

Missouri

Assessment Program
Grade-Level Assessments

Grades 3-8
English Language Arts
and Mathematics

Technical Report 2016
FINAL

Submitted to
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EXECUTIVE SUMMARY

This report is a technical summary of the 2016 administration of the Missouri Assessment Program (MAP) in English Language Arts (ELA) and Mathematics administered in Grades 3 through 8. These tests are designed to measure students' knowledge of ELA and Mathematics and are aligned with Missouri Learning Standards. The ELA and Mathematics test forms were developed by Data Recognition Corporation (DRC) using DRC's college- and career-ready item bank. All assessments except for Braille, large-print, and accommodated paper-and-pencil forms were administered online. This section provides a summary of the Spring 2016 MAP ELA and Mathematics Technical Report.

E.1 Background

The MAP was originally designed as grade-span tests to measure Missouri's Show-Me Standards. These standards were adopted by the Missouri State Board of Education in 1996. Since their inception, Missouri's Show-Me Standards have been further refined to better delineate Content Standards, Process Standards, and Content Strands as Missouri changed its testing program to comply with the requirements of No Child Left Behind. Starting in 2006, grade-level tests were administered in Communication Arts and Mathematics. In 2009, the MAP was no longer administered at the high school level. It was replaced by the Missouri End-of-Course Assessments (the technical report for these assessments may be found at: <http://dese.mo.gov/college-career-readiness/assessment/assessment-technical-support-materials>).

The MAP ELA and Mathematics tests have undergone multiple alignment analyses with the latest changes in the 2015–16 administration. While the 2015–16 ELA and Mathematics assessments are comparable content- and construct-wise to the assessments administered in the 2014–15 school year, there were no common items between the two assessments; therefore, they were not statistically linked to the previous scales. The new reporting scales for the ELA and Mathematics tests were established after the Spring 2016 test administration, and the new performance level cut scores were set for these assessments in the Summer of 2016. The ELA and Mathematics Spring 2016 results are considered a new baseline for year-to-year student performance comparisons.

The 2015–16 assessments were administered online and contained various item types including multiple-choice (MC), technology-enhanced (TE), evidence-based selected response (ESR), short-answer (SA), and writing prompt items (in ELA Grades 5 and 8).

E.2 Administration

In the Spring of 2016, Missouri administered summative assessments in English Language Arts and Mathematics to students in Grades 3 through 8 and in Science to students in Grades 5 and 8. The MAP was administered from April 4 to May 27, 2016. Test administration is discussed in Chapter 4 of this report.

Approximately 560 districts and charter schools administered ELA and Mathematics MAP tests in Grades 3 through 8. Table E.1 shows test completion rates based on Missouri student census data.¹ For the purposes of this report, completion rate is defined as the percentage of students who received a valid scale score given the total number of students eligible to take the online test or receive a test book. The Accountable columns show the total number of students eligible to take the online test or received a test book. The Percent Reportable columns show the percentage of students who received a scale score on the MAP. Further analysis of completion rates is provided in Chapter 7 of this report.

E.3 Student Performance

This is the eleventh year of the grade-level MAP testing programs in English Language Arts and Mathematics. Tables E.2 and E.3 present the percentage of students classified as *Proficient* or *Advanced* in 2006 through 2016 in English Language Arts and Mathematics, respectively. The percentage of students classified as *Proficient* or *Advanced* in ELA was similar for all grade levels and ranged from 58% for Grade 7 to 63% for Grade 4. The percentage of students classified as *Proficient* or *Advanced* in Mathematics was found to be decreasing as grade level increased and ranged from 28% for Grade 8 to approximately 53% for Grades 3 and 4. More details on student performance is provided in Chapter 7.

Due to setting new performance cut scores for ELA and Mathematics after the 2015–16 test administration, the student performance in these two content areas is not directly comparable between the 2015–16 and 2014–15 administrations. Similarly, because the 2014–15 assessments were different in content and format from the 2013–14 assessments, the performance of students in these two years is not directly comparable either.

E.4 Validity of Intended Interpretation of Test Scores

Most sections of this Technical Report are designed to provide validity evidence to support the use and intended interpretation of the MAP ELA and Mathematics test scores. MAP scores are used to identify students' strengths and weaknesses in Missouri's student performance; to inform stakeholders (teachers, school administrators, district administrators, DESE staff members, parents, and the public) about the status of the progress toward meeting academic achievement standards of the state; and to meet the requirements of the state's accountability program.

Evidence of validity based on test content was supported by the test specifications, including the test design and test blueprint. Missouri Grade 3–8 assessments were developed in alignment with Missouri Learning Standards. Rigorous item review and test form development process was implemented to select ELA and Mathematics items from DRC's college- and career-ready item pool. More details on test content and test development are provided in Chapter 3 of this report.

With the exceptions of Braille, large-print, and a limited number of paper-and-pencil test forms, MAP assessments were administered online in a standardized manner further supporting validity of

¹ The census data used in this report do not reflect additional cleaning steps that DESE staff implements once DRC/CTB releases data to DESE; therefore, the numbers in this report may differ from those in DESE reports using their cleaned data.

the intended score interpretation. Universal tools were available for all students to use and accommodations were available to students for whom such aids were deemed appropriate and indicated in their Individualized Education Programs. More details on test administration and use of accommodations or universal tools are provided in Chapter 4 of this report.

Scoring of technology-enhanced, short-answer, evidence-based selected response, and writing prompt (in ELA Grades 5 and 8) items followed predefined scoring criteria. The technology-enhanced, short-answer, and evidence-based selected response items were auto-scored. Writing prompts were scored by human readers. The inter-rater reliability statistics demonstrated that the writing prompt items were scored reliably (refer to Chapter 5 for details).

The test scaling was conducted using item response theory (IRT) methodology. Students' ELA and Mathematics scale scores were derived using item parameters estimated after the 2015–16 test administration. The IRT models used for ELA and Mathematics test scaling were appropriate for the test data supporting the operational data analysis and ensuring that the test items, as well as the overall tests, were functioning appropriately. For details on test scaling, refer to Chapter 6. The cut scores used for classification of students into different performance levels and associated achievement level descriptors were established during the Summer 2016 standard setting in a collaborative and participatory process further supporting the validity and interpretation of the MAP scores (refer to Chapter 8 for details).

Evidence of construct-related validity—supporting the intended interpretation of test scores and their use—was provided through studies of test reliability, evaluation of internal test structure, and evaluation of the relationship of test scores with external variables. The reliability analysis results indicated that the MAP tests produce scores that would be relatively stable if the tests were administered repeatedly under similar conditions. The assumption that the content-area MAP tests were unidimensional (that is, the grade level test measured one primary dimension) was confirmed through principal component analysis. The divergent evidence of the validity of the intended interpretation of the MAP test scores was evaluated through the correlations computed between the ELA, Mathematics, and Science scale scores (refer to Chapter 9 for details). The student scores were found to be highly but not perfectly related to each other, suggesting that while different constructs are being measured, the three assessments may also be tapping into a similar knowledge base or general underlying ability. In addition, test fairness was evaluated through differential item functioning analysis and analysis of differences in test performance among subgroups (refer to Chapter 10 for details).

Table E1: Test Completion Rates: All Students

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics
3	69,524	99.76%	69,518	99.94%
4	67,988	99.75%	67,990	99.94%
5	66,957	99.78%	66,953	99.93%
6	66,519	99.80%	66,504	99.89%
7	66,161	99.75%	65,334	99.87%
8	65,859	99.76%	52,870*	99.79%

*Algebra I students had the option of taking Algebra EOC instead of MAP Mathematics in Grade 8

Table E2: Percentage of Students Classified as *Proficient* or *Advanced* in 2006 through 2016 Using Census Data: English Language Arts

Grade	English Language Arts										
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*	2016**
3	42.4	42.6	40.3	40.3	43.1	43.6	45.3	47.8	41.6	57.1	60.6
4	43.8	45.1	45.1	46.3	50.9	51.9	52.2	52.8	45.5	58.3	63.2
5	45.0	47.8	48.1	48.8	51.0	51.1	51.8	52.3	50.0	58.9	62.0
6	42.2	43.6	47.4	47.7	49.6	50.5	50.2	51.0	47.5	54.9	58.3
7	42.7	44.4	49.0	50.8	51.7	53.8	55.2	54.9	55.4	57.2	58.0
8	41.5	41.6	48.1	49.7	51.8	52.5	53.3	53.9	50.4	57.5	59.2

*Students were classified into achievement levels based on the Smarter Balanced Assessment Consortium's cut scores

** Students were classified into achievement levels based on the new Missouri cut scores

Table E3: Percentage of Students Classified as *Proficient* or *Advanced* in 2006 through 2016 Using Census Data: Mathematics

Grade	Mathematics										
	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015*	2016**
3	43.3	45.0	43.8	44.4	47.1	49.4	51.9	50.7	50.2	52.0	52.5
4	43.4	44.5	44.2	44.4	48.4	50.5	50.5	50.1	42.1	49.6	52.9
5	43.3	46.6	45.8	47.2	51.7	52.5	54.3	53.9	52.2	39.8	46.7
6	43.9	47.8	50.7	50.1	55.4	56.9	55.7	56.2	55.6	38.1	43.3
7	42.9	44.9	49.5	51.9	54.5	55.8	59.6	57.3	56.7	35.3	42.1
8	39.8	40.6	43.8	46.4	51.3	50.8	52.0	40.3	42.2	28.2	28.3

*Students were classified into achievement levels based on the Smarter Balanced Assessment Consortium's cut scores

** Students were classified into achievement levels based on the new Missouri cut scores

CHAPTER 1: INTRODUCTION

The 2016 Missouri Assessment Program (MAP) marked the eleventh administration of the grade-level English Language Arts (ELA) and Mathematics MAP tests in Missouri. The MAP is designed to measure students' knowledge of English Language Arts and Mathematics. This report provides a technical overview of the English Language Arts and Mathematics assessments of the 2015–16 MAP. As such, it presents evidence for the validity of the intended interpretation of the 2015–16 MAP scores.

