic	39	6.00
			Proficient	151	23.23
			Advanced	434	66.77
			Proficient + Advanced	585	90.00
			Total	650	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	14	51.85
			Advanced	--	--
			Proficient + Advanced	20	74.07
			Total	27	100.00
		Black (not Hispanic)	Below Basic	287	25.04
			Basic	293	25.57
			Proficient	387	33.77
			Advanced	179	15.62
			Proficient + Advanced	566	49.39
			Total	1,146	100.00
		Hispanic	Below Basic	126	14.19
			Basic	174	19.59
			Proficient	357	40.20
			Advanced	231	26.01
			Proficient + Advanced	588	66.22
			Total	888	100.00
		White (not Hispanic)	Below Basic	1,673	11.06
			Basic	2,368	15.66
			Proficient	5,646	37.34
			Advanced	5,434	35.94
			Proficient + Advanced	11,080	73.28
			Total	15,121	100.00
		Multi-racial	Below Basic	52	11.63
			Basic	64	14.32
			Proficient	178	39.82
			Advanced	153	34.23
			Proficient + Advanced	331	74.05
			Total	447	100.00
	Geometry	American Indian/ Alaskan Native	Below Basic	11	23.91
			Basic	14	30.43
Spring 2017	Geometry	American Indian/	Proficient	17	36.96

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
		Alaskan Native	Advanced	--	--
			Proficient + Advanced	21	45.65
			Total	46	100.00
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	35	30.97
			Advanced	64	56.64
			Proficient + Advanced	99	87.61
			Total	113	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	13	100.00
		Black (not Hispanic)	Below Basic	112	35.78
			Basic	74	23.64
			Proficient	107	34.19
			Advanced	20	6.39
			Proficient + Advanced	127	40.57
			Total	313	100.00
		Hispanic	Below Basic	85	28.91
			Basic	77	26.19
			Proficient	110	37.41
			Advanced	22	7.48
			Proficient + Advanced	132	44.90
			Total	294	100.00
		White (not Hispanic)	Below Basic	1,320	21.76
			Basic	1,139	18.78
			Proficient	2,640	43.52
			Advanced	967	15.94
			Proficient + Advanced	3,607	59.46
			Total	6,066	100.00
		Multi-racial	Below Basic	46	29.11
			Basic	28	17.72
			Proficient	62	39.24
			Advanced	22	13.92
			Proficient + Advanced	84	53.16
			Total	158	100.00
	Government	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	59	31.05
			Proficient	92	48.42
			Advanced	30	15.79
			Proficient + Advanced	122	64.21
			Total	190	100.00
		Asian	Below Basic	65	7.38
			Basic	198	22.47
			Proficient	334	37.91
			Advanced	284	32.24
			Proficient + Advanced	618	70.15
			Total	881	100.00
Spring 2017	Government	Pacific Islander	Below Basic	11	10.78

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
			Basic	38	37.25
			Proficient	42	41.18
			Advanced	11	10.78
			Proficient + Advanced	53	51.96
			Total	102	100.00
		Black (not Hispanic)	Below Basic	1,252	18.29
			Basic	2,841	41.49
			Proficient	2,302	33.62
			Advanced	452	6.60
			Proficient + Advanced	2,754	40.22
			Total	6,847	100.00
		Hispanic	Below Basic	247	10.01
			Basic	853	34.58
			Proficient	1,064	43.13
			Advanced	303	12.28
			Proficient + Advanced	1,367	55.41
			Total	2,467	100.00
		White (not Hispanic)	Below Basic	1,838	5.24
			Basic	8,554	24.39
			Proficient	16,334	46.57
			Advanced	8,348	23.80
			Proficient + Advanced	24,682	70.37
			Total	35,074	100.00
		Multi-racial	Below Basic	62	5.64
			Basic	304	27.64
			Proficient	497	45.18
			Advanced	237	21.55
			Proficient + Advanced	734	66.73
			Total	1,100	100.00
	Am. History	American Indian/ Alaskan Native	Below Basic	10	24.39
			Basic	--	--
			Proficient	14	34.15
			Advanced	--	--
			Proficient + Advanced	22	53.66
			Total	41	100.00
		Asian	Below Basic	13	14.94
			Basic	16	18.39
			Proficient	28	32.18
			Advanced	30	34.48
			Proficient + Advanced	58	66.67
			Total	87	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	11	100.00
		Black (not Hispanic)	Below Basic	125	40.32
			Basic	75	24.19
			Proficient	65	20.97
			Advanced	45	14.52
Spring 2017	Am. History	Black	Proficient + Advanced	110	35.48

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
		(not Hispanic)	Total	310	100.00
		Hispanic	Below Basic	57	28.93
			Basic	52	26.40
			Proficient	57	28.93
			Advanced	31	15.74
			Proficient + Advanced	88	44.67
			Total	197	100.00
		White (not Hispanic)	Below Basic	1,410	24.68
			Basic	1,408	24.65
			Proficient	1,732	30.32
			Advanced	1,162	20.34
			Proficient + Advanced	2,894	50.67
			Total	5,712	100.00
		Multi-racial	Below Basic	37	26.43
			Basic	29	20.71
			Proficient	43	30.71
			Advanced	31	22.14
			Proficient + Advanced	74	52.86
			Total	140	100.00
	Physical Science	American Indian/ Alaskan Native	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	15	100.00
		Asian	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	10	50.00
			Total	20	100.00
		Pacific Islander	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	1	100.00
		Black (not Hispanic)	Below Basic	17	10.06
			Basic	122	72.19
			Proficient	27	15.98
			Advanced	--	--
			Proficient + Advanced	30	17.75
			Total	169	100.00
		Hispanic	Below Basic	--	--
			Basic	45	61.64
			Proficient	20	27.40
			Advanced	--	--
			Proficient + Advanced	20	27.40
			Total	73	100.00
		White (not Hispanic)	Below Basic	145	5.54
			Basic	1,703	65.05
Spring 2017	Physical	White	Proficient	636	24.29

Test Period	Content Area	Ethnicity	Achievement Level	Freq.	%
	Science	(not Hispanic)	Advanced	134	5.12
			Proficient + Advanced	770	29.41
			Total	2,618	100.00
		Multi-racial	Below Basic	--	--
			Basic	22	50.00
			Proficient	16	36.36
			Advanced	--	--
			Proficient + Advanced	17	38.63
			Total	44	100.00

Table F.7. Achievement-Level Distributions—Migrant, Summer 2016

Test Period	Content Area	Migrant	Achievement Level	Freq.	%
Summer 2016	English II	No	Below Basic	60	19.29
			Basic	113	36.33
			Proficient	130	41.80
			Advanced	--	--
			Proficient + Advanced	138	44.37
			Total	311	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
	Algebra I	No	Below Basic	161	19.75
			Basic	221	27.12
			Proficient	341	41.84
			Advanced	92	11.29
			Proficient + Advanced	433	53.13
			Total	815	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
	Biology	No	Below Basic	78	32.91
			Basic	82	34.60
			Proficient	68	28.69
			Advanced	--	--
			Proficient + Advanced	77	32.49
			Total	237	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
	English I	No	Below Basic	--	--
			Basic	--	--
			Proficient	10	43.48
			Advanced	--	--
			Proficient + Advanced	11	47.83
			Total	23	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--

Table F.7 (continued). Achievement-Level Distributions—Migrant, Summer 2016

Test Period	Content Area	Migrant	Achievement Level	Freq.	%
Summer 2016	Algebra II	No	Below Basic	--	--
			Basic	--	--
			Proficient	11	61.11
			Advanced	--	--
			Proficient + Advanced	12	66.67
			Total	18	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
	Geometry	No	Below Basic	17	28.81
			Basic	13	22.03
			Proficient	24	40.68
			Advanced	--	--
			Proficient + Advanced	29	49.15
			Total	59	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
	Government	No	Below Basic	83	11.11
			Basic	188	25.17
			Proficient	304	40.70
			Advanced	172	23.03
			Proficient + Advanced	476	63.72
			Total	747	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
	Am. History	No	Below Basic	11	15.94
			Basic	19	27.54
			Proficient	24	34.78
			Advanced	15	21.74
			Proficient + Advanced	39	56.52
			Total	69	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--

Table F.7 (continued). Achievement-Level Distributions—Migrant, Summer 2016

Test Period	Content Area	Migrant	Achievement Level	Freq.	%
Summer 2016	Physical Science	No	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	11	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--

Table F.8. Achievement-Level Distributions—Migrant, Fall 2016

Test Period	Content Area	Migrant	Achievement Level	Freq.	%
Fall 2016	English II	No	Below Basic	508	15.96
			Basic	890	27.96
			Proficient	1,509	47.41
			Advanced	276	8.67
			Proficient + Advanced	1,785	56.08
			Total	3,183	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced		
			Total	4	100.00
	Algebra I	No	Below Basic	1,023	23.36
			Basic	1,071	24.45
			Proficient	1,556	35.53
			Advanced	730	16.67
			Proficient + Advanced	2,286	52.19
			Total	4,380	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	1	100.00
	Biology	No	Below Basic	575	18.45
			Basic	931	29.87
			Proficient	1,143	36.67
			Advanced	468	15.01
			Proficient + Advanced	1,611	51.68
			Total	3,117	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
	English I	No	Below Basic	27	10.15
			Basic	64	24.06
			Proficient	147	55.26
			Advanced	28	10.53
			Proficient + Advanced	175	65.79
			Total	266	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--

Table F.8 (continued). Achievement-Level Distributions—Migrant, Fall 2016

Test Period	Content Area	Migrant	Achievement Level	Freq.	%
Fall 2016	Algebra II	No	Below Basic	124	14.83
			Basic	133	15.91
			Proficient	333	39.83
			Advanced	246	29.43
			Proficient + Advanced	579	69.42
			Total	834	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
	Geometry	No	Below Basic	181	17.97
			Basic	147	14.60
			Proficient	447	44.39
			Advanced	232	23.04
			Proficient + Advanced	679	67.43
			Total	1,007	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
	Government	No	Below Basic	1,374	10.34
			Basic	3,372	25.37
			Proficient	5,200	39.13
			Advanced	3,344	25.16
			Proficient + Advanced	8,544	64.29
			Total	13,290	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
	Am. History	No	Below Basic	137	23.62
			Basic	141	24.31
			Proficient	181	31.21
			Advanced	121	20.86
			Proficient + Advanced	302	52.07
			Total	580	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--

Table F.9. Achievement-Level Distributions—Migrant, Spring 2017

Test Period	Content Area	Migrant	Achievement Level	Freq.	%
Spring 2017	English II	No	Below Basic	3,560	5.79
			Basic	14,080	22.88
			Proficient	34,124	55.46
			Advanced	9,770	15.88
			Proficient + Advanced	43,894	71.33
			Total	61,534	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	19	100.00
	Algebra I	No	Below Basic	12,342	20.41
			Basic	11,572	19.14
			Proficient	25,032	41.40
			Advanced	11,516	19.05
			Proficient + Advanced	36,548	60.45
			Total	60,462	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced		
			Total	10	100.00
	Biology	No	Below Basic	3,934	6.35
			Basic	17,173	27.73
			Proficient	27,825	44.94
			Advanced	12,987	20.97
			Proficient + Advanced	40,812	65.91
			Total	61,919	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced		
			Total	14	100.00
	English I	No	Below Basic	928	7.22
			Basic	3,843	29.89
			Proficient	6,868	53.41
			Advanced	1,220	9.49
			Proficient + Advanced	8,088	62.90
			Total	12,859	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced		
			Total	1	100.00

Table F.9 (continued). Achievement-Level Distributions—Migrant, Spring 2017

Test Period	Content Area	Migrant	Achievement Level	Freq.	%
Spring 2017	Algebra II	No	Below Basic	2,168	11.82
			Basic	2,960	16.14
			Proficient	6,756	36.85
			Advanced	6,452	35.19
			Proficient + Advanced	13,208	72.03
			Total	18,336	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	1	100.00
	Geometry	No	Below Basic	1,589	22.69
			Basic	1,342	19.17
			Proficient	2,971	42.43
			Advanced	1,100	15.71
			Proficient + Advanced	4,071	58.14
			Total	7,002	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	1	100.00
	Government	No	Below Basic	3,471	7.44
			Basic	12,835	27.53
			Proficient	20,654	44.30
			Advanced	9,662	20.72
			Proficient + Advanced	30,316	65.03
			Total	46,622	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	8	100.00
	Am. History	No	Below Basic	1,654	25.46
			Basic	1,592	24.50
			Proficient	1,943	29.91
			Advanced	1,308	20.13
			Proficient + Advanced	3,251	50.04
			Total	6,497	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--

Table F.9 (continued). Achievement-Level Distributions—Migrant, Spring 2017

Test Period	Content Area	Migrant	Achievement Level	Freq.	%
Spring 2017	Physical Science	No	Below Basic	178	6.06
			Basic	1,906	64.90
			Proficient	710	24.17
			Advanced	143	4.87
			Proficient + Advanced	853	29.04
			Total	2,937	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--

Table F.10. Achievement-Level Distributions—Free and Reduced Lunch, Summer 2016

Test Period	Content Area	FRL	Achievement Level	Freq.	%
Summer 2016	English II	No	Below Basic	--	--
			Basic	48	42.11
			Proficient	59	51.75
			Advanced	--	--
			Proficient + Advanced	61	53.51
			Total	114	100.00
		Yes	Below Basic	55	27.92
			Basic	65	32.99
			Proficient	71	36.04
			Advanced	--	--
			Proficient + Advanced	77	39.09
			Total	197	100.00
	Algebra I	No	Below Basic	37	9.07
			Basic	91	22.30
			Proficient	218	53.43
			Advanced	62	15.20
			Proficient + Advanced	280	68.63
			Total	408	100.00
		Yes	Below Basic	124	30.47
			Basic	130	31.94
			Proficient	123	30.22
			Advanced	30	7.37
			Proficient + Advanced	153	37.59
			Total	407	100.00
	Biology	No	Below Basic	14	13.46
			Basic	44	42.31
			Proficient	37	35.58
			Advanced	--	--
			Proficient + Advanced	46	44.23
			Total	104	100.00
		Yes	Below Basic	64	48.12
			Basic	38	28.57
			Proficient	31	23.31
			Advanced	--	--
			Proficient + Advanced	31	23.31
			Total	133	100.00
	English I	No	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	6	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	17	100.00

Table F.10 (continued). Achievement-Level Distributions—Free and Reduced Lunch, Summer 2016

Test Period	Content Area	FRL	Achievement Level	Freq.	%
Summer 2016	Algebra II	No	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	7	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	11	100.00
	Geometry	No	Below Basic	--	--
			Basic	--	--
			Proficient	10	50.00
			Advanced	--	--
			Proficient + Advanced	10	50.00
			Total	20	100.00
		Yes	Below Basic	11	28.21
			Basic	--	--
			Proficient	14	35.90
			Advanced	--	--
			Proficient + Advanced	19	48.72
			Total	39	100.00
	Government	No	Below Basic	17	3.87
			Basic	93	21.18
			Proficient	191	43.51
			Advanced	138	31.44
			Proficient + Advanced	329	74.94
			Total	439	100.00
		Yes	Below Basic	66	21.43
			Basic	95	30.84
			Proficient	113	36.69
			Advanced	34	11.04
			Proficient + Advanced	147	47.73
			Total	308	100.00
	Am. History	No	Below Basic	--	--
			Basic	10	22.73
			Proficient	18	40.91
			Advanced	--	--
			Proficient + Advanced	27	61.36
			Total	44	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	12	48.00
			Total	25	100.00

Table F.10 (continued). Achievement-Level Distributions—Free and Reduced Lunch, Summer 2016

Test Period	Content Area	FRL	Achievement Level	Freq.	%
Summer 2016	Physical Science	No	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	3	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	8	100.00

Table F.11. Achievement-Level Distributions—Free and Reduced Lunch, Fall 2016

Test Period	Content Area	FRL	Achievement Level	Freq.	%
Fall 2016	English II	No	Below Basic	113	11.52
			Basic	192	19.57
			Proficient	531	54.13
			Advanced	145	14.78
			Proficient + Advanced	676	68.91
			Total	981	100.00
		Yes	Below Basic	395	17.91
			Basic	699	31.69
			Proficient	981	44.47
			Advanced	131	5.94
			Proficient + Advanced	1,112	50.41
			Total	2,206	100.00
	Algebra I	No	Below Basic	316	13.78
			Basic	418	18.22
			Proficient	957	41.72
			Advanced	603	26.29
			Proficient + Advanced	1,560	68.00
			Total	2,294	100.00
		Yes	Below Basic	707	33.88
			Basic	654	31.34
			Proficient	599	28.7
			Advanced	127	6.09
			Proficient + Advanced	726	34.79
			Total	2,087	100.00
	Biology	No	Below Basic	142	9.27
			Basic	292	19.07
			Proficient	696	45.46
			Advanced	401	26.19
			Proficient + Advanced	1,097	71.65
			Total	1,531	100.00
		Yes	Below Basic	433	27.3
			Basic	639	40.29
			Proficient	447	28.18
			Advanced	67	4.22
			Proficient + Advanced	514	32.78
			Total	1,586	100.00
	English I	No	Below Basic	--	--
			Basic	26	16.46
			Proficient	100	63.29
			Advanced	25	15.82
			Proficient + Advanced	125	79.11
			Total	158	100.00
		Yes	Below Basic	20	18.52
			Basic	38	35.19
			Proficient	47	43.52
			Advanced	--	--
			Proficient + Advanced	50	
			Total	108	100.00

Table F.11 (continued). Achievement-Level Distributions—Free and Reduced Lunch, Fall 2016

Test Period	Content Area	FRL	Achievement Level	Freq.	%
	Algebra II	No	Below Basic	65	11.13
			Basic	82	14.04
			Proficient	241	41.27
			Advanced	196	33.56
			Proficient + Advanced	437	74.83
			Total	584	100.00
		Yes	Below Basic	59	23.41
			Basic	51	20.24
			Proficient	92	36.51
			Advanced	50	19.84
			Proficient + Advanced	142	56.34
			Total	252	100.00
	Geometry	No	Below Basic	88	12.07
			Basic	94	12.89
			Proficient	341	46.78
			Advanced	206	28.26
			Proficient + Advanced	547	75.03
			Total	729	100.00
		Yes	Below Basic	93	33.45
			Basic	53	19.06
			Proficient	106	38.13
			Advanced	26	9.35
			Proficient + Advanced	132	47.48
			Total	278	100.00
	Government	No	Below Basic	407	5.23
			Basic	1431	18.39
			Proficient	3,260	41.89
			Advanced	2,685	34.50
			Proficient + Advanced	5,945	76.38
			Total	7,783	100.00
		Yes	Below Basic	967	17.56
			Basic	1,941	35.25
			Proficient	1,940	35.23
			Advanced	659	11.97
			Proficient + Advanced	2,599	47.19
			Total	5,507	100.00
	Am. History	No	Below Basic	70	17.77
			Basic	97	24.62
			Proficient	127	32.23
			Advanced	100	25.38
			Proficient + Advanced	227	57.61
			Total	394	100.00
		Yes	Below Basic	67	36.02
			Basic	44	23.66
			Proficient	54	29.03
			Advanced	21	11.29
			Proficient + Advanced	75	40.32
			Total	186	100.00