This chapter of the Technical Report serves to describe the background, history, purpose, and design of the MAP for ELA and Mathematics, followed by an overview of the major sections of the current report.

1.1 Background of the Missouri Assessment Program

The MAP traces its origin to the 1993 Outstanding Schools Act. This act required that Missouri create a statewide assessment system that measured challenging academic standards. From this act, grade-span assessments were created that measured Missouri's Show-Me Standards. Originally, the MAP was designed to be a grade-span test: Grades 3, 7, and 11 in Communication Arts; Grades 4, 8, and 10 in Mathematics; and Grades 3, 7, and 10 in Science. Table 1.1 provides a brief timeline of the events of the grade-span MAP.

In 2001, the federal No Child Left Behind (NCLB) legislation was enacted, which required states to develop grade-level tests in both Reading and Mathematics to be administered annually in Grades 3 through 8 and once in Grades 10 through 12. In accordance with the NCLB legislation, student performance, reported in terms of proficiency categories, is used to determine the adequate yearly progress of students at the school, district, and state levels.

In response to NCLB, the Missouri Department of Elementary and Secondary Education (DESE) contracted with CTB/McGraw-Hill (CTB) in 2003 to expand the testing program to grade-level testing for Communication Arts and Mathematics. This contract was renewed in 2007 and extended through 2013–14.

New ELA and Mathematics assessments for Grades 3–8 were developed for the 2014–15 administration. While the 2013–14 assessments were aligned to the Missouri Grade-Level Expectations with only partial alignment to the Common Core Standards, the 2014–15 assessments consisted of items fully aligned to the new Missouri Learning Standards, which are the same as Common Core State Standards. The ELA and Mathematics 2014–15 MAP assessments were built as fixed forms using Smarter Balanced Assessment Consortium's (SBAC) computer-adaptive item bank. The 2014–15 test scores were reported on new scales, and students were classified into achievement levels on the basis of the cut scores established by SBAC on their computer-adaptive item bank.

The MAP tests have undergone yet another change in the 2015–16 administration for ELA and Mathematics Grades 3–8. These assessments were developed using DRC's college- and career-ready item pools. While the 2015–16 ELA and Mathematics assessments were comparable content-

and construct-wise to the assessments administered in the 2014–15 year, there were no common items between the two assessments. Therefore, the 2015–16 assessments were not statistically linked to the previous scales. The new reporting scales for the ELA and Mathematics tests were established after the Spring 2016 test administration, and the new achievement level cut scores were set for these assessments in the Summer of 2016. The ELA and Mathematics Spring 2016 results are considered a new baseline for year-to-year student performance comparisons.

The fixed forms of the 2015–16 assessments were administered online and contained various item types including multiple-choice (MC), technology-enhanced (TE), evidence-based selected response (ESR), short-answer (SA), and writing-prompt items (in ELA Grades 5 and 8).

Table 1.2 shows a timeline of the development history of the NCLB-compliant testing program and the transition to the assessment aligned with the Missouri Learning Standards.

1.2 Purpose of the Missouri Assessment Program

The MAP ELA and Mathematics tests are designed to measure how well students acquire the skills and knowledge described in the Missouri Learning Standards. The assessments yield information on academic achievement at the student, class, school, district, and state levels. This information is used to diagnose individual student knowledge and skills in relation to the instruction and to gauge the overall quality of education throughout Missouri.

1.3 Design of the Missouri Assessment Program

The spring 2016 MAP ELA and Mathematics administration consisted of twelve operational grade-level assessments. One operational test form was administered in ELA Grades 3, 4, 6, and 7 and in Mathematics Grades 3 through 8. Multiple test forms were administered in ELA Grades 5 and 8, each containing a different writing prompt. Braille and large-print test forms were constructed for each grade/content area to enable visually impaired students to participate in MAP testing. Table 1.3 provides an overview of the 2015–16 MAP ELA and Mathematics test design.

1.4 Overview of This Report

This Technical Report documents in the subsequent chapters the major activities of the testing cycle. This report provides comprehensive details confirming that the processes and procedures applied in the MAP ELA and Mathematics adhere to appropriate professional standards and practices of educational assessment. Ultimately, this report serves to document evidence that valid inferences about Missouri student performance can be derived from the MAP. An overview of major activities documented within this report is provided below.

Uses of Test Scores (Chapter 2)

Chapter 2 of the Technical Report discusses the concept of validity evidence. This Technical Report is composed of evidence that supports the use of the MAP ELA and Mathematics scores. In Chapter 2, some of the uses of the MAP scores are discussed.

Item and Test Development (Chapter 3)

Chapter 3 of the Technical Report provides a summary of the test development activities that occurred to create the Spring 2016 operational test forms and the materials developed to inform the public about the testing program. As each major event is presented and discussed, the role of the event in contributing to evidence for validity of the interpretation and use of test results is discussed.

Test Administration (Chapter 4)

Chapter 4 of the Technical Report serves to describe the processes and activities implemented and information disseminated to help ensure standardized test administration procedures and, thus, uniform test administration conditions for students.

Scoring of Constructed-Response and Technology-Enhanced Items (Chapter 5)

Chapter 5 of the Technical Report describes the processes and activities for auto-scoring technology-enhanced, short-answer, and evidence-based selected response items, and for hand-scoring writing prompts. This chapter also discusses the measures for training raters and for ensuring consistency among scorers. Finally, this chapter presents the results of the inter-rater reliability studies.

Operational Data Analyses (Chapter 6)

Chapter 6 of the Technical Report includes a detailed description of the operational analyses of the 2016 ELA and Mathematics MAP, which are composed of three major parts: the classical item analysis; calibration and scaling using item response theory (IRT) models; and student scoring. This chapter also describes the demographics of the calibration samples and compares them to the state census data. It reports the results of the classical item analysis, as well as the results of the calibration, scaling, and linking.

Test Results and Reporting (Chapter 7)

Chapter 7 of the Technical Report contains information on the results of the Spring 2016 MAP administration. Detailed summary statistics based on scale scores and achievement level information are also provided. Finally, this chapter presents information on the score reports sent to districts.

Standard Setting (Chapter 8)

Chapter 8 of the Technical Report briefly discusses standard setting. It provides an overview of the standard setting procedure and setting of cut scores used to classify students into achievement levels for ELA and Mathematics after the 2015–16 test administration.

Reliability and Validity Evidence (Chapter 9)

Chapter 9 of the Technical Report provides evidence of reliability and validity of the interpretation of the MAP ELA and Mathematics scores. This chapter provides detailed results of the reliability of the tests, as well as information on the decision consistency of the cut scores. It also provides evidence of construct-related validity for the intended interpretation of the MAP scores.

Fairness (Chapter 10)

Chapter 10 of the Technical Report discusses fairness and how the MAP ELA and Mathematics tests are constructed to be fair to all Missouri students. This chapter summarizes the results of the

differential item functioning (DIF) analysis. It also discusses the results of an impact analysis to determine whether large differences exist between demographic groups in Missouri.

Table 1.1: Timeline of the Grade-Span MAP

Year	Event
1996	Show-Me Standards approved
1996	Frameworks for Curriculum Development published
1997	Annotations to the Curriculum Frameworks published
1998	First operational administration of Mathematics MAP (Grades 4, 8, and 10)
1999	First operational administration of Communication Arts MAP (Grades 3, 7, and 11) and Science MAP (Grades 4, 8, and 11)
2000	First operational administration of Social Studies MAP (Grades 4, 8, and 10)
2001	Mathematics Curriculum Supplement published
2005	Last year of grade-span MAP

Table 1.2: Timeline of the Grade-Level MAP

Year	Event
2004	Grade-Level Expectations published
2005	Communication Arts and Mathematics field test
2005	Standard setting for Communication Arts and Mathematics
2006	First operational Communication Arts and Mathematics MAP
2007	Science field test
2008	First operational Science MAP
2008	Standard setting for Science
2008	Last operational administration of High School MAP
2008	Version 2.0 Grade-Level Expectations (GLEs) published
2009	Last operational administration of MAP based on V1.0 GLEs
2010	First operational administration of MAP based on V2.0 GLEs
2015	First and last operational administration of MAP based on Common Core State Standards for ELA and Mathematics under SBAC patronage
2016	First operational administration of MAP based on Missouri Learning Standards for ELA and Mathematics using DRC's college- and career-ready item pool
2016	Standard setting for ELA and Mathematics

Table 1.3: Spring 2016 MAP Test Design

Form Type	Number of Test Forms			
	English Language Arts			Mathematics
	3, 4, 6, and 7	5	8	All Grades
Regular Operational Form (online)	1	7*	4*	1
Braille or Large Print (transcribed)	1	1	1	1

*All operational test items, except for a writing prompt, were the same on ELA Grades 5 and 8 test forms.