Table F.12. Achievement-Level Distributions—Free and Reduced Lunch, Spring 2017

Test Period	Content Area	FRL	Achievement Level	Freq.	%
Spring 2017	English II	No	Below Basic	958	2.74
			Basic	5,550	15.89
			Proficient	20,656	59.14
			Advanced	7,761	22.22
			Proficient + Advanced	28,417	81.37
			Total	34,925	100.00
		Yes	Below Basic	2,610	9.80
			Basic	8,538	32.06
			Proficient	13,471	50.59
			Advanced	2,009	7.54
			Proficient + Advanced	15,480	58.13
			Total	26,628	100.00
	Algebra I	No	Below Basic	3,959	12.30
			Basic	4,879	15.15
			Proficient	14,469	44.93
			Advanced	8,893	27.62
			Proficient + Advanced	28,362	72.55
			Total	32,200	100.00
		Yes	Below Basic	8,386	29.66
			Basic	6,696	23.68
			Proficient	10,568	37.38
			Advanced	2,623	9.28
			Proficient + Advanced	13,191	46.66
			Total	28,273	100.00
	Biology	No	Below Basic	895	2.56
			Basic	6,889	19.69
			Proficient	17,080	48.81
			Advanced	10,126	28.94
			Proficient + Advanced	27,206	77.75
			Total	34,990	100.00
		Yes	Below Basic	3,043	11.29
			Basic	10,291	38.20
			Proficient	10,748	39.89
			Advanced	2,861	10.62
			Proficient + Advanced	13,609	50.51
			Total	26,943	100.00
	English I	No	Below Basic	225	3.48
			Basic	1,441	22.29
			Proficient	3,893	60.22
			Advanced	906	14.01
			Proficient + Advanced	4,799	74.23
			Total	6,465	100.00
		Yes	Below Basic	703	10.99
			Basic	2,403	37.58
			Proficient	2,975	46.52
			Advanced	314	4.91
			Proficient + Advanced	3,289	51.43
			Total	6,395	100.00

Table F.12 (continued). Achievement-Level Distributions—Free and Reduced Lunch, Spring 2017

Test Period	Content Area	FRL	Achievement Level	Freq.	%
Spring 2017	Algebra II	No	Below Basic	1,180	8.72
			Basic	1,894	13.99
			Proficient	4,969	36.70
			Advanced	5,496	40.59
			Proficient + Advanced	10,465	77.30
			Total	13,539	100.00
		Yes	Below Basic	988	20.59
			Basic	1,066	22.22
			Proficient	1,788	37.27
			Advanced	956	19.92
			Proficient + Advanced	2,744	57.19
			Total	4,798	100.00
	Geometry	No	Below Basic	789	18.35
			Basic	736	17.12
			Proficient	1,933	44.96
			Advanced	841	19.56
			Proficient + Advanced	2,774	64.53
			Total	4,299	100.00
		Yes	Below Basic	800	29.59
			Basic	607	22.45
			Proficient	1,038	38.39
			Advanced	259	9.58
			Proficient + Advanced	1,297	47.97
			Total	2,704	100.00
	Government	No	Below Basic	928	3.46
			Basic	5,474	20.43
			Proficient	12,908	48.18
			Advanced	7,481	27.92
			Proficient + Advanced	20,389	76.10
			Total	26,791	100.00
		Yes	Below Basic	2,548	12.84
			Basic	7,364	37.12
			Proficient	7,746	39.04
			Advanced	2,181	10.99
			Proficient + Advanced	9,927	50.04
			Total	19,839	100.00
	Am. History	No	Below Basic	680	17.96
			Basic	859	22.68
			Proficient	1,245	32.88
			Advanced	1,003	26.49
			Proficient + Advanced	2,248	59.36
			Total	3,787	100.00
		Yes	Below Basic	974	35.94
			Basic	733	27.05
			Proficient	698	25.76
			Advanced	305	11.25
			Proficient + Advanced	1,003	37.01
			Total	2,710	100.00

Table F.12 (continued). Achievement-Level Distributions—Free and Reduced Lunch, Spring 2017

Test Period	Content Area	FRL	Achievement Level	Freq.	%
Spring 2017	Physical Science	No	Below Basic	47	3.19
			Basic	893	60.62
			Proficient	427	28.99
			Advanced	106	7.20
			Proficient + Advanced	533	36.18
			Total	1,473	100.00
		Yes	Below Basic	131	8.95
			Basic	1,013	69.19
			Proficient	283	19.33
			Advanced	37	2.53
			Proficient + Advanced	320	21.86
			Total	1,464	100.00

Table F.13. Achievement-Level Distributions—Limited English Proficient, Summer 2016

Test Period	Content Area	LEP	Achievement Level	Freq.	%
Summer 2016	English II	No	Below Basic	60	19.61
			Basic	112	36.60
			Proficient	126	41.18
			Advanced	--	--
			Proficient + Advanced	134	44.97
			Total	298	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	5	100.00
	Algebra I	No	Below Basic	157	19.63
			Basic	213	26.63
			Proficient	338	42.25
			Advanced	92	11.50
			Proficient + Advanced	430	53.75
			Total	800	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	15	100.00
	Biology	No	Below Basic	76	32.34
			Basic	82	34.89
			Proficient	68	28.94
			Advanced	--	--
			Proficient + Advanced	235	82.17
			Total	286	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	2	100.00
	English I	No	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	10	50.00
			Total	20	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	3	100.00

Table F.13 (continued). Achievement-Level Distributions—Limited English Proficient, Summer 2016

Test Period	Content Area	LEP	Achievement Level	Freq.	%
Summer 2016	Algebra II	No	Below Basic	--	--
			Basic	--	--
			Proficient	11	61.11
			Advanced	--	--
			Proficient + Advanced	12	66.67
			Total	18	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
	Geometry	No	Below Basic	17	30.91
			Basic	12	21.82
			Proficient	22	40.00
			Advanced	--	--
			Proficient + Advanced	26	47.27
			Total	55	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	4	100.00
	Government	No	Below Basic	77	10.55
			Basic	181	24.79
			Proficient	300	41.10
			Advanced	172	23.56
			Proficient + Advanced	472	64.66
			Total	730	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	17	100.00
	Am. History	No	Below Basic	11	15.94
			Basic	19	27.54
			Proficient	24	34.78
			Advanced	15	21.74
			Proficient + Advanced	39	56.52
			Total	69	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--

Table F.13 (continued). Achievement-Level Distributions—Limited English Proficient, Summer 2016

Test Period	Content Area	LEP	Achievement Level	Freq.	%
Summer 2016	Physical Science	No	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	11	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--

Table F.14. Achievement-Level Distributions—Limited English Proficient, Fall 2016

Test Period	Content Area	LEP	Achievement Level	Freq.	%
Fall 2016	English II	No	Below Basic	478	15.63
			Basic	832	27.21
			Proficient	1,473	48.17
			Advanced	275	8.99
			Proficient + Advanced	1,748	57.16
			Total	3,058	100.00
		Yes	Below Basic	30	23.26
			Basic	59	45.74
			Proficient	39	30.23
			Advanced	--	--
			Proficient + Advanced	40	31.00
			Total	129	100.00
	Algebra I	No	Below Basic	962	22.73
			Basic	1,029	24.31
			Proficient	1,521	35.94
			Advanced	720	17.01
			Proficient + Advanced	2,241	52.95
			Total	4,232	100.00
		Yes	Below Basic	61	40.94
			Basic	43	28.86
			Proficient	35	23.49
			Advanced	10	6.71
			Proficient + Advanced	45	30.20
			Total	149	100.00
	Biology	No	Below Basic	527	17.41
			Basic	899	29.70
			Proficient	1,134	37.46
			Advanced	467	15.43
			Proficient + Advanced	1,601	52.89
			Total	3,027	100.00
		Yes	Below Basic	48	53.33
			Basic	32	35.56
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	10	11.11
			Total	90	100.00
	English I	No	Below Basic	25	9.51
			Basic	63	23.95
			Proficient	147	55.89
			Advanced	28	10.65
			Proficient + Advanced	175	66.54
			Total	263	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	3	100.00

Table F.14 (continued). Achievement-Level Distributions—Limited English Proficient, Fall 2016

Test Period	Content Area	LEP	Achievement Level	Freq.	%
Fall 2016	Algebra II	No	Below Basic	124	14.98
			Basic	131	15.82
			Proficient	327	39.49
			Advanced	246	29.71
			Proficient + Advanced	573	69.20
			Total	828	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	8	100.00
	Geometry	No	Below Basic	162	16.65
			Basic	143	14.70
			Proficient	438	45.02
			Advanced	230	23.64
			Proficient + Advanced	668	68.65
			Total	973	100.00
		Yes	Below Basic	19	55.88
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	11	32.35
			Total	34	100.00
	Government	No	Below Basic	1,294	9.91
			Basic	3,283	25.14
			Proficient	5,148	39.42
			Advanced	3,333	25.52
			Proficient + Advanced	8,481	64.95
			Total	13,058	100.00
		Yes	Below Basic	80	34.48
			Basic	89	38.36
			Proficient	52	22.41
			Advanced	11	4.74
			Proficient + Advanced	63	27.15
			Total	232	100.00
	Am. History	No	Below Basic	131	22.94
			Basic	140	24.52
			Proficient	179	31.35
			Advanced	121	21.19
			Proficient + Advanced	300	52.54
			Total	571	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	9	100.00

Table F.15. Achievement-Level Distributions—Limited English Proficient, Spring 2017

Test Period	Content Area	LEP	Achievement Level	Freq.	%
Spring 2017	English II	No	Below Basic	3,268	5.43
			Basic	13,493	22.40
			Proficient	33,727	56.00
			Advanced	9,742	16.17
			Proficient + Advanced	43,469	72.17
			Total	60,230	100.00
		Yes	Below Basic	300	22.68
			Basic	595	44.97
			Proficient	400	30.23
			Advanced	28	2.12
			Proficient + Advanced	428	32.35
			Total	1,323	100.00
	Algebra I	No	Below Basic	11,812	20.08
			Basic	11,185	19.01
			Proficient	24,443	41.55
			Advanced	11,392	19.36
			Proficient + Advanced	35,835	60.91
			Total	58,832	100.00
		Yes	Below Basic	533	32.50
			Basic	390	23.78
			Proficient	593	36.16
			Advanced	124	7.56
			Proficient + Advanced	717	43.72
			Total	1,640	100.00
	Biology	No	Below Basic	3,605	5.96
			Basic	16,457	27.22
			Proficient	27,469	45.43
			Advanced	12,932	21.39
			Proficient + Advanced	40,401	66.82
			Total	60,463	100.00
		Yes	Below Basic	333	22.65
			Basic	723	49.18
			Proficient	359	24.42
			Advanced	55	3.74
			Proficient + Advanced	414	28.16
			Total	1,470	100.00
	English I	No	Below Basic	861	6.82
			Basic	3,731	29.56
			Proficient	6,815	53.99
			Advanced	1,215	9.63
			Proficient + Advanced	8,030	63.62
			Total	12,622	100.00
		Yes	Below Basic	67	28.15
			Basic	113	47.48
			Proficient	53	22.27
			Advanced	--	--
			Proficient + Advanced	58	24.37
			Total	238	100.00

Table F.15 (continued). Achievement-Level Distributions—Limited English Proficient, Spring 2017

Test Period	Content Area	LEP	Achievement Level	Freq.	%
Spring 2017	Algebra II	No	Below Basic	2,109	11.66
			Basic	2,916	16.12
			Proficient	6,671	36.87
			Advanced	6,397	35.36
			Proficient + Advanced	13,068	72.23
			Total	18,093	100.00
		Yes	Below Basic	59	24.18
			Basic	44	18.03
			Proficient	86	35.25
			Advanced	55	22.54
			Proficient + Advanced	141	57.79
			Total	244	100.00
	Geometry	No	Below Basic	1,550	22.48
			Basic	1,318	19.12
			Proficient	2,933	42.54
			Advanced	1,094	15.87
			Proficient + Advanced	4,027	58.40
			Total	6,895	100.00
		Yes	Below Basic	39	36.11
			Basic	25	23.15
			Proficient	38	35.19
			Advanced	--	--
			Proficient + Advanced	44	40.74
			Total	108	100.00
	Government	No	Below Basic	3,226	7.07
			Basic	12,368	27.11
			Proficient	20,401	44.73
			Advanced	9,619	21.09
			Proficient + Advanced	30,020	65.81
			Total	45,614	100.00
		Yes	Below Basic	250	24.61
			Basic	470	46.26
			Proficient	253	24.90
			Advanced	43	4.23
			Proficient + Advanced	296	29.13
			Total	1,016	100.00
	Am. History	No	Below Basic	1,626	25.24
			Basic	1,577	24.48
			Proficient	1,931	29.98
			Advanced	1,307	20.29
			Proficient + Advanced	3,238	50.27
			Total	6,441	100.00
		Yes	Below Basic	28	50.00
			Basic	15	26.79
			Proficient	12	21.43
			Advanced	--	--
			Proficient + Advanced	13	23.21
			Total	56	100.00

Table F.15 (continued). Achievement-Level Distributions—Limited English Proficient, Spring 2017

Test Period	Content Area	LEP	Achievement Level	Freq.	%
Spring 2017	Physical Science	No	Below Basic	174	5.97
			Basic	1,893	64.96
			Proficient	704	24.16
			Advanced	143	4.91
			Proficient + Advanced	847	29.07
			Total	2,914	100.00
		Yes	Below Basic	--	--
			Basic	13	56.52
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	23	100.00

Table F.16. Achievement-Level Distributions—Title I, Summer 2016

Test Period	Content Area	Title I	Achievement Level	Freq.	%
Summer 2016	English II	No	Below Basic	58	20.07
			Basic	107	37.02
			Proficient	117	40.48
			Advanced	--	--
			Proficient + Advanced	124	42.91
			Total	289	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	13	59.09
			Advanced	--	--
			Proficient + Advanced	14	63.64
			Total	22	100.00
	Algebra I	No	Below Basic	145	20.74
			Basic	191	27.32
			Proficient	292	41.77
			Advanced	71	10.16
			Proficient + Advanced	363	51.93
			Total	699	100.00
		Yes	Below Basic	16	13.79
			Basic	30	25.86
			Proficient	49	42.24
			Advanced	21	18.10
			Proficient + Advanced	70	60.34
			Total	116	100.00
	Biology	No	Below Basic	76	36.36
			Basic	77	36.84
			Proficient	49	23.44
			Advanced	--	--
			Proficient + Advanced	56	26.79
			Total	209	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	19	67.86
			Advanced	--	--
			Proficient + Advanced	21	75.00
			Total	28	100.00
	English I	No	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	11	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	12	100.00

Table F.16 (continued). Achievement-Level Distributions—Title I, Summer 2016

Test Period	Content Area	Title I	Achievement Level	Freq.	%
Summer 2016	Algebra II	No	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	9	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	9	100.00
	Geometry	No	Below Basic	13	39.39
			Basic	--	--
			Proficient	13	39.39
			Advanced	--	--
			Proficient + Advanced	14	42.42
			Total	33	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	11	42.31
			Advanced	--	--
			Proficient + Advanced	15	57.69
			Total	26	100.00
	Government	No	Below Basic	80	11.44
			Basic	171	24.46
			Proficient	278	39.77
			Advanced	170	24.32
			Proficient + Advanced	448	64.09
			Total	699	100.00
		Yes	Below Basic	--	--
			Basic	17	35.42
			Proficient	26	54.17
			Advanced	--	--
			Proficient + Advanced	28	58.33
			Total	48	100.00
	Am. History	No	Below Basic	11	15.94
			Basic	19	27.54
			Proficient	24	34.78
			Advanced	15	21.74
			Proficient + Advanced		56.52
			Total	69	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--

Table F.16 (continued). Achievement-Level Distributions—Title I, Summer 2016

Test Period	Content Area	Title I	Achievement Level	Freq.	%
Summer 2016	Physical Science	No	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	1	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	10	100.00

Table F.17. Achievement-Level Distributions—Title I, Fall 2016

Test Period	Content Area	Title I	Achievement Level	Freq.	%
Fall 2016	English II	No	Below Basic	430	16.06
			Basic	741	27.67
			Proficient	1,268	47.35
			Advanced	239	8.92
			Proficient + Advanced	1,507	56.27
			Total	2,678	100.00
		Yes	Below Basic	78	15.32
			Basic	150	29.47
			Proficient	244	47.94
			Advanced	37	7.27
			Proficient + Advanced	281	55.21
			Total	509	100.00
	Algebra I	No	Below Basic	866	22.82
			Basic	905	23.85
			Proficient	1,346	35.47
			Advanced	678	17.87
			Proficient + Advanced	2,024	53.33
			Total	3,795	100.00
		Yes	Below Basic	157	26.79
			Basic	167	28.50
			Proficient	210	35.84
			Advanced	52	8.87
			Proficient + Advanced	262	44.71
			Total	586	100.00
	Biology	No	Below Basic	461	17.67
			Basic	727	27.87
			Proficient	987	37.83
			Advanced	434	16.63
			Proficient + Advanced	1,421	54.47
			Total	2,609	100.00
		Yes	Below Basic	114	22.44
			Basic	204	40.16
			Proficient	156	30.71
			Advanced	34	6.69
			Proficient + Advanced	190	37.40
			Total	508	100.00
	English I	No	Below Basic	26	10.40
			Basic	61	24.40
			Proficient	136	54.40
			Advanced	27	10.80
			Proficient + Advanced	163	65.20
			Total	250	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	11	68.75
			Advanced	--	--
			Proficient + Advanced	12	75.00
			Total	16	100.00

Table F.17 (continued). Achievement-Level Distributions—Title I, Fall 2016

Test Period	Content Area	Title I	Achievement Level	Freq.	%
Fall 2016	Algebra II	No	Below Basic	120	15.44
			Basic	120	15.44
			Proficient	310	39.90
			Advanced	227	29.21
			Proficient + Advanced	537	69.11
			Total	777	100.00
		Yes	Below Basic	--	--
			Basic	13	22.03
			Proficient	23	38.98
			Advanced	19	32.20
			Proficient + Advanced	42	71.19
			Total	59	100.00
	Geometry	No	Below Basic	181	17.97
			Basic	147	14.60
			Proficient	447	44.39
			Advanced	232	23.04
			Proficient + Advanced	679	67.43
			Total	1,007	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
	Government	No	Below Basic	1,192	9.71
			Basic	3,017	24.57
			Proficient	4,835	39.38
			Advanced	3,233	26.33
			Proficient + Advanced	8,068	65.72
			Total	12,277	100.00
		Yes	Below Basic	182	17.97
			Basic	355	35.04
			Proficient	365	36.03
			Advanced	111	10.96
			Proficient + Advanced	476	46.99
			Total	1,013	100.00
	Am. History	No	Below Basic	137	23.62
			Basic	141	24.31
			Proficient	181	31.21
			Advanced	121	20.86
			Proficient + Advanced	302	52.07
			Total	580	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--

Table F.18. Achievement-Level Distributions—Title I, Spring 2017

Test Period	Content Area	Title I	Achievement Level	Freq.	%
Spring 2017	English II	No	Below Basic	2,957	5.22
			Basic	12,548	22.14
			Proficient	31,739	56.00
			Advanced	9,431	16.64
			Proficient + Advanced	41,170	72.64
			Total	56,675	100.00
		Yes	Below Basic	611	12.53
			Basic	1,540	31.57
			Proficient	2,388	48.95
			Advanced	339	6.95
			Proficient + Advanced	2,727	55.90
			Total	4,878	100.00
	Algebra I	No	Below Basic	10,349	19.20
			Basic	10,113	18.76
			Proficient	22,575	41.88
			Advanced	10,872	20.17
			Proficient + Advanced	33,447	62.04
			Total	53,909	100.00
		Yes	Below Basic	1,996	30.41
			Basic	1,462	22.27
			Proficient	2,462	37.51
			Advanced	644	9.81
			Proficient + Advanced	3,106	47.32
			Total	6,564	100.00
	Biology	No	Below Basic	3,133	5.51
			Basic	15,116	26.58
			Proficient	25,990	45.70
			Advanced	12,628	22.21
			Proficient + Advanced	38,618	67.91
			Total	56,867	100.00
		Yes	Below Basic	805	15.89
			Basic	2,064	40.74
			Proficient	1,838	36.28
			Advanced	359	7.09
			Proficient + Advanced	2,197	43.37
			Total	5,066	100.00
	English I	No	Below Basic	760	6.63
			Basic	3,367	29.37
			Proficient	6,198	54.06
			Advanced	1,139	9.94
			Proficient + Advanced	7,337	64.00
			Total	11,464	100.00
		Yes	Below Basic	168	12.03
			Basic	477	34.17
			Proficient	670	47.99
			Advanced	81	5.80
			Proficient + Advanced	751	53.80
			Total	1,396	100.00

Table F.18. (continued). Achievement-Level Distributions—Title I, Spring 2017

Test Period	Content Area	Title I	Achievement Level	Freq.	%
Spring 2017	Algebra II	No	Below Basic	1,944	11.11
			Basic	2,759	15.76
			Proficient	6,483	37.04
			Advanced	6,317	36.09
			Proficient + Advanced	12,800	73.13
			Total	17,503	100.00
		Yes	Below Basic	224	26.86
			Basic	201	24.10
			Proficient	274	32.85
			Advanced	135	16.19
			Proficient + Advanced	409	49.04
			Total	834	100.00
	Geometry	No	Below Basic	1,520	22.70
			Basic	1,281	19.13
			Proficient	2,828	42.23
			Advanced	1,068	15.95
			Proficient + Advanced	3,896	58.18
			Total	6,697	100.00
		Yes	Below Basic	69	22.55
			Basic	62	20.26
			Proficient	143	46.73
			Advanced	32	10.46
			Proficient + Advanced	175	57.19
			Total	306	100.00
	Government	No	Below Basic	2,677	6.35
			Basic	10,977	26.06
			Proficient	19,130	45.41
			Advanced	9,342	22.18
			Proficient + Advanced	28,472	67.59
			Total	42,126	100.00
		Yes	Below Basic	799	17.74
			Basic	1,861	41.32
			Proficient	1,524	33.84
			Advanced	320	7.10
			Proficient + Advanced	1,844	40.94
			Total	4,504	100.00
	Am. History	No	Below Basic	1,562	24.92
			Basic	1,532	24.44
			Proficient	1,889	30.14
			Advanced	1,285	20.50
			Proficient + Advanced	3,174	51.05
			Total	6,218	100.00
		Yes	Below Basic	92	40.17
			Basic	60	26.20
			Proficient	54	23.58
			Advanced	23	10.04
			Proficient + Advanced	77	33.62
			Total	229	100.00

Table F.18. (continued). Achievement-Level Distributions—Title I, Spring 2017

Test Period	Content Area	Title I	Achievement Level	Freq.	%
Spring 2017	Physical Science	No	Below Basic	169	6.14
			Basic	1,777	64.52
			Proficient	670	24.33
			Advanced	138	5.01
			Proficient + Advanced	808	70.02
			Total	1,154	100.00
		Yes	Below Basic	--	--
			Basic	129	70.49
			Proficient	40	21.86
			Advanced	--	--
			Proficient + Advanced	45	24.59
			Total	183	100.00

Table F.19. Achievement-Level Distributions—Individualized Education Program, Summer 2016

Test Period	Content Area	IEP	Achievement Level	Freq.	%
Summer 2016	English II	No	Below Basic	60	20.91
			Basic	95	33.10
			Proficient	124	43.21
			Advanced	--	--
			Proficient + Advanced	132	45.99
			Total	287	100.00
		Yes	Below Basic	--	--
			Basic	18	75.00
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	24	100.00
	Algebra I	No	Below Basic	137	18.46
			Basic	199	26.82
			Proficient	317	42.72
			Advanced	89	11.99
			Proficient + Advanced	406	54.72
			Total	742	100.00
		Yes	Below Basic	24	32.88
			Basic	22	30.14
			Proficient	24	32.88
			Advanced	--	--
			Proficient + Advanced	27	36.99
			Total	73	100.00
	Biology	No	Below Basic	72	33.96
			Basic	70	33.02
			Proficient	62	29.25
			Advanced	--	--
			Proficient + Advanced	70	33.02
			Total	212	100.00
		Yes	Below Basic	--	--
			Basic	12	48.00
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	25	100.00
	English I	No	Below Basic	--	--
			Basic	--	--
			Proficient	10	47.62
			Advanced	--	--
			Proficient + Advanced	11	52.38
			Total	21	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	2	100.00

Table F.19. (continued). Achievement-Level Distributions—Individualized Education Program, Summer 2016

Test Period	Content Area	IEP	Achievement Level	Freq.	%
Summer 2016	Algebra II	No	Below Basic	--	--
			Basic	--	--
			Proficient	11	61.11
			Advanced	--	--
			Proficient + Advanced	12	66.67
			Total	18	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
	Geometry	No	Below Basic	17	29.31
			Basic	13	22.41
			Proficient	23	39.66
			Advanced	--	--
			Proficient + Advanced	28	48.28
			Total	58	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced		
			Total	1	100.00
	Government	No	Below Basic	76	10.66
			Basic	170	23.84
			Proficient	295	41.37
			Advanced	172	24.12
			Proficient + Advanced	467	65.50
			Total	713	100.00
		Yes	Below Basic	--	--
			Basic	18	52.94
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	34	100.00
	Am. History	No	Below Basic	9	13.43
			Basic	19	28.36
			Proficient	24	35.82
			Advanced	15	22.39
			Proficient + Advanced	39	58.20
			Total	67	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	2	100.00

Table F.19. (continued). Achievement-Level Distributions—Individualized Education Program, Summer 2016

Test Period	Content Area	IEP	Achievement Level	Freq.	%
Summer 2016	Physical Science	No	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	11	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--

Table F.20. Achievement-Level Distributions—Individualized Education Program, Fall 2016

Test Period	Content Area	IEP	Achievement Level	Freq.	%
Fall 2016	English II	No	Below Basic	353	12.63
			Basic	731	26.16
			Proficient	1,439	51.50
			Advanced	271	9.70
			Proficient + Advanced	1,710	61.20
			Total	2,794	100.00
		Yes	Below Basic	155	39.44
			Basic	160	40.71
			Proficient	73	18.58
			Advanced	--	--
			Proficient + Advanced	78	19.85
			Total	393	100.00
	Algebra I	No	Below Basic	791	19.95
			Basic	961	24.24
			Proficient	1,492	37.64
			Advanced	720	18.16
			Proficient + Advanced	2,212	55.80
			Total	3,964	100.00
		Yes	Below Basic	232	55.64
			Basic	111	26.62
			Proficient	64	15.35
			Advanced	10	2.40
			Proficient + Advanced	74	17.75
			Total	417	100.00
	Biology	No	Below Basic	453	16.12
			Basic	816	29.03
			Proficient	1086	38.63
			Advanced	456	16.22
			Proficient + Advanced	1,542	54.80
			Total	2,814	100.00
		Yes	Below Basic	122	39.87
			Basic	115	37.58
			Proficient	57	18.63
			Advanced	12	3.92
			Proficient + Advanced	69	22.55
			Total	306	100.00
	English I	No	Below Basic	18	7.32
			Basic	58	23.58
			Proficient	143	58.13
			Advanced	27	10.98
			Proficient + Advanced	170	69.10
			Total	246	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	20	100.00

Table F.20. (continued). Achievement-Level Distributions—Individualized Education Program, Fall 2016

Test Period	Content Area	IEP	Achievement Level	Freq.	%
Fall 2016	Algebra II	No	Below Basic	122	14.82
			Basic	130	15.80
			Proficient	329	39.98
			Advanced	242	29.40
			Proficient + Advanced	571	69.38
			Total	823	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	13	100.00
	Geometry	No	Below Basic	149	15.70
			Basic	140	14.75
			Proficient	431	45.42
			Advanced	229	24.13
			Proficient + Advanced	660	69.55
			Total	949	--
		Yes	Below Basic	32	55.17
			Basic	--	--
			Proficient	16	27.59
			Advanced	--	--
			Proficient + Advanced	19	32.75
			Total	58	100.00
	Government	No	Below Basic	1,062	8.80
			Basic	2,912	24.12
			Proficient	4,860	40.25
			Advanced	3,240	26.83
			Proficient + Advanced	8,100	67.09
			Total	12,074	100.00
		Yes	Below Basic	312	25.64
			Basic	460	37.83
			Proficient	340	27.94
			Advanced	104	8.55
			Proficient + Advanced	444	36.48
			Total	1,217	100.00
	Am. History	No	Below Basic	107	20.66
			Basic	122	23.55
			Proficient	174	33.59
			Advanced	115	22.20
			Proficient + Advanced	289	55.79
			Total	518	100.00
		Yes	Below Basic	30	48.39
			Basic	19	30.65
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	13	20.97
			Total	62	100.00

Table F.21. Achievement-Level Distributions—Individualized Education Program, Spring 2017

Test Period	Content Area	IEP	Achievement Level	Freq.	%
Spring 2017	English II	No	Below Basic	1,937	3.49
			Basic	11,448	20.61
			Proficient	32,510	58.54
			Advanced	9,641	17.36
			Proficient + Advanced	42,151	75.90
			Total	55,536	100.00
		Yes	Below Basic	1,631	27.11
			Basic	2,640	43.88
			Proficient	1,617	26.87
			Advanced	129	2.14
			Proficient + Advanced	1,746	29.02
			Total	6,017	100.00
	Algebra I	No	Below Basic	9,006	16.54
			Basic	10,251	18.82
			Proficient	23,937	43.95
			Advanced	11,270	20.69
			Proficient + Advanced	35,207	64.64
			Total	54,464	100.00
		Yes	Below Basic	3,339	55.58
			Basic	1,324	22.04
			Proficient	1,100	18.31
			Advanced	246	4.09
			Proficient + Advanced	1,346	22.40
			Total	6,009	100.00
	Biology	No	Below Basic	2,125	3.82
			Basic	14,247	25.61
			Proficient	26,511	47.65
			Advanced	12,758	22.93
			Proficient + Advanced	39,269	70.58
			Total	55,641	100.00
		Yes	Below Basic	1,813	28.81
			Basic	2,933	46.61
			Proficient	1,317	20.93
			Advanced	229	3.64
			Proficient + Advanced	1,546	24.57
			Total	6,292	100.00
	English I	No	Below Basic	631	5.34
			Basic	3,343	28.28
			Proficient	6,636	56.14
			Advanced	1,211	10.24
			Proficient + Advanced	7,847	66.38
			Total	11,821	100.00
		Yes	Below Basic	297	28.59
			Basic	501	48.22
			Proficient	232	22.33
			Advanced	--	--
			Proficient + Advanced	241	23.20
			Total	1,039	100.00

Table F.21. (continued). Achievement-Level Distributions—Individualized Education Program, Spring 2017

Test Period	Content Area	IEP	Achievement Level	Freq.	%
Spring 2017	Algebra II	No	Below Basic	2,082	11.51
			Basic	2,915	16.12
			Proficient	6,682	36.95
			Advanced	6,407	35.43
			Proficient + Advanced	13,089	72.37
			Total	18,086	100.00
		Yes	Below Basic	86	34.26
			Basic	45	17.93
			Proficient	75	29.88
			Advanced	45	17.93
			Proficient + Advanced	120	47.81
			Total	251	100.00
	Geometry	No	Below Basic	1,431	21.31
			Basic	1,284	19.12
			Proficient	2,915	43.40
			Advanced	1,086	16.17
			Proficient + Advanced	4,001	59.57
			Total	6,716	100.00
		Yes	Below Basic	158	55.05
			Basic	59	20.56
			Proficient	56	19.51
			Advanced	14	4.88
			Proficient + Advanced	70	24.39
			Total	287	100.00
	Government	No	Below Basic	2,179	5.16
			Basic	10,864	25.73
			Proficient	19,691	46.64
			Advanced	9,484	22.46
			Proficient + Advanced	29,175	69.11
			Total	42,218	100.00
		Yes	Below Basic	1,297	29.40
			Basic	1,974	44.74
			Proficient	963	21.83
			Advanced	178	4.03
			Proficient + Advanced	1,141	25.86
			Total	4,412	100.00
	Am. History	No	Below Basic	1,374	22.79
			Basic	1,501	24.90
			Proficient	1,880	31.19
			Advanced	1,273	21.12
			Proficient + Advanced	3,153	52.31
			Total	6,028	100.00
		Yes	Below Basic	280	59.70
			Basic	91	19.40
			Proficient	63	13.43
			Advanced	35	7.46
			Proficient + Advanced	98	20.90
			Total	469	100.00

Table F.21. (continued). Achievement-Level Distributions—Individualized Education Program, Spring 2017

Test Period	Content Area	IEP	Achievement Level	Freq.	%
Spring 2017	Physical Science	No	Below Basic	122	4.56
			Basic	1,725	64.46
			Proficient	686	25.64
			Advanced	143	5.34
			Proficient + Advanced	829	30.98
			Total	2,676	100.00
		Yes	Below Basic	56	21.46
			Basic	181	69.35
			Proficient	24	9.20
			Advanced	--	--
			Proficient + Advanced	24	9.20
			Total	261	100.00

Table F.22. Achievement-Level Distributions—Accommodations, Summer 2016

Test Period	Content Area	Accom.	Achievement Level	Freq.	%
Summer 2016	English II	No	Below Basic	65	20.83
			Basic	110	35.26
			Proficient	129	41.35
			Advanced	--	--
			Proficient + Advanced	137	43.91
			Total	312	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	9	100.00
	Algebra I	No	Below Basic	159	19.73
			Basic	217	26.92
			Proficient	339	42.06
			Advanced	91	11.29
			Proficient + Advanced	430	53.35
			Total	806	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	22	100.00
	Biology	No	Below Basic	83	34.44
			Basic	81	33.61
			Proficient	68	28.22
			Advanced	--	--
			Proficient + Advanced	77	31.95
			Total	241	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	4	100.00
	English I	No	Below Basic	--	--
			Basic	23	45.10
			Proficient	10	43.48
			Advanced	--	--
			Proficient + Advanced	11	47.83
			Total	23	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--

Table F.22. (continued). Achievement-Level Distributions—Accommodations, Summer 2016

Test Period	Content Area	Accom.	Achievement Level	Freq.	%
Summer 2016	Algebra II	No	Below Basic	--	--
			Basic	--	--
			Proficient	11	57.89
			Advanced	--	--
			Proficient + Advanced	12	63.16
			Total	19	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
	Geometry	No	Below Basic	17	28.81
			Basic	13	22.03
			Proficient	24	40.68
			Advanced	--	--
			Proficient + Advanced	29	49.15
			Total	59	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--
	Government	No	Below Basic	87	11.52
			Basic	189	25.03
			Proficient	307	40.66
			Advanced	172	22.78
			Proficient + Advanced	479	63.44
			Total	755	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	5	100.00
	Am. History	No	Below Basic	11	15.94
			Basic	19	27.54
			Proficient	24	34.78
			Advanced	15	21.74
			Proficient + Advanced	39	56.52
			Total	69	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--

Table F.22. (continued). Achievement-Level Distributions—Accommodations, Summer 2016

Test Period	Content Area	Accom.	Achievement Level	Freq.	%
Summer 2016	Physical Science	No	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	11	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	--	--