CHAPTER 2: THE USES OF TEST SCORES

Validity is the overarching component of the MAP ELA and Mathematics testing program. The following excerpt is from the *Standards for Educational and Psychological Testing* (hereafter the *Standards*; American Educational Research Association [AERA], American Psychological Association [APA], & National Council on Measurement in Education [NCME], 2014):

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. Different components of validity evidence . . . include 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. (22)

As stated by the *Standards*, the validity of a testing program hinges on the interpretation of the test scores. Validity evidence that supports the uses of the MAP test scores is provided in this Technical Report. This section examines some possible uses of the MAP ELA and Mathematics test scores.

The following sections (Chapters 3 through 10) of this Technical Report provide additional evidence for these uses, as well as technical support for some of the interpretations and uses of test scores. The information in Chapters 3 through 10 also provides a firm foundation of evidence that the MAP tests measure what they are intended to measure. However, this Technical Report cannot anticipate all possible interpretations and uses of the MAP ELA and Mathematics scores. It is recommended that policy and program evaluation studies, in accordance with the *Standards*, be conducted to support some of the uses of the MAP ELA and Mathematics scores.

2.1 Uses of Test Scores

The validity of an interpretation of test score ultimately rests on how that test score is used and the information that supports such uses. To understand whether a test score is being used properly, it is necessary to first understand the purpose of the test. The intended uses of the MAP ELA and Mathematics scores include the following:

- evaluating students' academic achievement
- communicating expectations for all students
- evaluating school-, district-, and state-level programs
- informing stakeholders (teachers, school administrators, district administrators, DESE staff members, parents, and the public) about the status of the progress toward meeting academic achievement standards of the state
- meeting the requirements of the state's accountability program, the Missouri School Improvement Program

This Technical Report refers to the use of the test-level scores: scale scores and achievement levels.

2.2 Test-Level Scores

At the test level, an overall scale score that is based on student performance on the entire test is reported. In addition, an associated level of achievement is reported. These scores indicate, in varying ways, a student's achievement in ELA or Mathematics. Test-level scores are reported at four levels: the state, the school district, the school, and the student.

The ELA and Mathematics test forms were developed by DRC using DRC's college- and career-ready item pools. The assessments are aligned with Missouri Learning Standards.

The following sections discuss two types of test-level scores that are reported to indicate a student's achievement on the ELA and Mathematics MAP: (1) the scale score and (2) its associated level of achievement.

2.2.1 Scale Scores

A scale score indicating a student's total performance is determined for ELA and Mathematics on the MAP. The overall scale score for a content area quantifies the achievement being measured by the ELA or Mathematics test. In other words, the scale score represents the student's degree of achievement, where higher scale scores indicate higher achievement levels on the test and lower scale scores indicate lower achievement levels.

2.2.2 Achievement Levels

A student's performance on the ELA or Mathematics MAP is reported in one of four achievement levels: *Below Basic*, *Basic*, *Proficient*, or *Advanced*. The cut scores for the ELA and Mathematics level of achievement were recommended by Missouri educators at the Bookmark Standard Setting workshop in July 2016, after the Spring 2016 test administration. The cut scores reflect the expectations of Missouri educators and citizens of what Missouri students should know and be able to do in ELA and Mathematics. (See Chapter 8 of this report for a discussion of the MAP ELA and Mathematics standard setting).

Therefore, the MAP achievement levels reflect the achievement standards and abilities intended by the Missouri legislature, Missouri teachers, Missouri citizens, and DESE. Descriptions of each level of achievement in terms of what a student should know and be able to do are provided with the *Guide to Interpreting Results* (see Chapters 4 and 7.)

2.2.3 Use of Test-Level Scores

The MAP scale scores and achievement levels provide summary evidence of student achievement in ELA and Mathematics. Classroom teachers may use these scores as evidence of student achievement in these content areas. At the aggregate level, district and school administrators may use this information for activities such as curriculum planning. The results presented in this Technical Report provide evidence that the scale scores are a valid and reliable indicator of student performance in ELA and Mathematics.

CHAPTER 3: TEST CONTENT DEVELOPMENT

Content-related evidence of the validity of the intended test score interpretation in achievement testing is supported by a correspondence between test content and a specification of the content domain. Evidence of content-related validity can be demonstrated through consistent adherence to test blueprints, through a high-quality test development process that includes review of items for accessibility to English language learners (ELL) and students with disabilities, and through alignment studies performed by independent groups. In this chapter, we will provide a detailed discussion of the test development cycle. In particular, this section will show how DRC followed rigorous procedures to construct ELA and Mathematics tests that reflect the full range of content that the MAP is expected to cover.

This chapter is particularly relevant to AERA, APA, & NCME (2014) Standards 4.0, 4.1, and 4.7. It also addresses Standards 3.1, 3.2, 3.9, 4.12, and 7.4, which will be discussed in pertinent sections of this chapter. Standards 4.0, 4.1, and 4.7 are from Chapter 4 of the AERA, APA, & NCME (2014) *Standards*, “Test Design and Development.” Each of these Standards and the way each Standard is addressed will be presented in this chapter. AERA, APA, & NCME (2014) Standard 4.0 states the following:

Tests and testing programs should be designed and developed in a way that supports the validity of interpretations of the test scores for their intended uses. Test developers and publishers should document steps taken during the design and development process to provide evidence of fairness, reliability, and validity for intended uses for individuals in the intended examinee population. (85)

The purpose of this chapter is to document the test development process used for the MAP ELA and Mathematics tests. In this chapter, we describe steps taken to create the MAP tests, from the development of test specifications to the selection of operational forms. Section 3.1 of this chapter describes development of DRC’s item bank from which MAP ELA and Mathematics items were selected. The remaining sections of the chapter describe test development process for Missouri ELA and Mathematics tests.

3.1 Development of Items for DRC’s Item Bank

In 2015, it was determined that Missouri DESE would license ELA and Mathematics items from DRC’s College- and Career-Ready (CCR) item bank. These items would be used on the Spring 2016 summative assessments. This section of the document provides a high-level overview of the development of the DRC’s CCR item bank from which MAP ELA and Mathematics items were selected.

The CCR item bank contains nationally field-tested items that support the next generation of standards and assessments. It is aligned to the CCR standards in Mathematics and English Language Arts in Grades 3–8.

Alignment to the CCR standards, grade-level appropriateness, depth of knowledge (DOK), item/task level of complexity, estimated difficulty level, relevancy of context, rationale for

distractors, style, accuracy, and correct terminology were major considerations in the item development process. DRC's item development processes for the CCR item bank followed the *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 2014). DRC's item development work was and continues to be designed to produce reliable and instructionally valid tests that adhere to the guidelines articulated in the AERA, APA, & NCME (2014) *Standards*. In particular, the item development process discussed in this section is in compliance with the AERA, APA, & NCME (2014) Standard 4.7 stating the following:

The procedures used to develop, review, and try out items and to select items from the item pool should be documented. (87)

3.1.1 Considerations of Test Fairness in Item Development

AERA, APA, & NCME (2014) Standard 3.2 is particularly relevant to fairness in item development:

Test developers are responsible for developing tests that measure the intended construct and for minimizing the potential for tests' being affected by construct-irrelevant characteristics, such as linguistic, communicative, cognitive, cultural, physical, or other characteristics. (64)

DRC developed bias and sensitivity guidelines to help ensure that the items are fair for all groups of test takers, despite differences in characteristics including, but not limited to, disability status, ethnic group, gender, regional background, native language, race, religion, sexual orientation, and socioeconomic status. DRC strongly relied on the bias and sensitivity guidelines in the development of the items and assessments, particularly in item writing and review. Items had to comply with the guidelines in order to be included in the assessments. DRC also commissioned an external item bias and fairness review. The external bias, fairness, and sensitivity reviewers included experts who had a vast array of experience in education that provided them with diverse perspectives. All reviewers were experienced in the review of passage sets and items in English Language Arts and Mathematics for bias, fairness, and sensitivity issues. See Section 3.1.4 Item Reviews for more information about the external item reviewers.

3.1.2 Item Writing

DRC's CCR item development occurred from 2013 to 2015. DRC worked with qualified item writers throughout the test development cycle to develop items. The item writers were trained on DRC's CCR content specifications and item and stimulus specifications. In addition, DRC test development experts held regular meetings to provide direction and feedback to the item writers. Using an item development plan, the number and distribution of items to be written were specified for item writing teams. Pools of items were written to support a variety of item types and standards covered for future operational use.

To ensure that the items produced were sufficient in number and adequately distributed across subcategories and levels of difficulty, item writers were informed of the required quantities of items. An item authoring card was completed for each item. It contained information about the item, such as grade level, content category, and subcategories. Based on the item writer's classroom teaching experience, knowledge of the content area curriculum, and cognitive demands required by

the item, estimates were recorded for level of cognitive complexity and difficulty level. Items were written to provide for a range of difficulty.

Item Writer Training

Item writers were selected and trained for the content areas of ELA and Mathematics. All DRC item writers were experienced writers, teachers, or former teachers who had broad specialized knowledge in the subject area of their expertise. Only qualified individuals, possessing both content expertise and good technical writing skills were selected to write items for ELA and Mathematics. The qualifications DRC used to select item writers include the following:

- A bachelor’s degree or higher in Reading, English Language Arts, Mathematics, Curriculum and Instruction, and/or related fields.
- In-depth understanding and knowledge of the special considerations involving the following: the writing of standards-based multiple-choice items, including writing distractor rationales for each answer option; an understanding of depth-of-knowledge levels, estimated difficulty levels, grade-level appropriateness, readability, and bias considerations; the development of technology-enhanced and open-ended items, including developing item-specific scoring guidelines for each item; and the writing of unique, independent, items for passages that do not clue or clang.
- Participation in the assessment-specific training workshop.

The writers were trained individually and had previous experience in writing selected-response, technology-enhanced, and constructed-response items. Prior to developing items for the CCR item bank, the item writers were trained with regard to the following:

- College- and Career-Ready standards (Mathematics and ELA)
- Webb’s Four Levels of Cognitive Complexity: Recall, Basic Application of Skill/Concept, Strategic Thinking, and Extended Thinking
- General scoring guidelines for each content area
- Specific and general guidelines for item writing
- Bias, fairness, and sensitivity guidelines
- Principles of universal design
- Item quality technical style guidelines
- Reference information
- Sample items

Reading Passage Development

The task of writing passages was conducted by DRC content experts with classroom experience in Reading/Language Arts as well as experience in writing informational and literary passages. These content experts also underwent specialized training (provided by DRC) in the characteristics of acceptable passages. Guidelines for passage writing included appropriate length, text structure, density, and vocabulary for the grade level. A judgment was also made about whether the reading level required by a particular passage was at the independent level, that is, where the average student should be able to read 90 percent of words in the text independently. Passage writers were required to write a specified number of passages for each genre. In some cases, public domain passages were acquired to address authentic works. Approval to reprint was secured from the

publishers as necessary. Passages underwent an internal review by several test development content editors who evaluated their merit with regard to the following criteria:

- Passages have interest value for students.
- Passages are grade-appropriate in terms of text complexity, vocabulary, and language characteristics.
- Passages are free of bias, fairness, and sensitivity issues.
- Passages represent different cultures.
- Passages are from a variety of sources.
- Passages are able to stand the test of time.
- Passages are sufficiently rich to generate a variety of item types.
- Passages are complete with all necessary permissions documentation.
- Passages avoid dated subject matter unless a relevant historical context is provided.
- Passages should not require students to have extensive background knowledge in a certain discipline or area to understand a text.

After completion of the internal review process, the passages deemed potentially acceptable were reviewed by the external reviewers for content and bias, fairness, and sensitivity. The approved passages were then used on the field test.

3.1.3 Pilot Tests

The online pilot test administrations in Spring and Fall 2014 were designed to collect preliminary data to determine the quality of the item pool's content and format. The pilot tests were conducted on relatively small volunteer student samples. The Spring pilot included Mathematics items only and was conducted in Alaska. The Fall pilot included both ELA and Mathematics items and was conducted in the following states: Texas, Oregon, Montana, Nebraska, Arkansas, Wisconsin, Alabama, Vermont, Oklahoma, California, Ohio, New Hampshire, Minnesota, and South Dakota. The items were administered using a fully randomized design for each subject and grade. One of the main goals was to try out a variety of new technology-enhanced item types to determine the best use when assessing the ELA and Mathematics standards. The content and item specifications were adjusted after the pilot tests, prior to development of new items for the field tests.

3.1.4 Item Reviews

As part of the item construction process, each item was reviewed by content specialists and editors at DRC. Content specialists and editors evaluated each item to make sure that it measured the intended College- and Career-Ready standards. They also assessed each item for grade-level appropriateness and verified that the items had only one correct answer (multiple-choice and some technology-enhanced items). In addition, the difficulty level, depth of knowledge, graphics, language demand, and distractors were also evaluated. Other elements considered in this process include, but are not limited to the universal design, bias, grammar/punctuation, and CCR item bank style.

Upon completion of the internal reviews, DRC commissioned an external review for both content and bias. DRC utilized qualified professionals to provide a review of the College- and Career-Ready items. The external reviewers had a broad range of experience in the educational field. All of the reviewers had either bachelor-level, master-level, or doctoral-level degrees and teaching experience

in their specific area of expertise. Their professional backgrounds included: classroom teachers (i.e., regular education, special education, and gifted/talented education), curriculum specialists, content area instructional specialists, test development editors, university professors, state department of education ELA and Mathematics specialists, members of the Smarter Balanced Consortium Item Development Team, and disability rights advocates. The reviewers resided in various part of the United States and were able to provide the national as well as regional perspective and understanding of the items.

The twelve English Language Arts reviewers had backgrounds in at least one of the following fields: English; Reading; Writing; Curriculum; English as a Second Language (ESL), Teachers of English to Speakers of Other Languages; Talented and Gifted; Elementary, Middle, and Secondary Education; Collegiate Education; and Applied Linguistics. They represent all levels in the field of teaching from kindergarten through collegiate as well as teaching of talented and gifted, ESL, Title I, Chapter I, and special education students.

The ten Mathematics reviewers were current or former teachers that had a range of experiences in the field of education. All reviewers had experience teaching in K–12 classrooms and more than half of them taught at the undergraduate and/or graduate level preparing future teachers as well as providing professional development for current teachers. All reviewers had extensive experience with College- and Career-Ready standards.

The ten Bias, Fairness and Sensitivity reviewers were experienced in the review of passage sets and items in ELA and Mathematics for bias, fairness, and sensitivity issues. Their perspective and experiences included knowledge of populations such as ELL, special education students, students with disabilities, highly capable students, and ethnically and culturally diverse populations.

Overall, the knowledge and educational experience of the item and passage writers as well as the item reviewers met the requirements of the following AERA, APA, & NCME (2014) standards:

Standard 3.1 Those responsible for test development, revision, and administration should design all steps of the testing process to promote valid score interpretations for intended score uses for the widest possible range of individuals and relevant subgroups in the intended population. (63)

Standard 3.2 Test developers are responsible for developing tests that measure the intended construct and for minimizing the potential for tests' being affected by construct-irrelevant characteristics, such as linguistic, communicative, cognitive, cultural, physical, or other characteristics. (64)

3.1.5 Field Test Selection and Administration

Based on the recommendations made by the external reviewers, DRC's test development content editors determined which item were to be included in DRC's final online field test administration, held from October 2015 to December 2015. The field test was conducted in the following states: Nebraska, Louisiana, Ohio, Texas, California, Michigan, Minnesota, Kentucky, Alabama, and Oregon. Between approximately 15 and 200 students responded to each item depending on the grade level, content area, and item type. The major purposes of the field test were: to administer a sufficiently large number of items that could be used in future summative assessments; to obtain

initial item classical statistics and conduct differential item functioning (DIF) analyses to inform item data reviews; to evaluate the protocols for the test administration and computer delivery system (technology infrastructure); and, to implement targeted test accommodations and elements of universal design. In total, over 5,000 items were field tested for ELA and Mathematics across all grade levels.

3.1.6 Summary of Item Development

DRC's CCR item development occurred from 2013 to 2015. DRC worked with qualified item writers throughout the test development cycle to develop items and passages for ELA and items for Mathematics. In addition, DRC sought the expertise of external reviewers to ensure the item quality. External reviewers, under DRC patronage, reviewed all CCR items and item stimuli for accessibility, bias, sensitivity, and content. (Item stimuli include the reading passages used on the ELA assessments and the figures and graphics used on the Mathematics assessments.) Prior to the Fall 2015 field test, twelve ELA experts, ten Mathematics experts, and ten bias, fairness, and sensitivity experts reviewed items for accessibility and bias and sensitivity. During the accessibility reviews, experts identified issues that could potentially negatively affect a student's ability to access stimuli and items. During the bias and sensitivity review, experts identified content in stimuli and items that could potentially unfairly affect a student's response because of his or her background. The content review focused on developmental appropriateness and alignment of stimuli and items to the CCR content specifications. The content review experts also checked the accuracy of the content, answer keys, and scoring materials. Items flagged for accessibility, bias and sensitivity, and/or other content concerns were either revised to address the issues identified by the experts or removed from the item pool. Items approved by external panels and DRC's internal content specialists became DRC's item bank and, after field testing, were used to select items for inclusion in the 2015–16 MAP ELA and Mathematics test forms. Table 3.1 shows the high-level sequence of the activities that occurred in the development of the CCR item bank.

Various item types were developed for inclusion in CCR item pool. Descriptions of each item type (in alphabetical order) used in the CCR item bank are included in Table 3.2.

3.2 Content and Bias Review of Items Used in MAP

It was determined that the CCR item bank would be utilized to develop the operational MAP ELA and Mathematics assessments for Grades 3 through 8. Therefore, prior to the Spring 2016 operational testing, all CCR items that could potentially be used on the Missouri tests were submitted to Missouri content and bias committees for review. The committees consisted of Missouri educators from school districts throughout the state. The primary responsibility of the committee was to evaluate items with regard to quality and content classification, including grade-level appropriateness, estimated difficulty, as well as bias, fairness and sensitivity issues. Due to the leasing agreement of the CCR items, the committee members were asked to note items as accepted without edits or rejected. The committee also reviewed the items for adherence to the principles of universal design, including language demand.