Table F.23. Achievement-Level Distributions—Accommodations, Fall 2016

Test Period	Content Area	Accom.	Achievement Level	Freq.	%
Fall 2016	English II	No	Below Basic	453	15.02
			Basic	820	27.20
			Proficient	1,472	48.82
			Advanced	270	8.96
			Proficient + Advanced	1,472	57.78
			Total	3,015	100.00
		Yes	Below Basic	56	31.82
			Basic	74	42.05
			Proficient	40	22.73
			Advanced	--	--
			Proficient + Advanced	46	26.14
			Total	176	100.00
	Algebra I	No	Below Basic	956	22.42
			Basic	1,055	24.74
			Proficient	1,529	35.86
			Advanced	724	16.98
			Proficient + Advanced	2,253	52.84
			Total	4,264	100.00
		Yes	Below Basic	86	52.44
			Basic	45	27.44
			Proficient	27	16.46
			Advanced	--	--
			Proficient + Advanced	33	20.12
			Total	164	100.00
	Biology	No	Below Basic	512	17.43
			Basic	864	29.41
			Proficient	1,099	37.41
			Advanced	463	15.76
			Proficient + Advanced	1,562	53.17
			Total	2,938	100.00
		Yes	Below Basic	64	35.56
			Basic	67	37.22
			Proficient	44	24.44
			Advanced	--	--
			Proficient + Advanced	49	27.22
			Total	180	100.00
	English I	No	Below Basic	18	7.59
			Basic	53	22.36
			Proficient	139	58.65
			Advanced	27	11.39
			Proficient + Advanced	166	70.04
			Total	237	100.00
		Yes	Below Basic	--	--
			Basic	11	37.93
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	29	100.00

Table F.23. (continued). Achievement-Level Distributions—Accommodations, Fall 2016

Test Period	Content Area	Accom.	Achievement Level	Freq.	%
Fall 2016	Algebra II	No	Below Basic	123	14.87
			Basic	131	15.84
			Proficient	328	39.66
			Advanced	245	29.63
			Proficient + Advanced	573	69.29
			Total	827	100.00
		Yes	Below Basic	--	--
			Basic	--	--
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	--	--
			Total	9	100.00
	Geometry	No	Below Basic	135	14.55
			Basic	135	14.55
			Proficient	430	46.34
			Advanced	228	24.57
			Proficient + Advanced	658	70.91
			Total	928	100.00
		Yes	Below Basic	46	58.23
			Basic	12	15.19
			Proficient	17	21.52
			Advanced	--	--
			Proficient + Advanced	21	26.58
			Total	79	100.00
	Government	No	Below Basic	1,193	9.45
			Basic	3,108	24.61
			Proficient	5,030	39.84
			Advanced	3,296	26.10
			Proficient + Advanced	8,326	65.94
			Total	12,627	100.00
		Yes	Below Basic	184	27.18
			Basic	270	39.88
			Proficient	175	25.85
			Advanced	48	7.09
			Proficient + Advanced	223	32.94
			Total	677	100.00
	Am. History	No	Below Basic	110	20.95
			Basic	125	23.81
			Proficient	175	33.33
			Advanced	115	21.90
			Proficient + Advanced	290	55.24
			Total	525	100.00
		Yes	Below Basic	27	49.09
			Basic	16	29.09
			Proficient	--	--
			Advanced	--	--
			Proficient + Advanced	12	21.81
			Total	55	100.00

Table F.24. Achievement-Level Distributions—Accommodations, Spring 2017

Test Period	Content Area	Accom.	Achievement Level	Freq.	%
Spring 2017	English II	No	Below Basic	2,461	4.29
			Basic	12,227	21.33
			Proficient	32,941	57.48
			Advanced	9,684	16.90
			Proficient + Advanced	42,625	74.38
			Total	57,313	100.00
		Yes	Below Basic	1,115	26.05
			Basic	1,871	43.70
			Proficient	1,207	28.19
			Advanced	88	2.06
			Proficient + Advanced	1,295	30.25
			Total	4,281	100.00
	Algebra I	No	Below Basic	10,266	18.12
			Basic	10,703	18.89
			Proficient	24,305	42.90
			Advanced	11,385	20.09
			Proficient + Advanced	35,690	62.99
			Total	56,659	100.00
		Yes	Below Basic	2,126	54.19
			Basic	898	22.89
			Proficient	764	19.47
			Advanced	135	3.44
			Proficient + Advanced	899	22.91
			Total	3,923	100.00
	Biology	No	Below Basic	2,723	4.75
			Basic	14,977	26.13
			Proficient	26,801	46.77
			Advanced	12,808	22.35
			Proficient + Advanced	39,609	69.11
			Total	57,309	100.00
		Yes	Below Basic	1,224	26.33
			Basic	2,214	47.63
			Proficient	1,030	22.16
			Advanced	180	3.87
			Proficient + Advanced	1,210	26.03
			Total	4,648	100.00
	English I	No	Below Basic	714	5.92
			Basic	3,435	28.49
			Proficient	6,694	55.52
			Advanced	1,213	10.06
			Proficient + Advanced	7,907	65.59
			Total	12,056	100.00
		Yes	Below Basic	215	26.41
			Basic	411	50.49
			Proficient	181	22.24
			Advanced	--	--
			Proficient + Advanced	188	23.10
			Total	814	100.00

Table F.24. (continued). Achievement-Level Distributions—Accommodations, Spring 2017

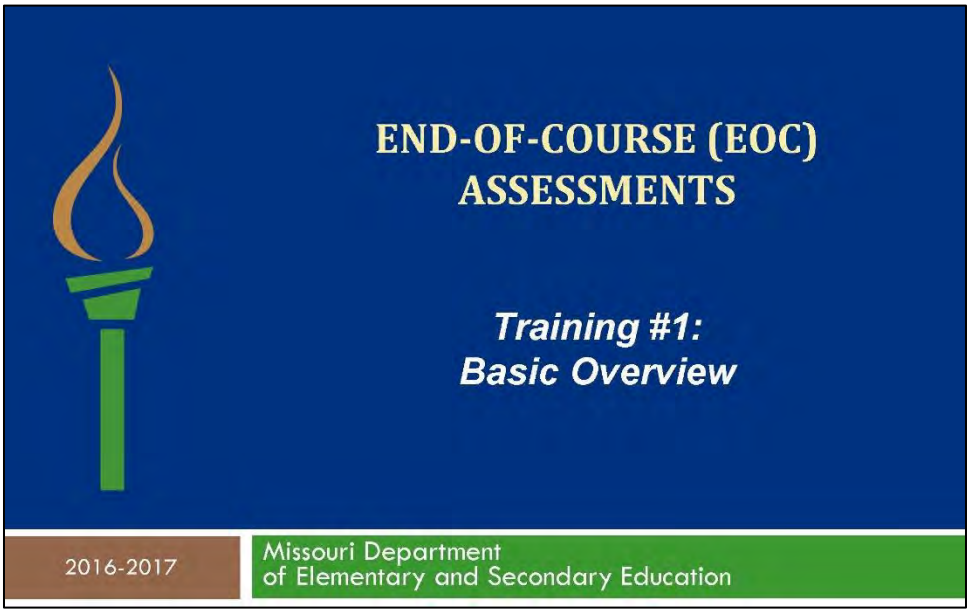
Test Period	Content Area	Accom.	Achievement Level	Freq.	%
Spring 2017	Algebra II	No	Below Basic	2,128	11.70
			Basic	2,919	16.05
			Proficient	6,707	36.88
			Advanced	6,430	35.36
			Proficient + Advanced	13,137	72.24
			Total	18,184	100.00
		Yes	Below Basic	46	28.05
			Basic	42	25.61
			Proficient	54	32.93
			Advanced	22	13.41
			Proficient + Advanced	76	46.34
			Total	164	100.00
	Geometry	No	Below Basic	1,445	21.44
			Basic	1,286	19.08
			Proficient	2,918	43.29
			Advanced	1,091	16.19
			Proficient + Advanced	4,009	59.48
			Total	6,740	100.00
		Yes	Below Basic	144	54.75
			Basic	57	21.67
			Proficient	53	20.15
			Advanced	--	--
			Proficient + Advanced	62	23.57
			Total	263	100.00
	Government	No	Below Basic	2,634	6.06
			Basic	11,407	26.22
			Proficient	19,906	45.76
			Advanced	9,551	21.96
			Proficient + Advanced	29,457	67.72
			Total	43,498	100.00
		Yes	Below Basic	850	26.87
			Basic	1,440	45.53
			Proficient	759	24.00
			Advanced	114	3.60
			Proficient + Advanced	873	27.60
			Total	3,163	100.00
	Am. History	No	Below Basic	1,436	23.33
			Basic	1,528	24.83
			Proficient	1,904	30.94
			Advanced	1,286	20.90
			Proficient + Advanced	3,190	51.84
			Total	6,154	100.00
		Yes	Below Basic	218	63.37
			Basic	64	18.60
			Proficient	39	11.34
			Advanced	23	6.69
			Proficient + Advanced	62	18.02
			Total	344	100.00

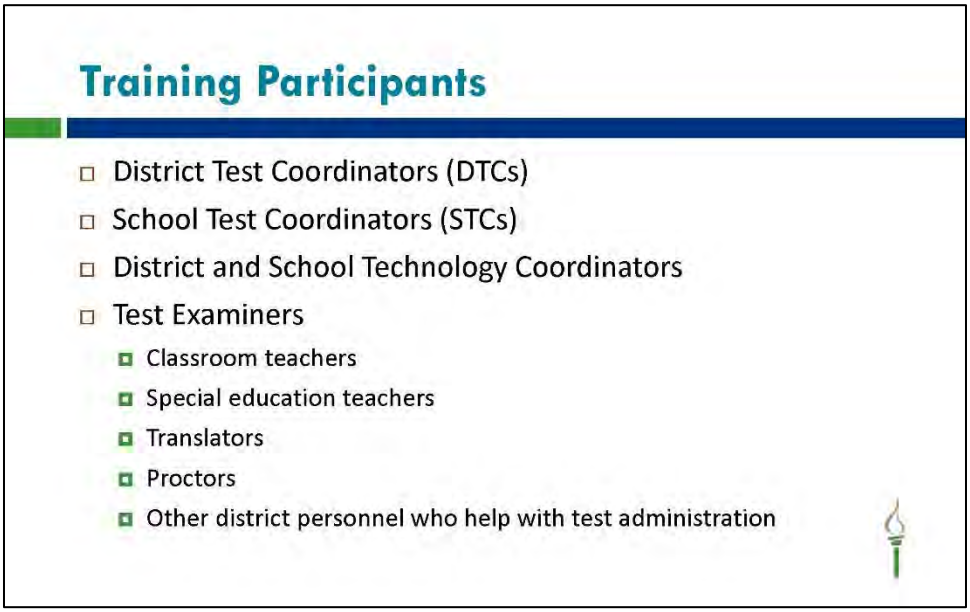
Table F.24 (continued). Achievement-Level Distributions—Accommodations, Spring 2017

Test Period	Content Area	Accom.	Achievement Level	Freq.	%
Spring 2017	Physical Science	No	Below Basic	133	4.86
			Basic	1,763	64.39
			Proficient	699	25.53
			Advanced	143	5.22
			Proficient + Advanced	842	30.75
			Total	2,738	100.00
		Yes	Below Basic	45	22.28
			Basic	145	71.78
			Proficient	12	5.94
			Advanced	--	--
			Proficient + Advanced	12	5.94
			Total	202	100.00

Appendix G: Training PowerPoints

Training #1: Basic Overview





Additional EOC Trainings

- EOC Trainings are also available for:
  - After Testing
  - Alternative Testing Formats
  - Blueprints and Timing Guidelines
  - EOC Process
  - Important Dates to Remember
  - Practice Tutorials & Pre-Tests
  - Test Tickets
  - Testing Day
  - Testing Issues
  - Universal Tools and Accommodations
  - Using iTester Admin
  - Who Is Tested

Accessing the Trainings

- DESE Assessment webpage under EOC training
  - http://dese.mo.gov/college-career-readiness/assessment/end-course
- iTester Admin page under the Help tab
  - http://moeoc.questarai.com/Admin

Subjects Tested

- Required
  - Algebra I
  - English II
  - Government
  - Biology
- Optional (For Local Use)
  - *Algebra II
  - Geometry
  - English I
  - American History
  - Physical Science

Testing Timelines

Administration	Pre-Code Due By	Students In iTester By	Students Can Test By
Fall 2016 10/3/16 – 1/20/17	9/16/16	9/26/16	10/3/16
	11/4/16	11/15/16	11/21/16
Spring 2015 2/20/17 – 5/26/17	1/27/17	2/13/17	2/20/17
	3/3/17	3/17/17	3/20/17
	3/31/17	4/14/17	4/17/17

DTCs must specify the district assessment windows for each content area. Districts have 7 business days per content area to administer the assessments. Once the district testing window has ended, iTester will close and no further tests will be accessible without contacting Questar.

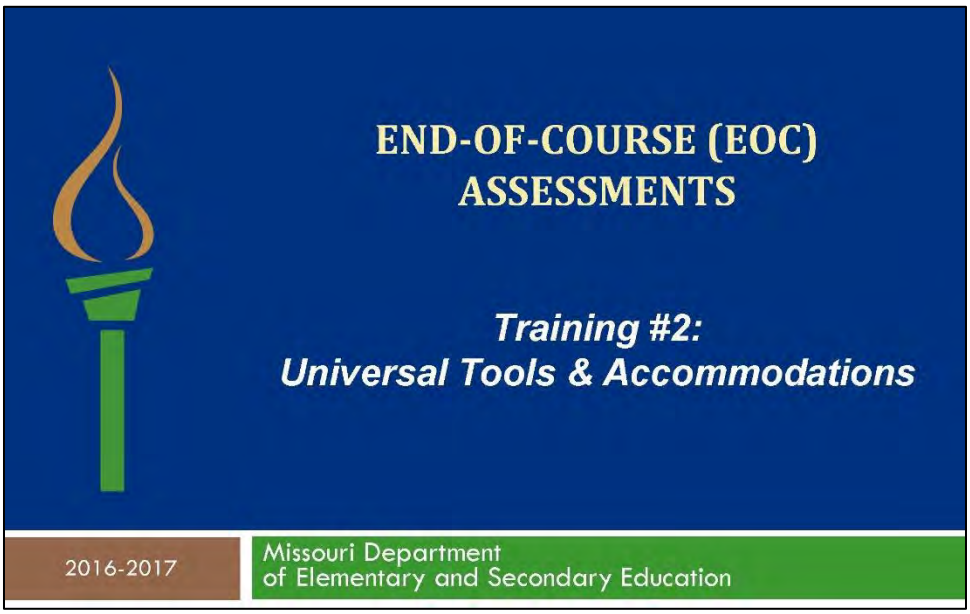
Costs for EOC Assessments

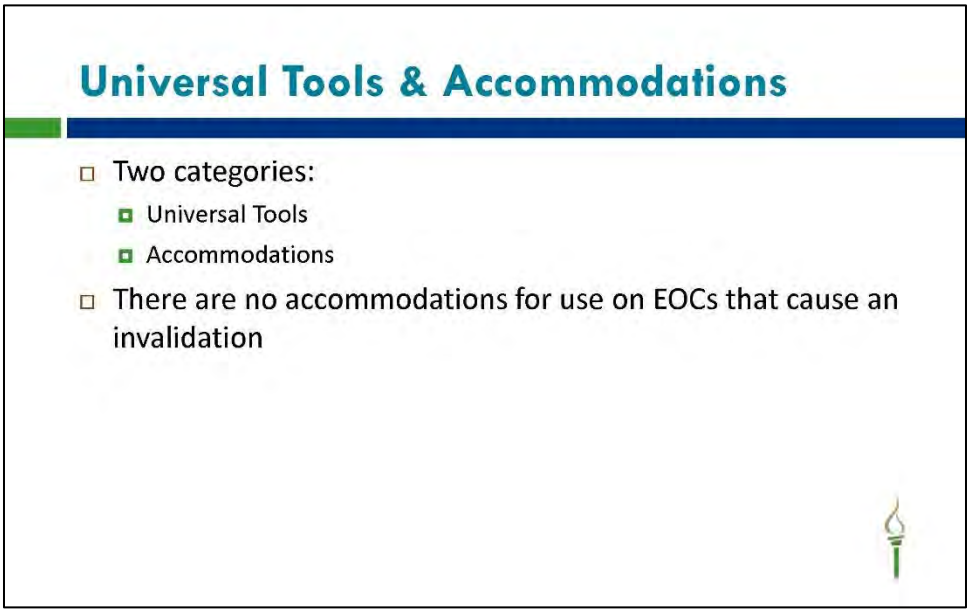
- Required:
  - Algebra I - $1.80
  - English II - $1.80
  - Biology - $1.80
  - Government – Free

Reminders

- Resources to consult:
  - The Test Administration Manual (TAM)
  - 2016-2017 LEA Guide to the Missouri Assessment Program
  - DESE EOC Website
    - http://dese.mo.gov/college-career-readiness/assessment/end-course
  - Your District Testing Coordinator (DTC)

Training #2: Universal Tools & Accommodations





Universal Tools

- Universal Tools
  - Available to all students taking EOC assessments, unless otherwise noted
  - Some tools are only for use by English Language Learner (ELL) students (ELL students are those marked LEP-RCV or LEP-NRC in Core Data)
  - Some tools need to be marked in iTester prior to the assessment. Please read the description to determine if the tool must be marked in iTester.