The content and bias reviews were held in Missouri from September 29 to October 1, 2015 for ELA, and from October 6 to October 8, 2015 for Mathematics. Committee members were recruited by DESE. The meetings commenced with a welcome by DESE and DRC, followed by an overview

of the test development process by DESE. DESE, along with DRC, also provided training on the procedures and forms to be used for item content and bias review.

The review facilitators were recruited by DESE and were assisted by representatives from DRC and DESE. Committee members, grouped by grade level and content area, worked through and reviewed the items for quality and content, as well as for the following properties:

- Missouri Learning Standard alignment
- Grade-level appropriateness
- Depth of knowledge
- Correct answer
- Quality of distractors
- Appropriate language demand
- Freedom from bias and sensitivity
- Recommendation for use on the large-print accommodation form
- Recommendation for use on the Braille accommodation form

The members of the review groups were asked to reach a consensus to either accept or reject each item. Committee facilitators recorded the committee decision on the item review rating forms provided by DRC.

Security of materials included in the item review process was addressed by adhering to a strict set of procedures. Items in binders were distributed for committee review and signed for by each member on a daily basis. All attendees, with the exception of DESE staff, were required to sign a confidentiality agreement. All materials not in use at any time were stored in a locked room. Secure materials that did not need to be retained after the meetings were deposited in secure containers and shredded.

3.3 Test Specifications of MAP ELA and Mathematics

As stated in the previous section, the test content for the 2016 MAP operational test was provided through DRC's CCR item bank. Items administered for the 2016 MAP operational test were aligned with Missouri Learning Standards. Operational forms were selected based on MAP test blueprint specifications.

AERA, APA, & NCME (2014) Standard 4.1 states the following:

Test specifications should describe the purpose(s) of the test, the definition of the construct or domain measured, the intended examinee population, and interpretations for intended uses. The specifications should include a rationale supporting the interpretations and uses of test results for the intended purpose(s). (85)

The purpose of the test is discussed in Chapter 2. The MAP ELA and Mathematics domains are generally defined as the knowledge and skills that are identified within the Missouri Learning Standards for ELA and Mathematics. The framework of Missouri Learning Standards, in turn, is based on prior consensus among DESE, Missouri educators, and experienced subject-matter experts that the framework represents what is important for teachers to teach and students to learn.

Evidence of validity based on test content includes information about the test specifications, including the test design and test blueprint. Test development involves creating a design framework from the statement of the construct to be measured. The primary consideration in the development of the MAP ELA and Mathematics test specifications was the assessment alignment with the Missouri Learning Standards. Constraints of the assessment program and the state policy decisions were also taken into consideration in development of the test specifications.

The MAP 2016 test specifications consist of a test blueprint and a test design for each grade level and content area. In partnership with DRC, DESE created test blueprints and test designs that were parallel to the Smarter Balanced Assessment Consortium (SBAC) 2014–15 operational form blueprints and test designs. DRC’s CCR item bank, which is aligned to the Common Core State Standards, was used to create the new test forms for 2015–16 administration. For ELA and Mathematics, the 2016 MAP test blueprints were finalized in December 2015. DRC and DESE content experts scrutinized each blueprint to ensure optimal content coverage and efficient use of time and resources. In general, the blueprints represent content sampling proportions that reflect intended emphasis in instruction and mastery at each grade level. The test specifications provide the number of items by strand, assessment focus, and item type in the desired proportions within test delivery constraints. The test designs for ELA and Mathematics were finalized in February 2016 by DESE and DRC.

The key structural aspect of the MAP ELA and Mathematics tests is the test blueprint, which specifies the target score points for each content category or strand, as shown in Table 3.3. The blueprint represents the target weights for each strand decided upon by DESE in collaboration with DRC. Test design elements include number and types of items for each of the scores reported. The degree to which the 2016 MAP operational forms matched the test blueprint can be assessed by comparing the targeted score point distributions defined in the test blueprint in Table 3.3, with the actual point distributions displayed in Tables 3.4 and 3.5 for ELA and Table 3.6 for Mathematics. Actual point distributions on the 2016 MAP operational forms matched blueprint targets within 10%, which was the tolerance for variation approved by DESE.

3.4 Standard and Content Specifications of MAP ELA and Mathematics

AERA, APA, & NCME (2014) Standard 4.12 states the following:

Test developers should document the extent to which the content domain of a test represents the domain defined in the test specifications. (89)

The MAP item specifications are designed to ensure that the assessment items measure the assessment’s domains. Indeed, the purpose of the item specifications is to define the characteristics of the items that will provide the evidence to support one or more domains. To do this, the item specifications delineate the types of evidence that should be elicited for each strand within a grade level. Then, they provide explicit guidance on how to write items in order to elicit the desired evidence.

In doing this, the item specifications provide guidance on how to measure the standards. The item specifications provide guidelines on how to create the items that are specific to each assessment domain, or strand. In ELA and Mathematics, item specifications describe the knowledge, skills, and

processes being measured by each of the item types aligned to particular standards. These item specifications were developed for each grade level and standard in order to delineate the expectations of knowledge and skill measured by the items on the MAP tests at each grade.

Table 3.4 provides the distribution of items and points on the 2016 MAP ELA by strand and Table 3.5 shows distribution of points by assessment focus for ELA.

Table 3.6 provides the distribution of items and points on the 2016 MAP Mathematics by strand and Table 3.7 shows distribution of points by content category for Mathematics.

3.4.1 Alignment Study

The alignment study, conducted for DESE by the Wisconsin Center for Education and Research at the University of Wisconsin-Madison and reported in the *Missouri Department of Elementary & Secondary Education 2016 Alignment Study Report* (WCER, 2016), demonstrated the degree to which (a) the MAP test specifications captured the Missouri Learning Standards and (b) the items adequately represent the reporting categories/strands delineated in the test specifications. The study utilized the Survey of Enacted Curriculum methodology for conducting content and alignment analyses.

The alignment study discussed the three dimensions of alignment among elements of content: topic coverage, cognitive demand, and balance of representation. The results of the alignment study for ELA showed good alignment results for all measures and grades, except for balance of representation. Results for topic coverage and cognitive demand indicated strong alignment across measures and grades. The balance of representation measures were somewhat lower than the measures of topic coverage and cognitive demand. The alignment results for the Mathematics assessments revealed strong alignment results across all grades, and especially high alignment results for topic coverage, indicating a large degree of alignment across all of Mathematics topics.

The overall results of the study indicated that the 2016 MAP ELA and Mathematics summative tests met or exceeded the average degree of alignment the WCER has found across the many dozens of assessments they have analyzed. The analysis was completed with test blueprints and operational assessments that were administered in Spring 2016.

3.5 Operational Test Selection of MAP English Language Arts and Mathematics

The Missouri educator-approved portion of the DRC CCR item bank was used to select the ELA and Mathematics forms. MAP operational test item selections for the Spring 2016 summative assessment were performed in October 19–23, 2015 by DESE and DRC. The DRC test development experts made initial selections which were either approved or revised by DESE content specialists. The selection process followed criteria specified by DRC staff and approved by DESE. Since the items had not been field-tested with Missouri students, the selection criteria were based mainly on content requirements and included the following:

1. Test length and item types adhered to the DESE-approved test design.
2. Content coverage adhered to the DESE-approved test blueprint.

3. Only items approved by Missouri educators during content and bias reviews were used in form selection.

Figure 3.1 outlines the steps that were used to develop MAP ELA and Mathematics summative assessments for the Spring 2016 administration.

3.6 Universal Design

Grade-level assessments that are universally designed allow participation of the widest possible range of students, resulting in more valid inferences about students' performance. Universally designed grade-level assessments may reduce the need for accommodations by reducing or eliminating access barriers associated with the tests themselves. Table 3.8 presents the elements of universal design (Thompson & Thurlow, 2002). The elements of universal design are relevant to both item development and form construction. This section addresses how the elements of universal design were addressed in the construction of the Spring 2016 test forms in compliance with AERA, APA, & NCME (2014) Standard 3.1, which states the following:

Those responsible for test development, revision, and administration should design all steps of the testing process to promote valid score interpretations for intended score uses for the widest possible range of individuals and relevant subgroups in the intended population. (63)

A goal of the universal design is to measure the performance of students with a wide range of abilities and skill, ensuring that students with diverse learning needs receive opportunities to demonstrate competence on the same content. To accommodate the greatest number of students for the MAP tests, the assessments include simple, clear, and intuitive instructions and procedures; maximum readability and comprehensibility; and maximum legibility. All of these design components are addressed primarily through the physical layout and formatting of the print test books and through the web formatting of the online test forms. The page specifications define how directions and test items are placed on the pages, the location and appearance of headers and footers, spacing between an item stem and answer choices, and other page elements to ensure a consistent, legible appearance of printed test books and online test forms. Written instructions at the beginning of each test session are clearly and simply stated, and the wording of such instructions is standardized as much as possible across content areas and grade levels to ensure clarity and consistency.

3.7 Accommodations

AERA, APA, & NCME (2014) Standard 3.9 states the following:

Test developers and/or test users are responsible for developing and providing test accommodations, when appropriate and feasible, to remove construct-irrelevant barriers that otherwise would interfere with examinees' ability to demonstrate their standing on the target constructs. (67)

Students with disabilities or students who are English Language Learners may be provided with test administration accommodation(s) based on their Individualized Education Plan (IEP). More information on accommodations can be found in Section 4.4.2 of Chapter 4. Accommodation code

definitions can be found in the *Test Coordinator's Manual* and also in the *Examiner's Manual* presented in Appendices A and B, respectively.