Universal Tools

Tool	Description	Code
Bilingual Dictionary	ELL students may have access to a physical Bilingual Dictionary for use ONLY on the Writing Prompt for the English I and English II assessments. If the Bilingual Dictionary is electronic, it may not connect to the internet. This tool must be chosen in the iTester system under student accommodations prior to testing.	S431
Break (Pause)	All students may take breaks of up to 20 minutes as needed. There is no limit to how many times a student may use this during an assessment. If a student hits the pause button, they will be logged out. They can log back in anytime that same day. If the assessment needs to be reopened on a subsequent day, the district will need to call help desk. If the need arises to move a student from one computer to another, pause the test to exit. The test will remain incomplete until the student logs back in and completes the test.	N/A
Color Contrast – Paper	All students taking the paper/pencil assessment may have the test printed in different colors based on student needs or preferences. This tool must be chosen in the iTester system under student accommodations prior to testing.	S102

Accommodations

- Accommodations
  - Must appear in an IEP or 504 plan
  - Some accommodations are only for use by English Language Learner (ELL) students (ELL students are those marked LEP-RCV or LEP-NRC in Core Data) with an IEP/504
  - All accommodations need to be marked in iTester prior to the assessment

Accommodations

- Accommodations for Missouri EOCs aligned to new accommodations being used for the MAP Grade-Level assessments
- Greater flexibility in providing accessibility for all students

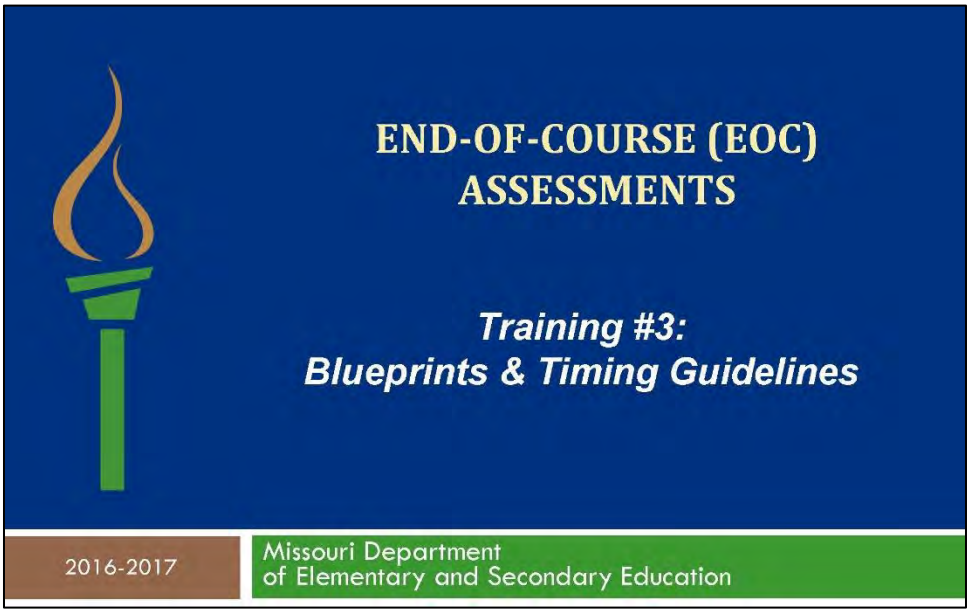
EOC Read Aloud

- All directions and items in any subject, except ELA reading passages, may be read by a trained reader
- Read aloud of an ELA reading passage requires an IEP or 504 plan
- Decision to read aloud should be made by educators who work with the student on a regular basis
- DESE does not recommend the use of Read Aloud for students who do not use it as part of their everyday learning in the classroom. The use of Read Aloud for some students can prove distracting and become a hindrance to student performance
- Completed in a small group or individual setting

Text-To-Speech (TTS)

- As a new feature this year, the iTester platform allows students to have the test directions and items read aloud via embedded text-to-speech technology
- The student can control the speed and volume of the voice
- Students should have multiple exposures or pratice using the synthetic voice in TTS. If districts or students are not comfortable with TTS, they can still use a Human Reader.
- The TTS tool must be turned on in the system prior to testing

Training #3: Blueprints & Timing Guidelines



Blueprints – Algebra I

Blueprint for ALGEBRA I

Category	Code	Target	Point Range	Range Of Emphasis
Number & Quantity	HSN-RN.A	The Real Number System	2-4	5-10%
	HSN-Q	Quantities		
Algebra	HSA-SSE	Seeing Structure In Expressions	14-21	35-53%
	HSA-APR	Arithmetic With Polynomials And Rational Expressions		
	HSA-CED	Creating Equations		
	HSA-REI	Reasoning With Equations And Inequalities		
Functions	HSF-IF	Interpreting Functions	11-20	28-50%
	HSF-BF	Building Functions		
	HSF-LE	Linear, Quadratic And Exponential Models		
Stats & Prob	HSS-ID	Interpreting Categorical And Quantitative Data	3-6	8-15%
Total			40	100%

Performance Event: Each year the performance event may align to any specific conceptual category or to a group of them. The Performance Event is worth 10 points.

Blueprints – Algebra II

Blueprint for ALGEBRA II

Category	Code	Target	Point Range	Range Of Emphasis
Number & Quantity	HSN-CN	The Complex Number System	0-4	0-10%
Algebra	HSA-SSE	Seeing Structure In Expressions	16-22	40-55%
	HSA-APR	Arithmetic With Polynomials And Rational Expressions		
	HSA-CED	Creating Equations		
	HSA-REI	Reasoning With Equations And Inequalities		
Functions	HSF-IF	Interpreting Functions	18-24	45-60%
	HSF-BF	Building Functions		
	HSF-LE	Linear, Quadratic And Exponential Models		
Stats & Prob	HSS-ID	Interpreting Categorical And Quantitative Data	0-6	0-15%
	HSS-MD	Using Probability To Make Decisions		
Total			**40**	**100%**

Blueprints – Geometry

Blueprint for GEOMETRY

Category	Code	Target	Point Range	Range Of Emphasis
Geometry	HSF-CO	Congruence	34-40	85-100%
	HSG-SRT	Similarity, Right Triangles And Trigonometry		
	HSG-C	Circles		
	HSG-GPE	Expressing Geometric Properties With Equations		
	HSG-GMD	Geometric Measurement And Dimension		
	HSG-MG	Linear, Quadratic And Exponential Models		
Stats & Prob	HSS-CP	Conditional Probability And The Rules Of Probability	0-6	0-15%
	HSS-MD	Using Probability To Make Decisions		
Total			**40**	**100%**

Blueprints – English I

Blueprint for ENGLISH I

Claim	Category	Big Idea	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	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	33%
Writing	Claim 2a	Demonstrate the ability to produce a variety of text types and purposes	10	22%
Writing	Claim 2b	Demonstrate a command of the conventions of standard English, appropriate grade-level acquisition of vocabulary	5	11%
Total			45	100%

Blueprints – English II

Blueprint for ENGLISH II

Claim	Category	Big Idea	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	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	33%
Writing	Claim 2a	Demonstrate the ability to produce a variety of text types and purposes	10	22%
Writing	Claim 2b	Demonstrate a command of the conventions of standard English, appropriate grade-level acquisition of vocabulary	5	11%
Total			45	100%

Blueprints – Biology

Blueprint for BIOLOGY

Content Strand	Point Range	Range Of Emphasis
Characteristics and Interactions of Living Organisms	20-24	36%-44%
Changes in Ecosystems and Interactions of Organisms with their Environments	12-14	22%-25%
Scientific Inquiry	20	36%
Total	**55**	**100%**

Blueprints – Physical Science

Blueprint for PHYSICAL SCIENCE

Content Strand	Point Range	Range Of Emphasis
Properties And Principles Of Matter And Energy	25-30	55-66%
Properties And Principles Of Force And Motion	15-20	33-44%
Total	**45**	**100%**

Blueprints – Government

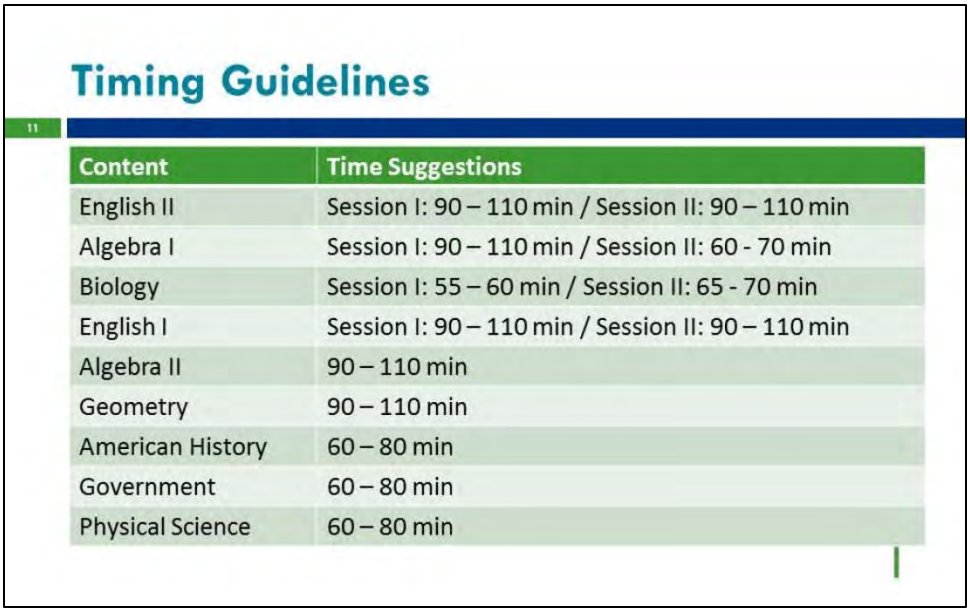
Blueprint for GOVERNMENT

Content Strand	Point Range	Range Of Emphasis
Principles of Constitutional Democracy	18-22	45%-55%
Principles and Processes of Governance Systems	18-22	45%-55%
Total	**40**	**100%**

Blueprints – American History

Blueprint for AMERICAN HISTORY

Reporting Categories	Point Range	Range Of Emphasis
Government	7-9	18%-23%
History	14-18	35%-45%
Economics	7-9	18%-23%
Geography	7-9	18%-23%
Total	**40**	**100%**

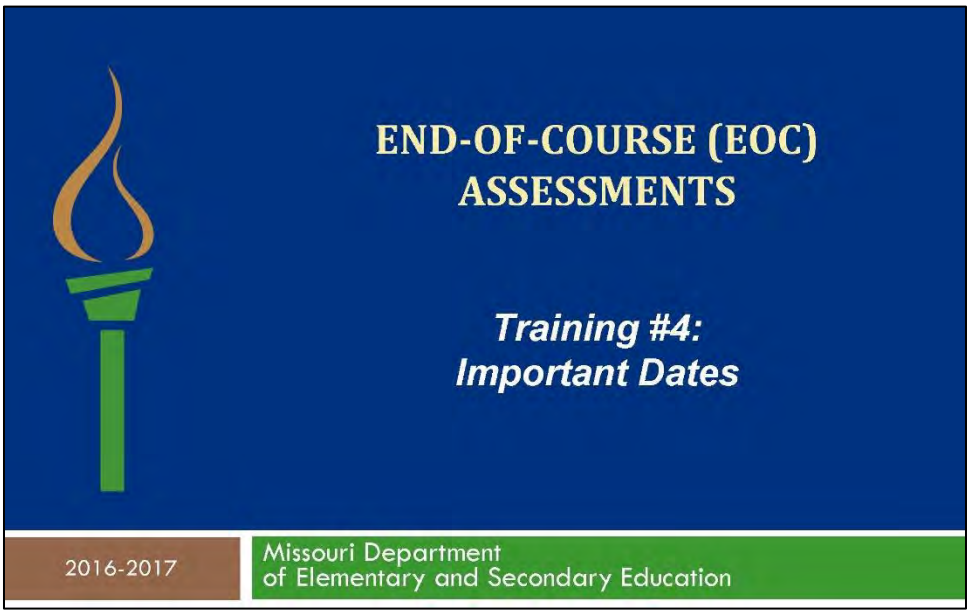


Timing Guidelines

11

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

Training #4: Important Dates



Important Dates

- Please check the DESE website often for updates
  - dese.mo.gov → MAP → EOC → Important Dates

Important Dates

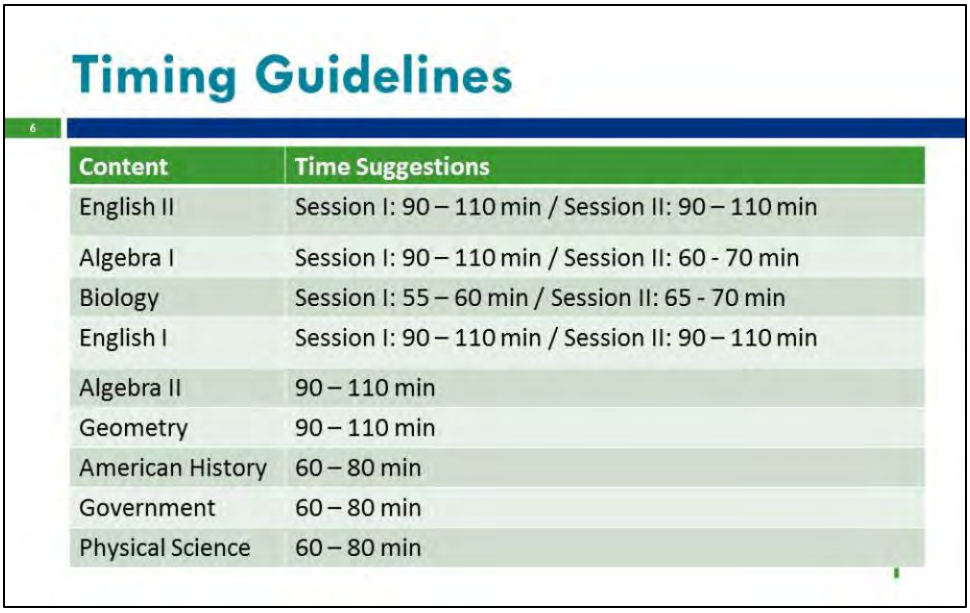
Administration	Dates	Event
Fall 2016	**DUE** September 16, 2016	Fall 2016 First Precode (students available in iTester 9/26/16 - students may begin testing 10/3/15)
	October 3, 2016 to January 20, 2017	**Fall 2016 Window**
	DUE November 4, 2016	Fall 2016 Second Precode (students available in iTester 11/15/16 - students may begin testing 11/21/16)
Spring 2017	**DUE** January 27, 2017	Spring 2017 First Precode (students available in iTester 2/13/17 - students may begin testing 2/20/17)
	February 20, 2017 to May 26, 2017	**Spring 2017 Window**
	DUE March 3, 2017	Spring 2017 Second Precode (students available in iTester 3/17/17 - students may begin testing 3/20/17)
	DUE March 31, 2017	Spring 2017 Third Precode (students available in iTester 4/14/17 - students may begin testing 4/17/17)

Important Dates

- Inform parents/ guardians of upcoming testing dates
- Minimize schedule conflicts
- Students participate when they complete associated course content

Important Dates

- 7 business days for each content area
- Identify a window for each content area
- Tests with more than one session are not required to be completed in the same day

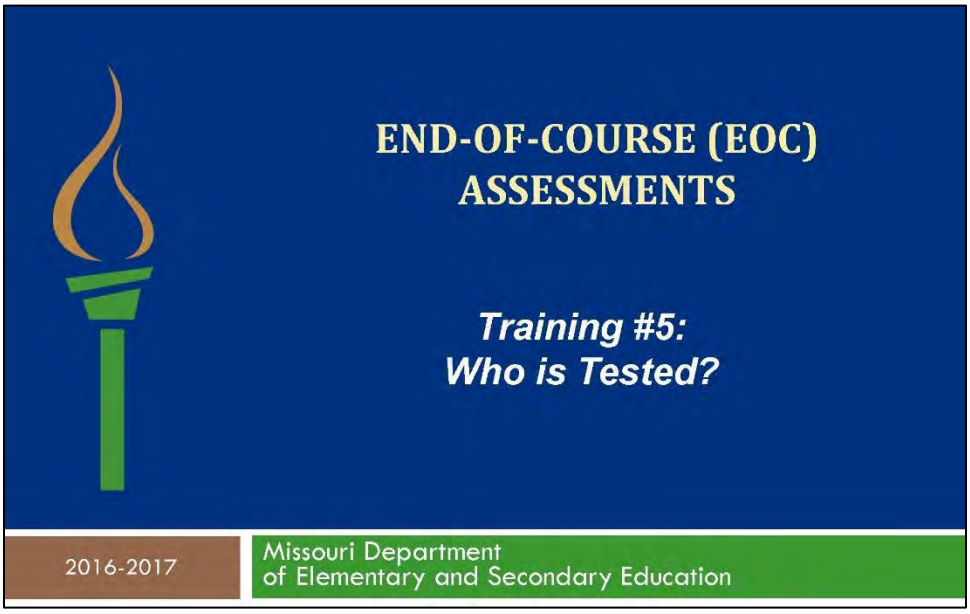


Timing Guidelines

6

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

Training #5: Who is Tested?



Who is Tested?

- Students participate when they complete associated course content

Required	Optional (For Local Use)
Algebra I	*Algebra II
Biology	American History
English II	English I
Government	Geometry
	Physical Science

Who is Tested?

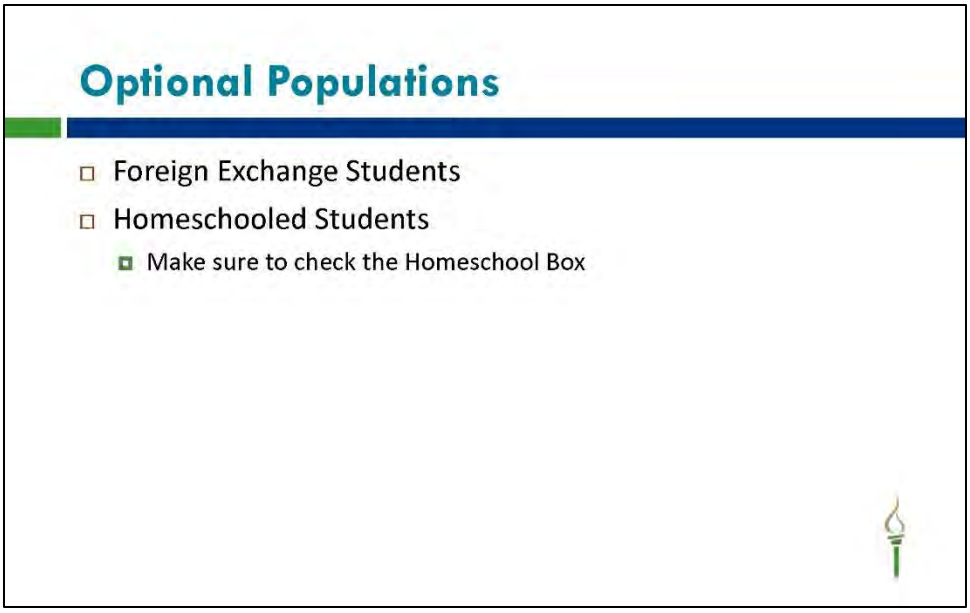
- Missouri Option students
- Homebound students
- MoVIP students

Who is Exempt from Testing?