Braille and large-print test versions were constructed for each grade/content area to enable students who are blind or visually impaired to participate in the MAP testing. Braille and large-print forms for ELA and Mathematics were created by DRC test developers and contained the same items as regular operational online test forms. Specific recommendations on how to transcribe items into Braille were provided by an independent Braille expert who collaborated with the Braille publisher to produce the Braille version of the MAP and teacher's notes that accompany the Braille forms. DESE conducted a review meeting with a committee of Missouri teachers in February 2016 to ensure that both the Braille and large-print versions of the 2016 MAP assessment would be accessible to Missouri's blind or visually impaired students. DESE and the teacher committee made recommendations, as needed, for how to further revise the transcription to best serve the needs of blind or visually impaired students.

3.8 Summary

In summary, the overall purpose of this chapter is to explicate the procedures used in the development of the MAP grade-level assessments. The efforts by DESE and DRC in developing the MAP are in alignment with multiple best practices of the test industry but, in particular, support the following AERA, APA, & NCME (2014) standards:

- Standard 3.1—Those responsible for test development, revision, and administration should design all steps of the testing process to promote valid score interpretations for intended score uses for the widest possible range of individuals and relevant subgroups in the intended population.
- Standard 3.2—Test developers are responsible for developing tests that measure the intended construct and for minimizing the potential for tests' being affected by construct-irrelevant characteristics, such as linguistic, communicative, cognitive, cultural, physical, or other characteristics.
- Standard 3.9—Test developers and/or test users are responsible for developing and providing test accommodations, when appropriate and feasible, to remove construct-irrelevant barriers that otherwise would interfere with examinees' ability to demonstrate their standing on the target constructs.
- Standard 4.0—Tests and testing programs should be designed and developed in a way that supports the validity of interpretations of the test scores for their intended uses. Test developers and publishers should document steps taken during the design and development process to provide evidence of fairness, reliability, and validity for intended uses for individuals in the intended examinee population.
- Standard 4.1—Test specifications should describe the purpose(s) of the test, the definition of the construct or domain measured, the intended examinee population, and interpretations for intended uses. The specifications should include a rationale supporting the interpretations and uses of test results for the intended purpose(s).
- Standard 4.7—The procedures used to develop, review, and try out items and to select items from the item pool should be documented.
- 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.

Table 3.1: College- and Career-Ready Item Bank Development Activities

College- and Career-Ready Item bank Development Activities
Establish item/passage development specifications and style guides, and prepare item writing training manuals.
Determine item development plans.
Train item writers and/or passage developers in the project requirements and specifications.
Develop passages and write items.
Review, edit, code, and track items and produce graphics.
Produce review forms for content and bias/fairness/sensitivity reviews by external reviewers.
Modify items based on external reviewers' recommendations.
Review and approve field test ready items and passages.
Develop field test forms and administer field test.
Review field test item data.
Approve items to be included in the item bank.

Table 3.2: College- and Career-Ready Item Types

Item Type	Name	Description
ESR	Evidence-Based Selected Response	Each evidence-based selected-response item has two parts, and each two-part item is designed to elicit an evidence-based response from a student who has read a literature text passage, an informational text passage, or a writing concept. In part one, which is similar to a multiple-choice item, the student analyzes a passage or writing concept and chooses the best answer from four response options. In part two, the student elicits evidence from the passage or writing concept to select one or more answers based on the response to part one. Each of these items is worth one point.
MC	Multiple Choice	Each multiple-choice item has four response options, only one of which is correct. Multiple-choice items are used to assess a variety of skill levels, from short-term recall of information to inference and problem solving. Each of these items is worth one point.
MS	Multiple Select	Each multiple-select item requires a student to evaluate information presented and respond by choosing two or more correct responses. Multiple-select items can be used to assess multiple skills and concepts in both mathematics and English language arts. Each of these items is worth one point.
SA	Short Answer	Each short-answer item requires a student to enter a short numeric or algebraic response. These items are designed to assess a student's ability to formulate a solution to a pure or applied mathematics problem without the assistance of response options. The short-answer items are scored on a 0–1-point scale using item-specific autoscoring rules.
SCR	Short Constructed Response	Each short-constructed-response item is designed to address writing through a short response as opposed to an essay. It assesses writing skills in ways a multiple-choice item cannot. The short-constructed-response items are scored on a 0–2-point scale using item-specific scoring rubric.
TE	Technology Enhanced	Each technology-enhanced item is designed to elicit evidence of a broad range of student understanding. A student interacts with the enhanced features of these computer-delivered, autoscoreable test items to show understanding of skills and concepts. Item types such as drag-and-drop, hot-spot, number line and coordinate graphing, data displays, matching interaction, and drop-down menus are just some of the technology-enhanced items presented to a student. The technology-enhanced items are scored on a 0–1-point scale using item-specific scoring rules.
WP	Writing Prompt	Each writing-prompt item is designed to assess the student's ability to write an on-demand essay response to a mode-specific task. A student demonstrates his/her writing skills by producing a narrative, informative/expository, or opinion/argumentative essay. The writing prompt items are scored using a three-trait holistic rubric for a total of 10 points. The rubric traits include: purpose/organization (1–4 points), development/elaboration (1–4 points), and conventions (1–2 points).

Table 3.3: 2016 MAP Test Blueprint: Target Score Points by Strand

Content Area	Grade					
Strand	3	4	5	6	7	8
English Language Arts						
Reading Literary and Informational	20	20	20	20	20	20
Writing	16	16	22	16	16	22
Research	8	8	8	8	8	8
Listening	8	8	8	8	8	8
Mathematics						
Operations and Algebraic Thinking	15	10	6			
Numbers and Operations in Base Ten	6	8	8			
Numbers and Operations - Fractions	7	12	16			
Measurement and Data	10	8	7			
Geometry	4	4	5	6	7	11
Ratios and Proportional Relationships				6	10	
The Number System				13	8	4
Expressions and Equations				15	13	15
Statistics and Probability				6	8	6
Functions						10

Table 3.3: MAP 2016 Strand Item/Point Distributions, English Language Arts

Grade	Strand	SR/TE Items	WP Items	Total Items	SR/TE Points	WP Points	Total Points	% of Total Points
3	Reading Literary and Informational	20		20	20		20	38%
	Writing	16		16	16		16	31%
	Research	8		8	8		8	15%
	Listening	8		8	8		8	15%
	Total	52	0	52	52	0	52	100%
4	Reading Literary and Informational	20		20	20		20	38%
	Writing	16		16	16		16	31%
	Research	8		8	8		8	15%
	Listening	8		8	8		8	15%
	Total	52	0	52	52	0	52	100%
5	Reading Literary and Informational	20		20	20		20	34%
	Writing	12	1	13	12	10	22	38%
	Research	8		8	8		8	14%
	Listening	8		8	8		8	14%
	Total	48	1	49	48	10	58	100%
6	Reading Literary and Informational	20		20	20		20	38%
	Writing	16		16	16		16	31%
	Research	8		8	8		8	15%
	Listening	8		8	8		8	15%
	Total	52	0	52	52	0	52	100%
7	Reading Literary and Informational	20		20	20		20	38%
	Writing	16		16	16		16	31%
	Research	8		8	8		8	15%
	Listening	8		8	8		8	15%
	Total	52	0	52	52	0	52	100%
8	Reading Literary and Informational	20		20	20		20	34%
	Writing	12	1	13	12	10	22	38%
	Research	8		8	8		8	14%
	Listening	8		8	8		8	14%
	Total	48	1	49	48	10	58	100%

Table 3.4: MAP 2016 Assessment Focus Point Distributions, English Language Arts

English Language Arts Grades 3–5					
Strand	Content Category	Assessment Focus	Total Points		
			Grade 3	Grade 4	Grade 5
Reading	Apply reading skills to literary texts	Key Ideas and Details	5	7	4
		Craft and Structure	5	3	4
		Integration of Knowledge and Ideas	0	0	2
	Apply reading skills to informational texts	Key Ideas and Details	5	5	5
		Craft and Structure	3	3	1
		Integration of Knowledge and Ideas	2	2	4
Writing	Demonstrate the ability to produce and examine writing	Text Types and Purposes	8	8	10
		Production and Distribution	8	8	12
Research	Research to build and present knowledge	N/A	8	8	8
Speaking and Listening	Demonstrate the ability to evaluate spoken material	Comprehension and Collaboration	8	8	8

Table 3.5: MAP 2016 Assessment Focus Point Distributions, English Language Arts (cont.)

English Language Arts Grades 6–8					
Strand	Content Category	Assessment Focus	Total Points		
			Grade 6	Grade 7	Grade 8
Reading	Apply reading skills to literary texts	Key Ideas and Details	5	3	4
		Craft and Structure	3	3	3
		Integration of Knowledge and Ideas	0	2	1
	Apply reading skills to informational texts	Key Ideas and Details	3	5	5
		Craft and Structure	5	6	3
		Integration of Knowledge and Ideas	4	1	4
Writing	Demonstrate the ability to produce and examine writing	Text Types and Purposes	8	8	10
		Production and Distribution	8	8	12
Research	Research to build and present knowledge	N/A	8	8	8
Speaking and Listening	Demonstrate the ability to evaluate spoken material	Comprehension and Collaboration	8	8	8

Table 3.5: MAP 2016 Strand Item/Point Distributions, Mathematics

Grade	Strand	MC/MS Items & Points*	Auto-scored CR Items & Points*	Total Items & Points*	% of Total Points
3	Operations and Algebraic Thinking	13	2	15	36%
	Numbers and Operations in Base Ten	4	2	6	14%
	Numbers and Operations - Fractions	6	1	7	17%
	Measurement and Data	8	2	10	24%
	Geometry	3	1	4	10%
	Total	34	8	42	100%
4	Operations and Algebraic Thinking	9	1	10	24%
	Numbers and Operations in Base Ten	4	4	8	19%
	Numbers and Operations - Fractions	11	1	12	29%
	Measurement and Data	6	2	8	19%
	Geometry	3	1	4	10%
	Total	33	9	42	100%
5	Operations and Algebraic Thinking	5	1	6	14%
	Numbers and Operations in Base Ten	6	2	8	19%
	Numbers and Operations - Fractions	10	6	16	38%
	Measurement and Data	5	2	7	17%
	Geometry	5	0	5	12%
	Total	31	11	42	100%
6	Ratios and Proportional Relationships	4	2	6	13%
	The Number System	9	4	13	28%
	Expressions and Equations	13	2	15	33%
	Geometry	4	2	6	13%
	Statistics and Probability	6	0	6	13%
	Total	36	10	46	100%
7	Ratios and Proportional Relationships	8	2	10	22%
	The Number System	6	2	8	17%
	Expressions and Equations	12	1	13	28%
	Geometry	4	3	7	15%
	Statistics and Probability	7	1	8	17%
	Total	37	9	46	100%
8	The Number System	2	2	4	9%
	Expressions and Equations	11	4	15	33%
	Functions	8	2	10	22%
	Geometry	10	1	11	24%
	Statistics and Probability	6	0	6	13%
	Total	37	9	46	100%

*Note: All Mathematics items were worth 1 point in the MAP 2016 assessment.

Table 3.6: MAP 2016 Content Category Point Distributions, Mathematics

Mathematics Grade 3		
Strand	Content Category	Total Points
Operations and Algebraic Thinking	Represent and solve problems involving multiplication and division.	5
	Understand properties of multiplication and the relationship between multiplication and division.	4
	Multiply and divide within 100.	2
	Solve problems involving the four operations, and identify and explain patterns in arithmetic.	4
Numbers and Operations in Base Ten	Use place value understanding and properties of operations to perform multi-digit arithmetic.	6
Numbers and Operations - Fractions	Develop understanding of fractions as numbers.	7
Measurement and Data	Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.	3
	Represent and interpret data.	2
	Geometric measurement: understand concepts of area and relate area to multiplication and to addition.	3
	Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.	2
Geometry	Reason with shapes and their attributes.	4

Table 3.7: MAP 2016 Content Category Point Distributions, Mathematics (cont.)

Mathematics Grade 4		
Strand	Content Category	Total Points
Operations and Algebraic Thinking	Use the four operations with whole numbers to solve problems.	5
	Gain familiarity with factors and multiples.	2
	Generate and analyze patterns.	3
Numbers and Operations in Base Ten	Generalize place value understanding for multidigit whole numbers.	3
	Use place value understanding and properties of operations to perform multi-digit arithmetic.	5
Numbers and Operations - Fractions	Extend understanding of fraction equivalents and ordering.	3
	Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.	4
	Understand decimal notation for fractions, and compare decimal fractions.	5
Measurement and Data	Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.	3
	Represent and interpret data.	2
	Geometric measurement: understand concepts of angle and measure angles.	3
Geometry	Draw and identify lines and angles, and classify shapes by properties of their lines and angles.	4

Table 3.7: MAP 2016 Content Category Point Distributions, Mathematics (cont.)

Mathematics Grade 5		
Strand	Content Category	Total Points
Operations and Algebraic Thinking	Write and interpret numerical expressions.	4
	Analyze patterns and relationships.	2
Numbers and Operations in Base Ten	Understand the place value system.	4
	Perform operations with multi-digit whole numbers and with decimals to hundredths.	4
Numbers and Operations - Fractions	Use equivalent fractions as a strategy to add and subtract fractions.	6
	Apply and extend previous understandings of multiplication and division to multiply and divide fractions.	10
Measurement and Data	Convert like measurement units within a given measurement system.	2
	Represent and interpret data.	2
	Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.	3
Geometry	Graph points on the coordinate plane to solve real-world and mathematical problems.	3
	Classify two-dimensional figures into categories based on their properties.	2

Table 3.7: MAP 2016 Content Category Point Distributions, Mathematics (cont.)

Mathematics Grade 6		
Strand	Content Category	Total Points
Ratios and Proportional Relationships	Understand ratio concepts and use ratio reasoning to solve problems.	6
The Number System	Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	2
	Compute fluently with multi-digit numbers and find common factors and multiples.	5
	Apply and extend previous understandings of numbers to the system of rational numbers.	6
Expressions and Equations	Apply and extend previous understandings of arithmetic to algebraic expressions.	6
	Reason about and solve one-variable equations and inequalities.	7
	Represent and analyze quantitative relationships between dependent and independent variables.	2
Geometry	Solve real-world and mathematical problems involving area, surface area, and volume.	6
Statistics and Probability	Develop understanding of statistical variability.	3
	Summarize and describe distributions.	3

Table 3.7: MAP 2016 Content Category Point Distributions, Mathematics (cont.)

Mathematics Grade 7		
Strand	Content Category	Total Points
Ratios and Proportional Relationships	Analyze proportional relationships and use them to solve real-world and mathematical problems.	10
The Number System	Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	8
Expressions and Equations	Use properties of operations to generate equivalent expressions.	5
	Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	8
Geometry	Draw, construct and describe geometrical figures and describe the relationships between them.	2
	Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	5
Statistics and Probability	Use random sampling to draw inferences about a population.	2
	Draw informal comparative inferences about two populations.	2
	Investigate chance processes and develop, use, and evaluate probability models.	4

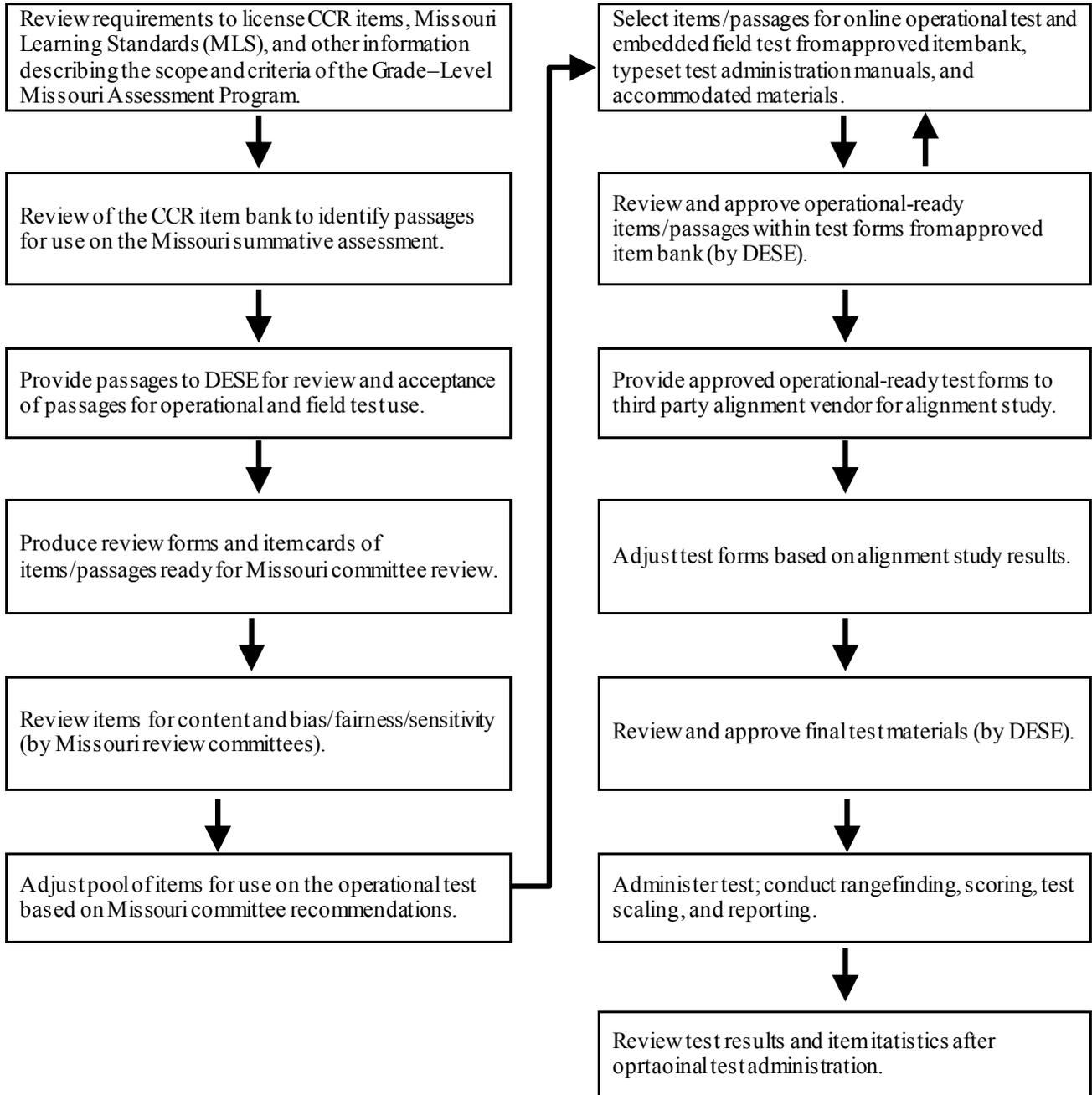
Table 3.7: MAP 2016 Content Category Point Distributions, Mathematics (cont.)