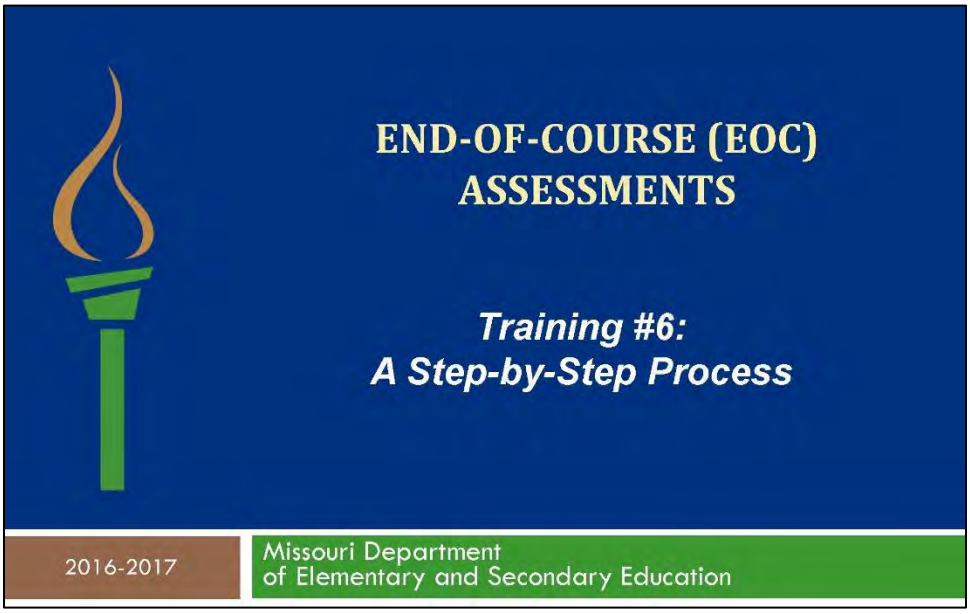
- Students eligible for MAP-A
- ELL students who have been in the United States for less than 12 cumulative months may be exempt from ELA assessments

Questions about Exemptions?

- Contact DESE's Accountability Data office at (573) 526-4886
- Keep track of each student's EOC completions
- See the EOC History Report on MCDS Portal



Training #6: A Step-by-Step Process



A 13-Step Process

- 1. Training Participants
- 2. Setting Up iTester
- 3. Site Setup
- 4. Selecting Students
- 5. Determining Content Windows
- 6. Pre-Coding
- 7. Final Preparations
- 8. Special Considerations
- 9. Accessing the Practice Tutorials
- 10. Printing Test Tickets
- 11. Testing
- 12. Closing a Window Early
- 13. Individual Student Reports

Step 1: Training Participants

- District Test Coordinator (DTC)
- School Test Coordinator (STC)
- Test Examiner (TE)
- Other district personnel involved in testing
  - View appropriate recorded trainings
  - Review the Test Administration Manual (TAM)

Step 2: Setting up iTester

- iTester Administration site opens on:
  - 9/26/16 (Fall)
  - 2/15/17 (Spring)
  - After these dates, DTCs & STCs can create testing sessions
- District IT staff should log in and download the latest version of the iTester student client and run workstation readiness tests

Step 3: Site Setup

- IT staff confirms that the building is ready for testing
- STC or DTC confirms that within iTester Admin

Step 4: Selecting Students

- Who will test during the window?
  - Students who have completed the Missouri Learning Standards for the appropriate course and content

Step 5: Determining Content Windows

- 7 business days for each content
- Content windows can be separate or overlap
- Must fall within the state testing window

Step 6: Pre-coding

- Populates students into iTester
- Determine which pre-code window works best for your district
- Pre-code during the window that accommodates your first anticipated content window

Step 7: Final Preparations

- Students are enrolled in the correct content area
- Students are enrolled with correct test examiner
- Changes can be made to student information and groups
- Students can be manually added

Step 8: Special Considerations

- Paper/Pencil, Braille or Large Print assessments must be marked prior to testing
  - Braille and Large Print tests need to be ordered at least one week prior to testing
  - Paper/Pencil tests must be downloaded by the DTC and printed prior to testing
- Other accommodations should be entered prior to testing

Step 9: Accessing the Practice Tutorials

- Students should be given ample time to access the tutorials
- Students who are testing in an assessment that has a performance event or writing task, should review and practice the tools multiple times
- Become familiar with the way the system works
- Become familiar with the tools
- Can be accessed at any time

Step 10: Printing Test Tickets

- iTester allows for batch printing of tickets
- Distribute prior to testing
- Will need session code if more than one session
- Collect and securely destroy tickets after testing

Step 11: Testing

- Once all preparations are made it's time to assess
- Refer to the timing guidelines for each content
  - These are general timing estimates
    - For example, 60-80 minutes
  - Please plan accordingly
- Answers from Paper/Pencil, Large Print and Braille tests must be entered into the system prior to the close of the 7 day window

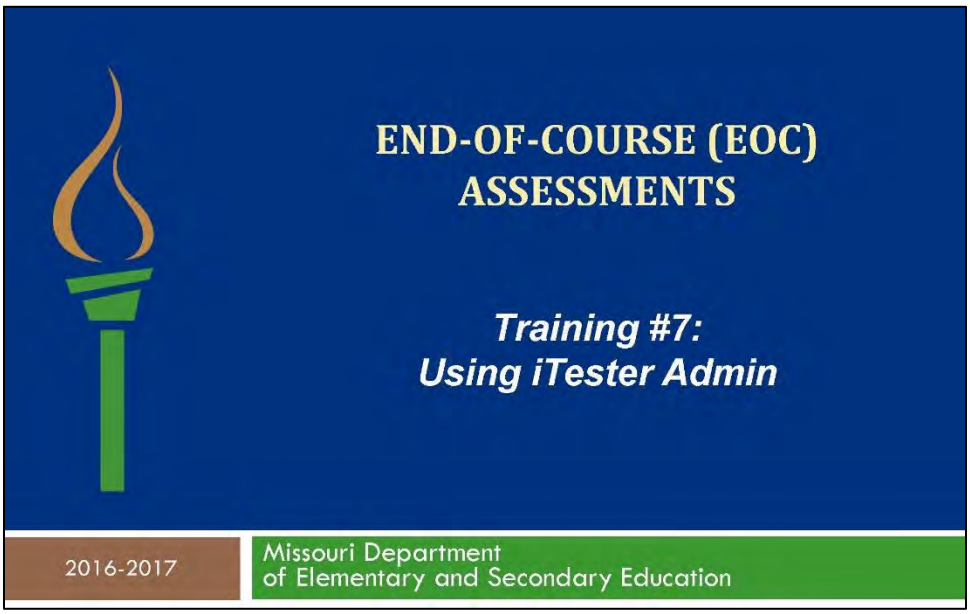
Step 12: Closing a Window Early

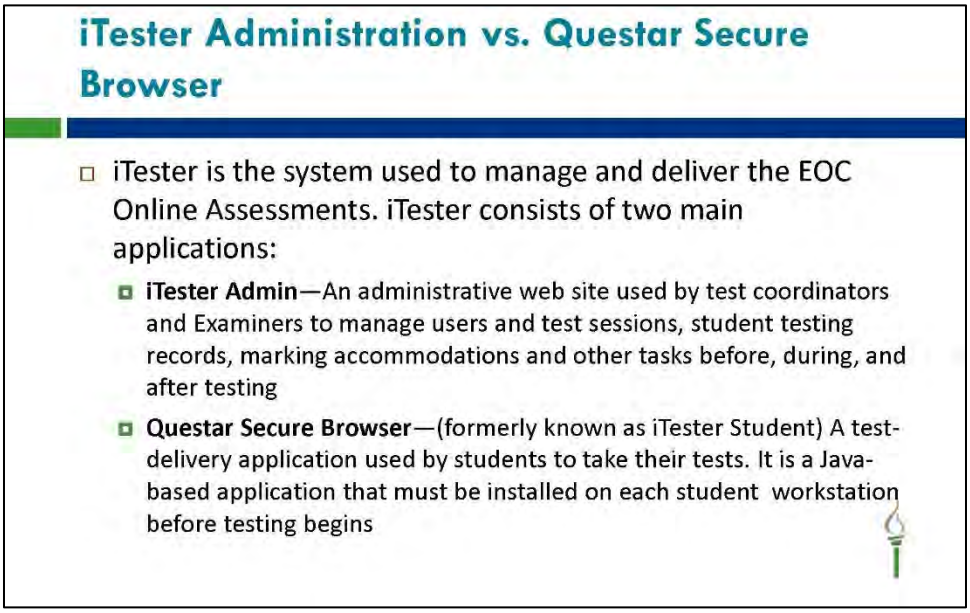
- 7 day window, if a district finishes early they may close the window
- 5 day turn around on results begins the business day after the window closes
- To close a window early contact Questar at:
  - (800) 571-2545

Step 13: Individual Student Reports

- Five business days after the close of the district content window
- DTCs can download student scores from the Reports tab
- Individual Student Reports (ISRs) are available to download and print at the district level.

Training #7: Using iTester Admin





iTester Administration Login

- iTester Admin can be accessed at: http://moeoc.questarai.com/Admin/
- If you cannot remember your username/password, use the "Can't Login" button found at the bottom of the Sign In box
- If you do not have a login, please contact the EOC Help Desk at 800-571-2545

iTester Admin – Materials Ordering

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- Click on the Materials Ordering tab to order
  - Large print test
  - Braille test

iTester Admin - Examiners

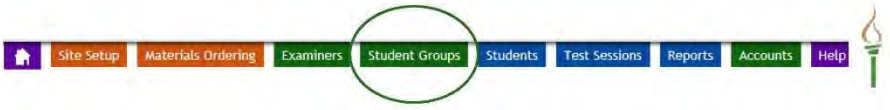
59

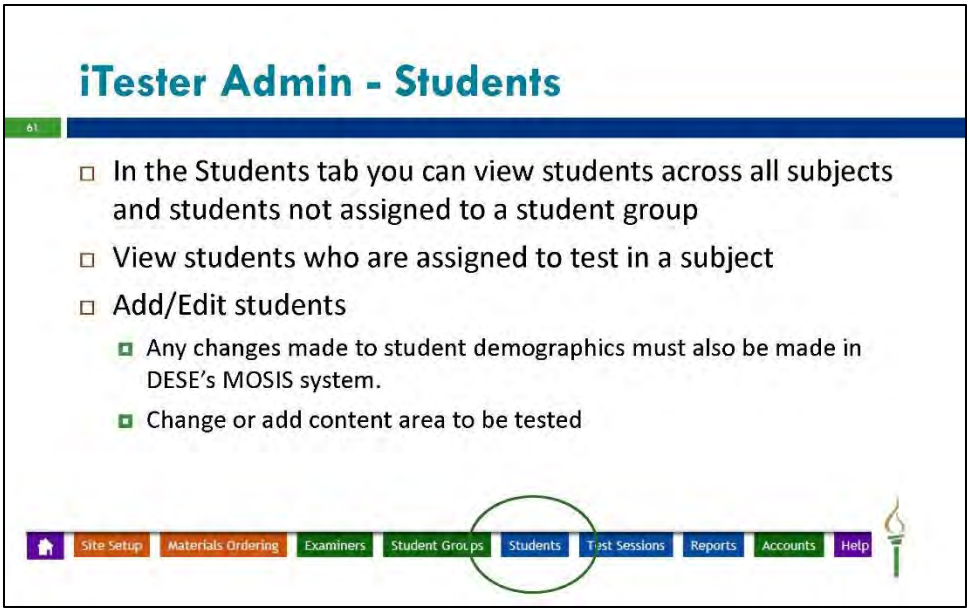
- Under the Examiners tab you can add examiners
- Examiners are divided by subject
- Examiners may be listed in more than one area
- Edit examiners name, email and content areas

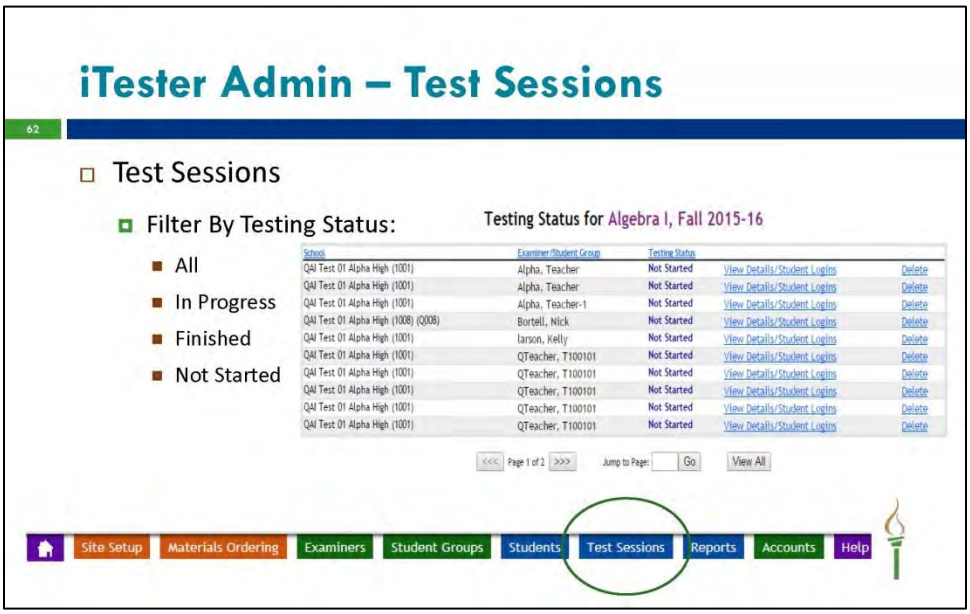
iTester Admin – Student Groups

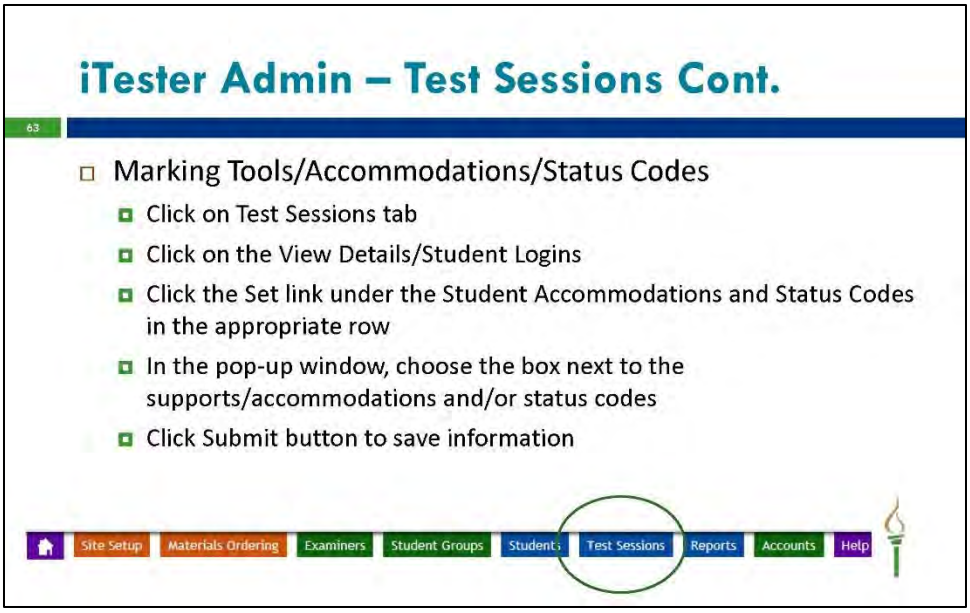
60

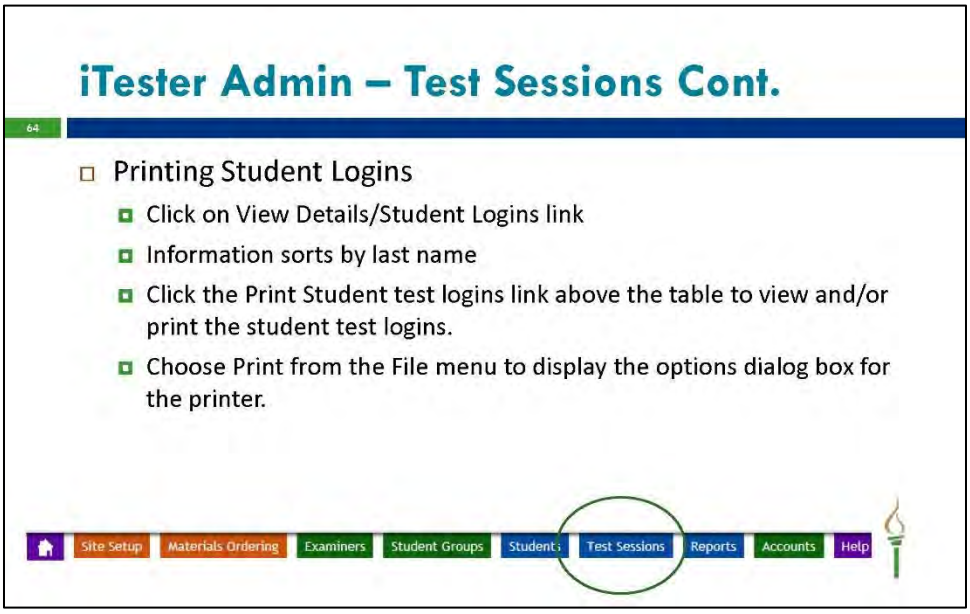
- In the Student Groups tab you can view groups scheduled to test in a subject
- Create a new student group
- Move a student to a new group

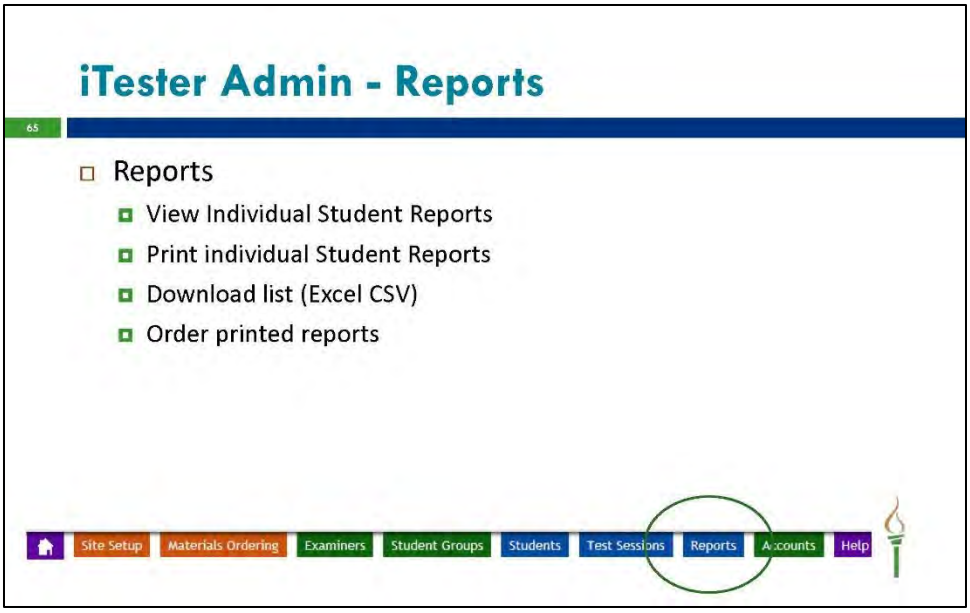


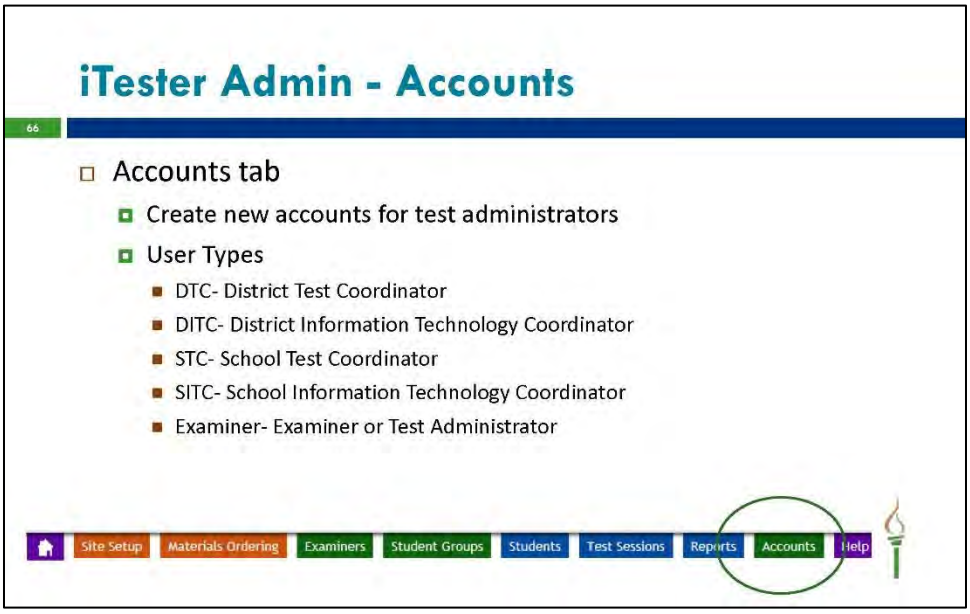


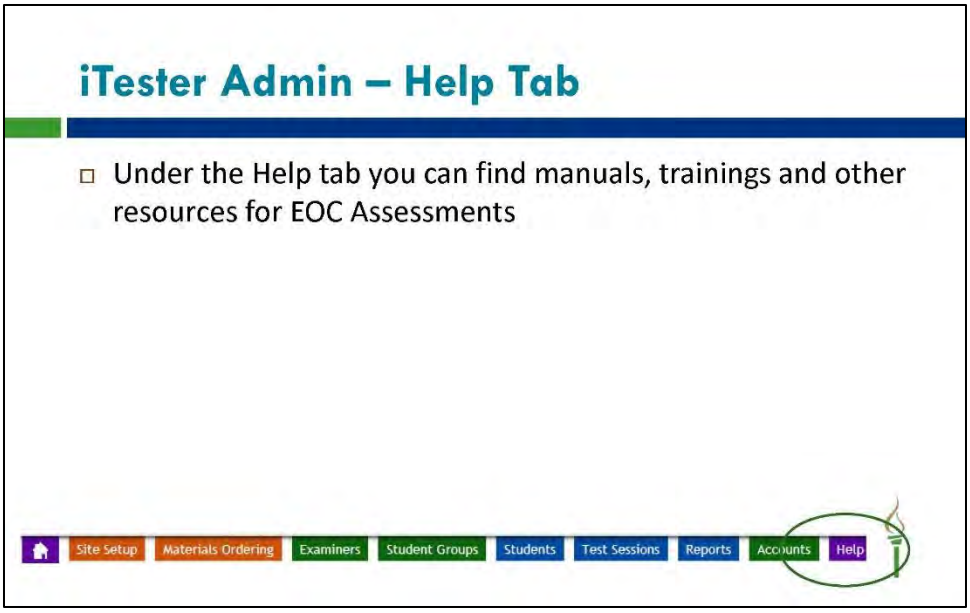




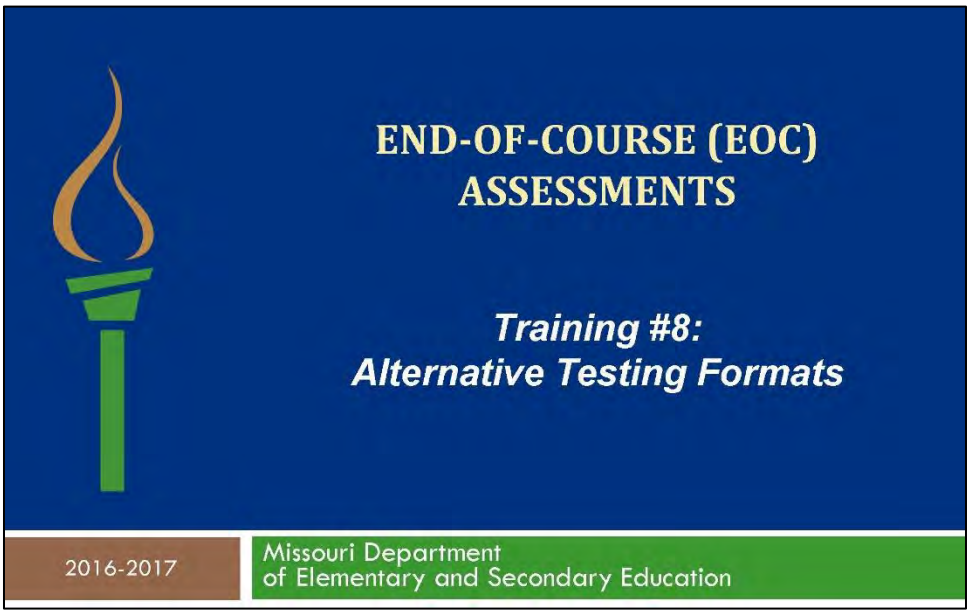








Training #8: Alternative Testing Formats



Large Print or Braille

- To order Large Print or Braille editions please contact Questar at:
  - (800) 571-2545
  - MOCustomerSupport@questarai.com
- Order at least one week prior to testing
- Accommodations codes
  - A012 for Braille
  - A021 for Large Print

Paper/Pencil Editions

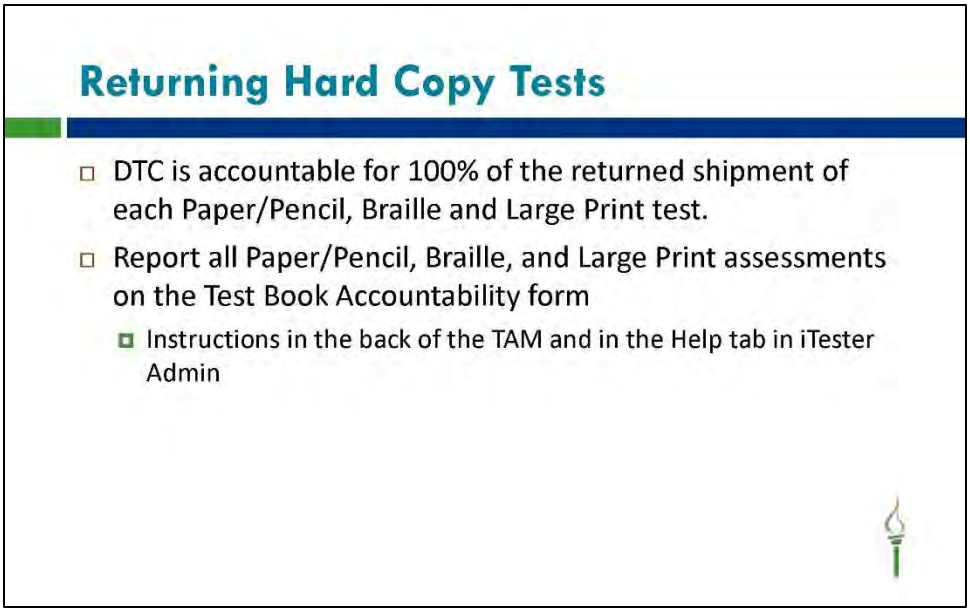
- Paper/Pencil edition of the test is available for:
  - Students with an IEP that says the student should take the Paper Based Assessment
  - Students who are out-of-district
  - Homebound students who cannot come to school to test
  - For ELL Translation when the translator needs to do translation prior to assessing the student due to technical language
- Use Accommodation code A102 for all scenarios

Downloading Paper/Pencil Editions

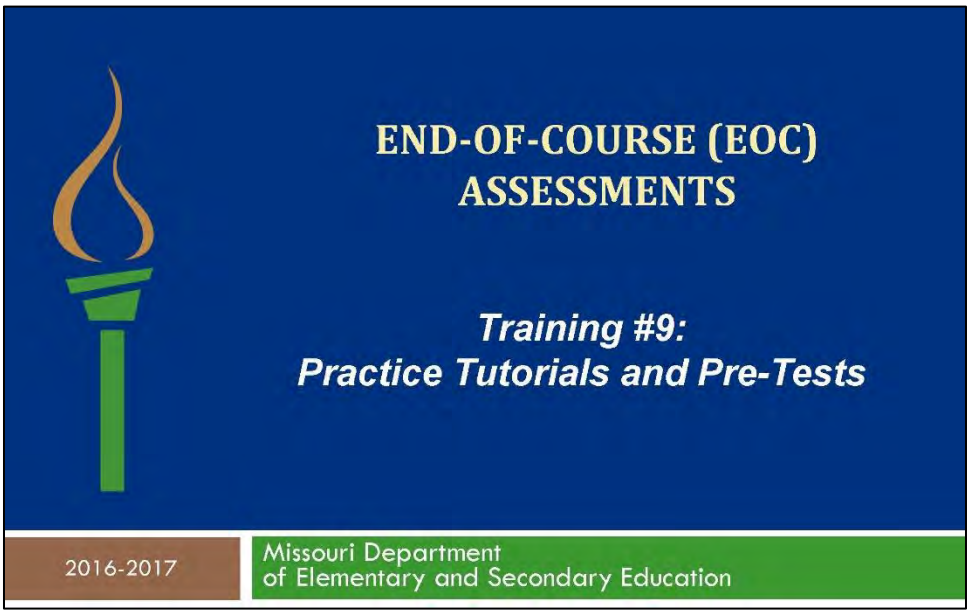
- DTC downloads and prints Paper/Pencil Editions
- Individual test for each student
- Cannot be saved to a computer or downloaded multiple times and must not be copied for any reason

After Testing

- Must immediately be transcribed into iTester
- Paper/Pencil assessments must be returned no later than 24 hours after the testing window closes
- Use shipping materials from Questar



Training #9: Practice Tutorials and Pre-Tests



Practice Tutorials

- Tutorials are available in Questar Secure Browser for students to practice using the tools within the system
- Open year round
- Login information in the TAM and on DESE EOC Page
  - http://dese.mo.gov/college-career-readiness/assessment/end-course

CONTENT	USERNAME	PASSWORD
Algebra I	MOALG1	practice
Algebra II	MOALG2	practice
Geometry	MOGEO	practice
Biology	MOBIO	practice
Physical Science	MOPHYSC	practice
English I	MOENG1	practice
English II	MOENG2	practice
American History	MOAMHIST	practice
Government	MOGOV	practice

Pre-Tests - Online

- Online Pre-Tests
  - Released EOC Forms
  - No specific testing window
  - Districts enroll students directly through iTester
  - If a student is precoded, a Pre-Test is available for them
  - Automatically scores selected response
  - Scores returned to districts within 24 hours of test submission
- Pretests are available at no charge

Pre-Tests - PDF

- PDF form
  - Located in iTester under the Help tab or on DESE EOC Page
  - Last page includes the answer key and alignment of each item
  - Allows students to be familiar with the types of questions they can expect to encounter

Pre-Tests Enrollment

- Two ways that students are enrolled for the Pre-Tests:
  - **For students included in the operational precode**
    The operational enrollment file is also loaded into the pre-test administration. This means there will be a pre-test scheduled for each student included in the operational enrollment file, and nothing further needs to be done.
  - **For students NOT included in the operational precode**
    In order to enroll additional students in the pre-tests, meaning those excluded from the operational precode file, districts either must enter the student manually in iTester admin or create a pre-test enrollment file which must contain unique students who have yet to be created either in a previous precode file or manually.

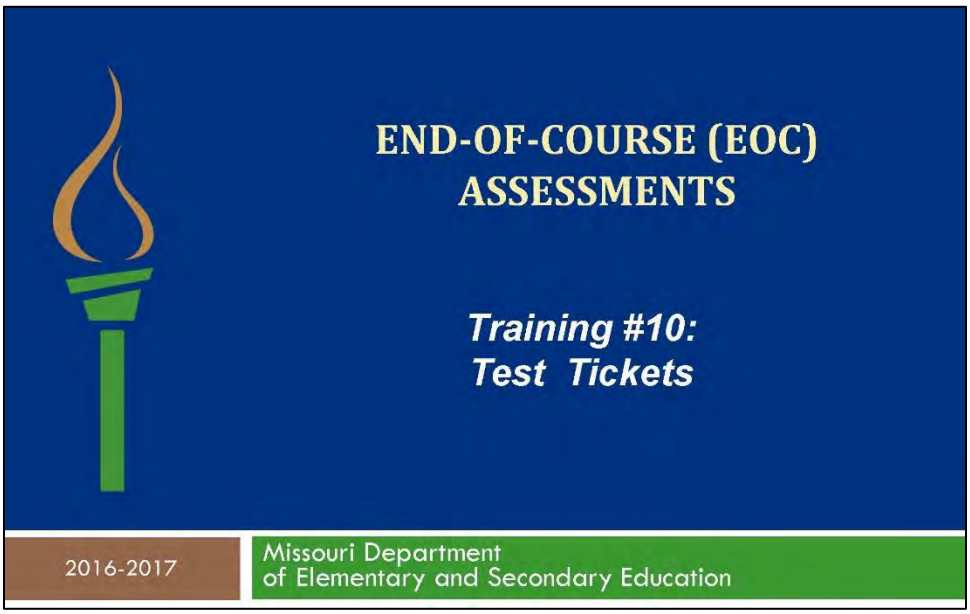
Accessing Pre-Tests

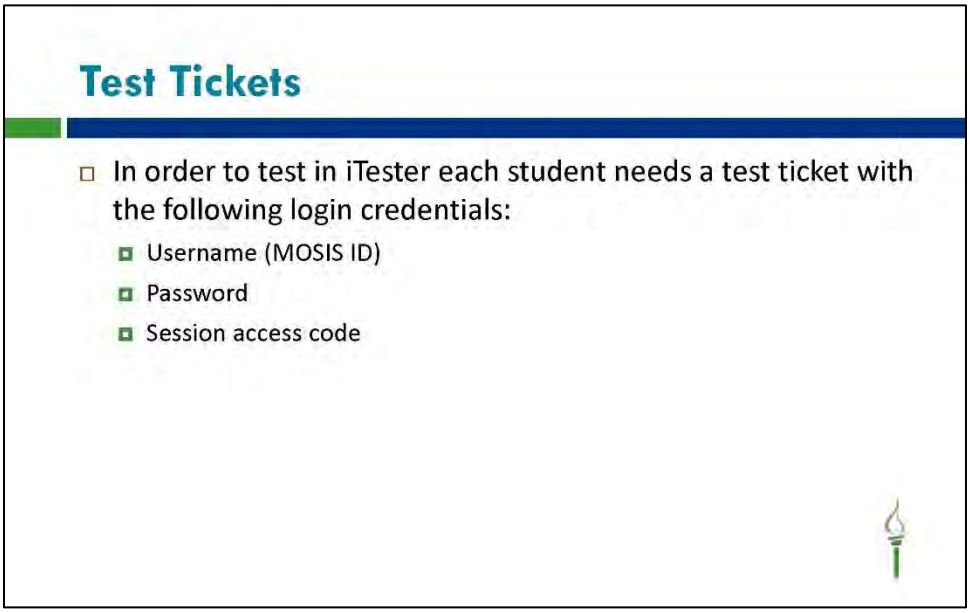
- Each student will be given a unique username and password
- Login information is generated and printed on test tickets
- Pre-Tests can be reset by the DTC

Pre-Test Results

- CSV file with raw scores available 24 hours after student submission
- Data for pre-tests available for 20 business days
- Pre-Test ISRs (for multiple choice) also available
- Pretests with a writing prompt or performance event
  - Locally scored using provided rubrics and scoring materials
  - Supplement to the TAM and brief training webinar are posted to iTester under the Help tab

Training #10: Test Tickets



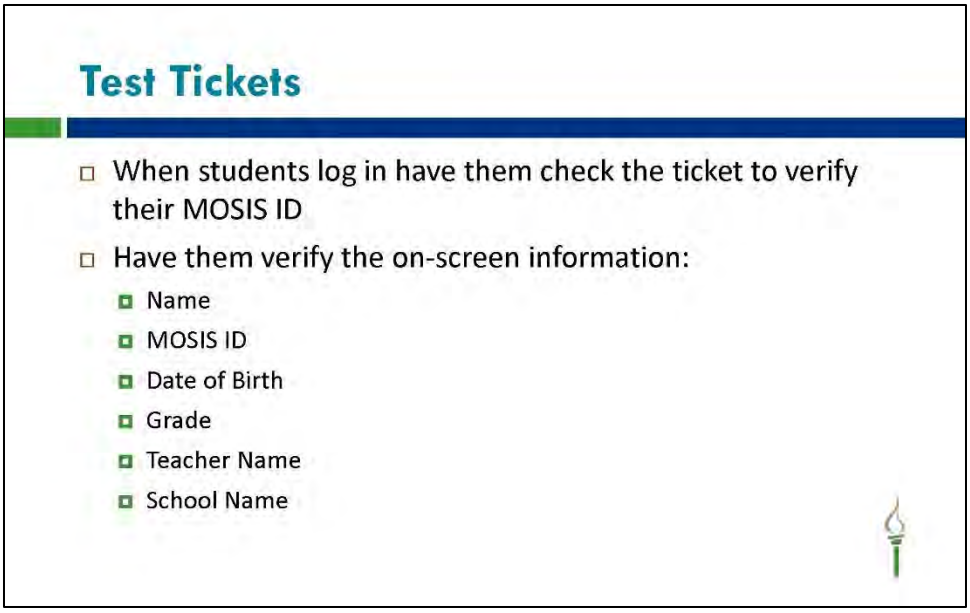


Test Tickets

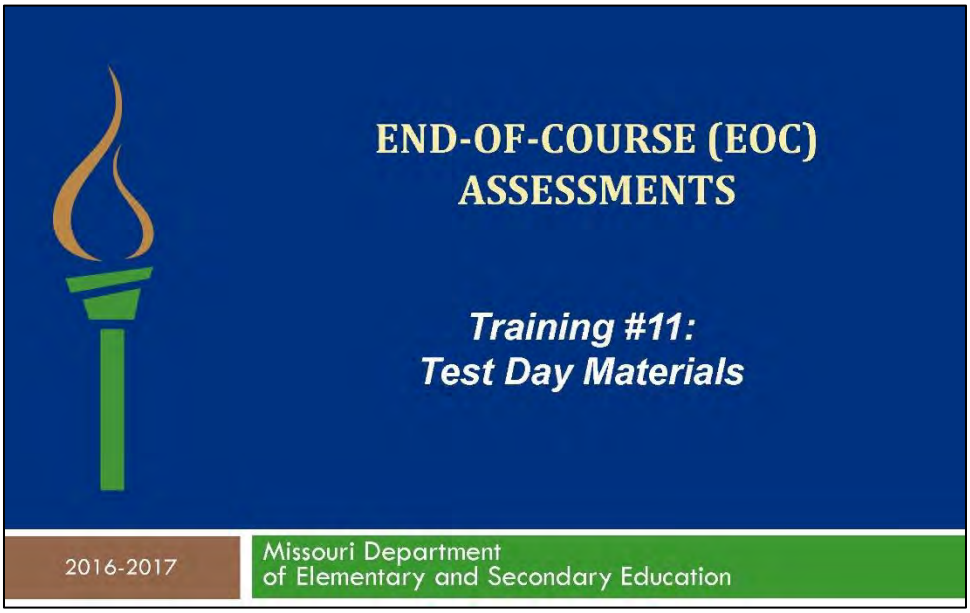
- May be printed on:
  - Plain paper
  - Avery labels (5160)
- In iTester, click on Test Sessions tab
  - View a list of registered students
  - Print tickets by student group

Test Tickets

- If a student is not listed:
  - STC or DTC creates a profile
  - Register student in a student group
  - Login information will be generated



Training #11: Test Day Materials



Test Day Materials

- Required materials
- Permitted but not provided materials
- Prohibited materials while testing
- Calculator Policy

Test Day: Required Materials

- Workstation with internet access
- Student login information
- Scratch paper for all assessments
- Unlabeled grid or graph paper for Math and Biology assessments
- Writing utensil

Test Day: Permitted Materials

- Hard copy of Mathematics Reference sheet
- Hard copy of the Periodic Table of Elements
- Calculators that meet TAM guidelines (Math only)
- ELA writing task only
  - Dictionary
  - Thesaurus
  - Grammar handbook
  - Bilingual dictionary for ELL students

Test Day: Prohibited Materials

- Electronic devices that can connect to the internet or to anyone inside or outside the classroom
  - Cell Phones
  - Electronic Music Players
  - Digital Cameras
  - Handheld Scanners
  - Portable Gaming Devices
- Cell Phones
  - Collect and return

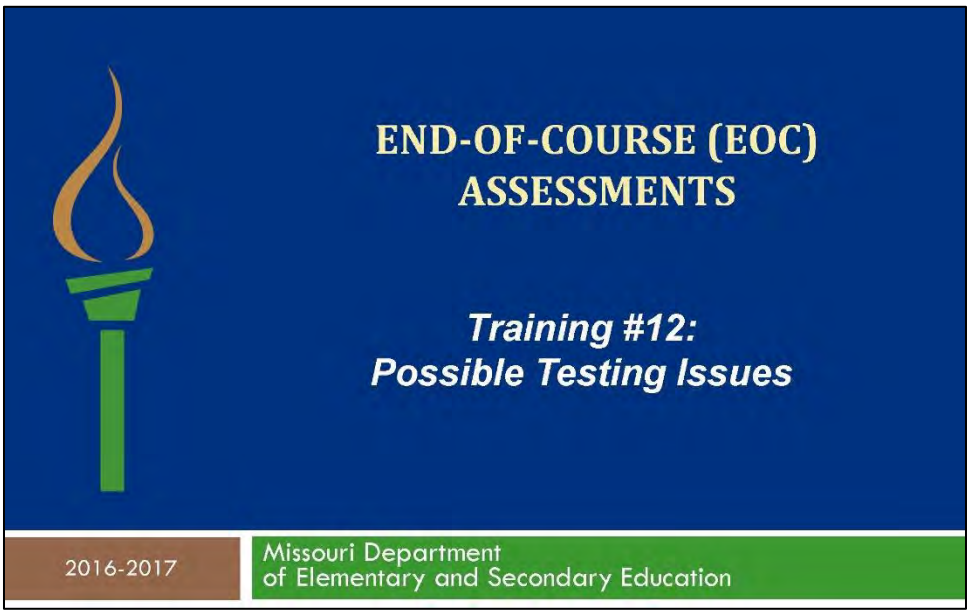
Test Day: Prohibited Materials

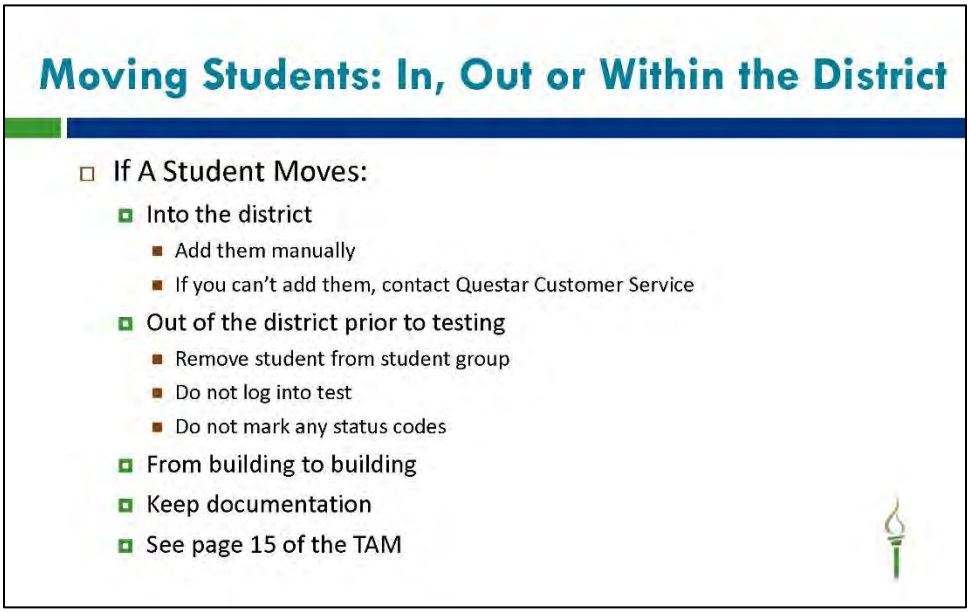
- Students who have devices for health monitoring may have those devices in the room but they should not be accessed by the student unless it is necessary to monitor their ongoing health

Test Day: Calculator Policy

- DESE does not provide, endorse, or recommend a list of calculator brands or types
- Calculators cannot contain stored equations or functions at the time of the End-of-Course Mathematics Assessments.
- Test Examiners are responsible to ensure and verify that calculators that have the ability to store functions and equations, e.g., a graphing or a scientific calculator, have the memory cleared before and after each Mathematics Assessment.
- Calculators cannot have Internet connectivity

Training #12: Possible Testing Issues





Student Drops

- If a student was enrolled in an EOC, but later drops the course:
  - Remove from the student group in iTester
  - Do not:
    - Log into the test
    - Mark any status codes

Absent Student or Incomplete Test

- All students should take the entire EOC assessment
  - However, is a student is:
    - absent
    - not ready to test
    - has an incomplete EOC
      - Follow the procedures on page 16 of the TAM

Moving Students: Disruption or Illness

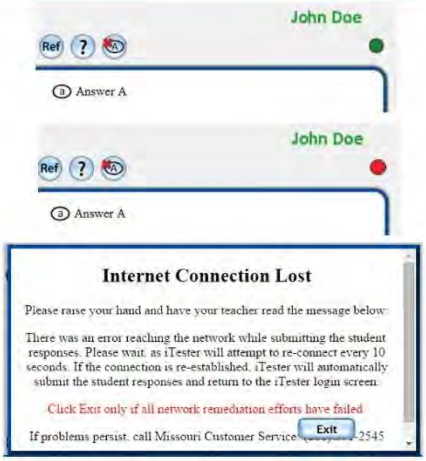
- Student may need to move during testing because of disruption or illness
  - Procedures are in the TAM
  - Pause the test
  - Escort the student to a new location
  - Login the student to a new workstation with the same operating system

Loss of Internet Connection

- 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 at (800) 571-2545
  - Track student's status in iTester Admin and ensure they submit their tests for scoring following each test session

Loss of Internet Connection-continued

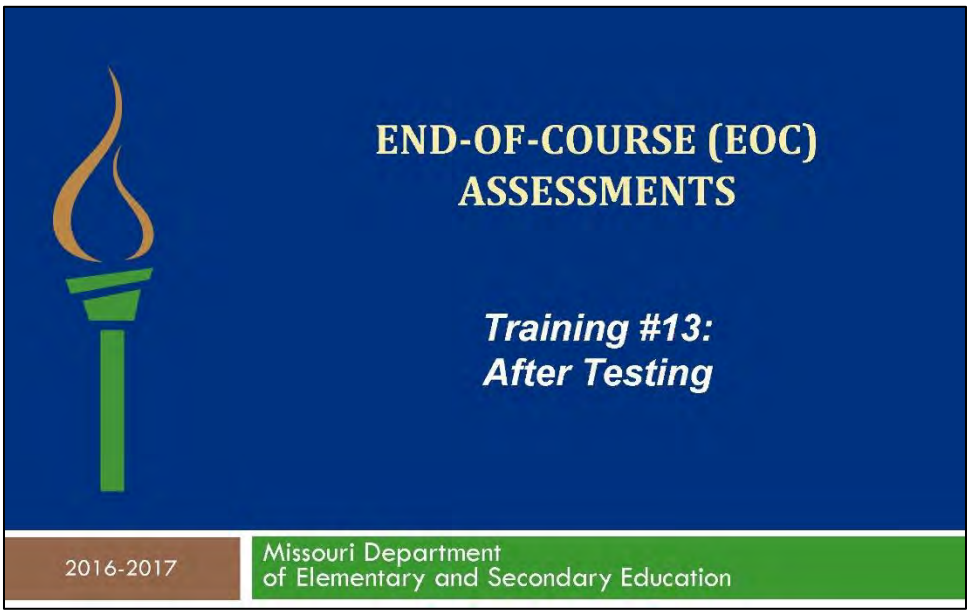
- As a new feature this year, if Internet connection is lost, a small green dot on the corner of the screen will turn red
- If this happens, contact Questar's customer service
- If you are using a portable device, do not close out, leave the testing platform open until connectivity is restored and then continue testing

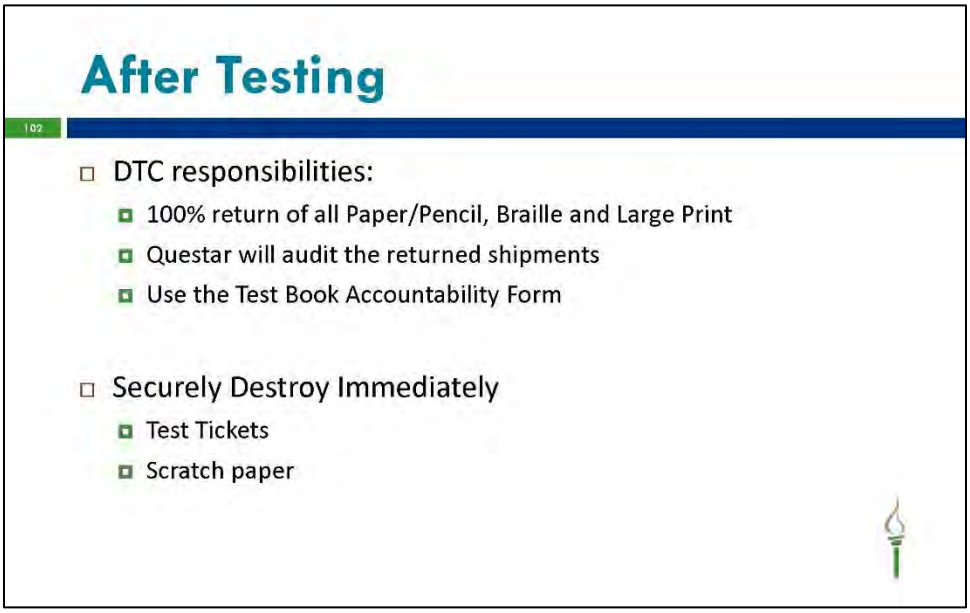


Invalidation

- Tests are not invalidated because of:
  - Students behavior
  - Judgment of student effort
- Only Invalidated because of cheating
  - Only the DTC can invalidate a test
  - Has to be done before the 7 day window closes

Training #13: After Testing





After Testing

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- Downloading results
  - Located in iTester Admin
    - Download, save, and print the Individual Student Reports (ISRs)
- Questar will send student score labels after the statewide window has closed
- Districts have 15 days to notify parents or guardians that ISRs are available

After Testing

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- Guide to Interpreting Results is available on DESE's website
- The Guide to Interpreting Results contains information regarding:
  - Scale scores
  - Achievement level descriptors
  - Standard error of measurement
  - Sample reports
  - Examples of student labels

Appendix H: Accommodation Codes

Accommodations

These accommodations for the End-of-Course Assessment are available only to students with an IEP/504 plan.

Please note:

- All accommodations need to be marked in iTester prior to the assessment.
- Some accommodations are only for use by English Language Learner (ELL) students with an IEP/504 plan (ELL students are those marked LEP-RCV or LEP-NRC in MOSIS).

Accommodation	Description	Code
Abacus	Students with this accommodation in their IEP/504 plan may have access to an abacus. This accommodation must be chosen in the iTester system under student accommodations prior to testing.	A391
Alternate Response Options	Students with this accommodation in their IEP/504 plan may respond to items using an alternate option, including but not limited to: Adapted Keyboards, StickyKeys, MouseKeys, FilterKeys, Adapted Mouse, Touch Screen, Head Wand, and Switches. This accommodation must be chosen in the iTester system under student accommodations prior to testing.	A441
Braille	Students with visual impairments with this accommodation in their IEP/504 plan may access the assessment via a Braille version. Tactile overlays and graphics tools may be used to assist the student in accessing the content. *Please Note: Answers from students who access the assessment using the Braille format must be entered into iTester prior to shipping the Braille assessment back. Please follow the instructions found in the Braille kit.* This accommodation must be chosen in the iTester Admin Students tab under special forms and also via the Test Sessions tab under student accommodations prior to testing. See page 38 for additional instructions.	A012
Large Print	Students with visual impairments with this accommodation in their IEP/504 plan may access the assessment via a Large Print version. *Please Note: Answers from students who access the assessment using the Large Print format must be entered into iTester prior to shipping the Large Print assessment back. Please follow the instructions found in the Large Print kit.* This accommodation must be chosen in the iTester Admin Students tab under special forms and also via the Test Sessions tab under student accommodations prior to testing. See page 38 for additional instructions.	A021
Multiplication Table	Students with this accommodation in their IEP/504 plan may have access to a single digit multiplication table. This accommodation must be chosen in the iTester Admin Test Sessions tab under student accommodations prior to testing.	A395

Accommodation	Description	Code
Paper Based Assessment	Students with this accommodation in their IEP/504 plan may take the assessment using the paper/pencil format. *Please Note: Answers from students who access the assessment using the Paper/Pencil format must be entered into iTester prior to shipping the Paper assessment back. Please follow the instructions found in the return kit.* This accommodation must be chosen in the iTester Admin Students tab under special forms and also via the Test Sessions tab under student accommodations prior to testing. See page 38 for additional instructions.	A102
Read Aloud (ELA Reading Passages) – Human Reader	Students with this accommodation in their IEP/504 plan, taking the online, paper/pencil, Large Print, or Braille assessments may have the ELA Reading Passages read aloud by a human reader. *Please Note: The Human Reader should be familiar to the student and have read aloud experience with the student in some capacity prior to the state assessment.* This accommodation must be chosen in the iTester Admin Test Sessions tab under student accommodations prior to testing.	A045
Read Aloud (ELA Reading Passages) – Assistive Technology	Students with this accommodation in their IEP/504 plan, who use specific text-to-speech assistive technology software in the everyday classroom, may use that technology in conjunction with the iTester testing platform to have the ELA Reading Passages read aloud by the software. The software must be provided by the district. *Please Note: The use of assistive technology software should be familiar to the student and should be software the student uses in the everyday classroom.* *Please Note: While the use of assistive technology software is not directly supported by Questar, the help desk will work with districts needing to use the software.* This accommodation must be chosen in the iTester system under student accommodations prior to testing.	A044
Read Aloud (ELA Reading Passages) – Native Language	ELL students with this accommodation in their IEP/504 plan, taking the online, paper/pencil, Large Print, or Braille assessments may have the ELA Reading Passages read aloud to them in their native language by a human reader. This accommodation must be chosen in the iTester Admin Test Sessions tab under student accommodations prior to testing.	A112
Read-Aloud (ELA Reading Passages) – Blind Students	Blind students who do not yet possess adequate Braille skills with this accommodation in their IEP/504 plan may have the ELA Reading Passages read aloud by a human reader. This accommodation must be chosen in the iTester Admin Test Sessions tab under student accommodations prior to testing.	A046
Specialized Calculator	Students with this accommodation in their IEP/504 plan may have access to a specialized calculator. The specialized calculator can include a talking calculator or Braille calculator among others. The memory of the physical calculator must be cleared before and after testing by the test examiner. This accommodation must be chosen in the iTester Admin Test Sessions tab under student accommodations prior to testing.	A396

Accommodation	Description	Code
Speech-To-Text – Assistive Technology	Students with this accommodation in their IEP/504 plan, who use specific speech-to-text assistive technology software in the everyday classroom, may use that technology in conjunction with the iTester testing platform. The software must be provided by the district. *Please Note: The use of assistive technology software should be familiar to the student and should be software the student uses in the everyday classroom.* *Please Note: While the use of assistive technology software is not directly supported by Questar, the help desk will work with districts needing to use the software.* This accommodation must be chosen in the iTester Admin Test Sessions tab under student accommodations prior to testing.	A352