Mathematics Grade 8		
Strand	Content Category	Total Points
The Number System	Know that there are numbers that are not rational, and approximate them by rational numbers.	4
Expressions and Equations	Work with radicals and integer exponents.	6
	Understand the connections between proportional relationships, lines, and linear equations.	5
	Analyze and solve linear equations and pairs of simultaneous linear equations.	4
Functions	Define, evaluate, and compare functions.	5
	Use functions to model relationships between quantities.	5
Geometry	Understand congruence and similarity using physical models, transparencies, or geometry software.	6
	Understand and apply the Pythagorean Theorem.	2
	Solve real-world and mathematical problems involving volume of cylinders, cones and spheres.	3
Statistics and Probability	Investigate patterns of association in bivariate data.	6

Table 3.8: Elements of Universal Design

Element	Explanation
Inclusive Assessment Population	Tests designed for state, district, or school accountability must include every student except those in the alternate assessment, and this is reflected in assessment design and field testing procedures.
Precisely Defined Constructs	The specific constructs tested must be clearly defined so that all construct-irrelevant cognitive, sensory, emotional, and physical barriers can be removed.
Accessible, Non-Biased Items	Accessibility is built into items from the beginning, and bias review procedures ensure that quality is retained in all items.
Amenable to Accommodations	The test design facilitates the use of needed accommodations.
Simple, Clear, and Intuitive Instructions and Procedures	All instructions and procedures are simple, clear, and presented in understandable language.
Maximum Readability and Comprehensibility	Readability and plain language guidelines are followed (e.g., sentence length and number of difficult words are kept to a minimum) to produce readable and comprehensible text.
Maximum Legibility	Characteristics that ensure easy decipherability are applied to text, tables, figures, illustrations, and response formats.

Figure 3.1: Operational Test Development



CHAPTER 4: TEST ADMINISTRATION

Chapter 4 of the Technical Report describes the processes and activities implemented and information disseminated to help ensure standardized test administration procedures and, thus, uniform test administration conditions for students. According to the AERA, APA, & NCME *Standards* (2014), “[t]he usefulness and interpretability of test scores require that a test be administered and scored according to the developer’s instructions” (111). Chapter 4 examines how test administration procedures implemented for the MAP strengthen and support the intended score interpretations and reduce construct-irrelevant variance that could threaten the validity of score interpretations.

Chapter 4 demonstrates adherence to AERA, APA, & NCME (2014) Standards 4.15, 4.16, 6.1, 6.2, 6.3, 6.4, 6.6, and 6.7 in the English Language Arts and Mathematics MAP program. Each standard will be explicated within the relevant section of this chapter.

4.1 Training of Districts

To ensure that the Missouri Assessment Program’s Grade-Level Assessments are administered and scored in accordance with the department’s mandates, DESE takes a primary role in communicating with and training district personnel. The development of the Grade-Level Assessments is a collaborative effort between DESE and DRC. DESE conveys to districts the purpose of the Grade-Level Assessments and the importance of test administration being consistent with test industry standards. The tests and the consistent standards of administration must also meet the State Board of Education policies and the mandates of both state and federal legislation.

To accomplish these goals, DESE provides train-the-trainer opportunities for the District Test Coordinators who, in turn, convey test administration training to schools within their districts. DESE conducts quality assurance visits during testing to ensure district adherence to the standardized administration of the tests.

The District Test Coordinators are responsible to the schools within their districts. They disseminate information to each school, offer assistance with test administration, and serve as the liaisons between DESE and their districts. The Department also provides assistance with and interpretation of Grade-Level Assessment data and test results.

DESE’s Assistant Director of Assessment trained the District Test Coordinators in the following components of Grade-Level Assessment administration: the *Test Coordinator’s Manual*; the *Examiner’s Manual*; the dates for testing; appropriate protocols for test administration and security; guidance on the timing and administration of tests; and changes made to the test since the last administration in Spring 2015.

During the recorded webinar for the test coordinator training, the Assistant Director of Assessment walked the District Test Coordinators and other Department staff through an annotated version of the *Test Coordinator’s Manual*. The District Test Coordinators, in turn, used this information to train staff within their districts.

4.2 Ancillary Materials

Test administration ancillary materials for the MAP contribute to the body of evidence of the validity of score interpretation. This section examines how the test materials address the AERA, APA, & NCME (2014) *Standards* related to test administration procedures.

For the Spring 2016 test administration, DRC produced two types of administration manuals: the *Test Coordinator's Manual* and the *Examiner's Manual* (presented in Appendix A and Appendix B, respectively). DESE Curriculum and Assessment staff review, provide feedback, and give final approval for each manual.

The *Test Coordinator's Manual* is common to all grades and content areas. It provides an overview of the MAP and any changes made to the MAP for 2016. It gives guidelines for testing, such as the inclusion of special populations, the use of translators, and the invalidation procedures. It also details the Test Coordinator's role in the testing process by outlining nine steps the Test Coordinator should follow. Information included in the *Test Coordinator's Manual* is listed below.

- 1.0 Overview of Important Information for the MAP Grade-Level Assessments
 - 1.1 This Test Coordinator's Manual
 - 1.2 Glossary of Terms
 - 1.3 About the Tests
 - 1.4 Schedule of Important Dates for Spring 2016
 - 1.5 Special Populations, Optional Populations, and Special Circumstances
- 2.0 Before Online Testing
 - 2.1 Advance Announcements and Preparation
 - 2.2 User Roles
 - 2.3 Test Security
 - 2.4 eDIRECT and INSIGHT
 - 2.5 Assessment Materials for Students/Administrators
- 3.0 After Online Testing
 - 3.1 Submitting All Tests/Close of Testing Window
 - 3.2 Reporting Test Invalidations
 - 3.3 How to Handle Student Absence
 - 3.4 Securely Destroy Materials
 - 3.5 Individual Student Reports
- 4.0 Large-Print, Braille, and Paper-and-Pencil Editions
 - 4.1 Before Testing
 - 4.2 After Testing

Appendix A: Handling Student Transfers and Changes in Testing Status

Appendix B: Test Timing Guidelines

The *Examiner's Manuals* are specific to each grade. The MAP *Examiner's Manuals* also outline steps that should be followed when administering the MAP. Information included in the *Examiner's Manual* is listed below:

- 1.0 Overview of Important Information for the MAP Grade-Level Assessments
 - 1.1 This Test Examiner's Manual
 - 1.2 Glossary of Terms
 - 1.3 About the Tests
 - 1.4 Test Administration Policies
 - 1.5 Scheduling the Tests
 - 1.6 Accommodations and Special Populations
 - 1.7 Online Tools Training and Tutorials
- 2.0 Before Online Testing
 - 2.1 Advance Announcements and Preparation
 - 2.2 User Roles
 - 2.3 Test Security
 - 2.4 Assessment Materials for Students/Administrators
- 3.0 During Online Testing
 - 3.1 Specific Administration Information
 - 3.2 Moving a Student During an Assessment
- 4.0 After Online Testing
 - 4.1 Reporting Test Invalidations
 - 4.2 How to Handle Student Absences
- 5.0 Large-Print, Braille, and Paper-and-Pencil Editions
 - 5.1 Before Testing
 - 5.2 During Testing
 - 5.3 After Testing

Appendix A: Item Types

Appendix B: INSIGHT Keyboard Shortcuts and Icons

This section presents the AERA, APA, & NCME (2014) *Standards* relevant to test administration and how information in the MAP *Examiner's Manual* addresses these standards.

Standard 4.15 The directions for test administration should be presented with sufficient clarity so that it is possible for others to replicate the administration conditions under which the data on reliability, validity, and (where appropriate) norms were obtained. Allowable variations in administration procedures should be clearly described. The process for reviewing requests for additional testing variations should also be documented. (90)

The MAP *Examiner's Manual* provides instructions for before-, during-, and after-testing activities with sufficient detail and clarity to support reliable test administrations by qualified test administrators. To ensure uniform administration conditions throughout the state, instructions in the *Examiner's Manual* describe the following: general rules of online testing; pause rules; scheduling the tests; recommended order of test administration; classroom activity information; assessment duration, timing, and sequencing information; and the materials that the examiner and students need for testing.

Standard 4.16 The instructions presented to test takers should contain sufficient detail so that test takers can respond to a task in the manner that the test developer intended. When appropriate, sample materials, practice or sample questions, criteria for scoring, and a representative item identified with each item format or major area in the test’s specification or domain should be provided to the test takers prior to the administration of the test, or should be included in the testing material as part of the standard administration instructions. (90)

To ensure clarity of instructions to students, the manuals include scripts that the examiner is instructed to read verbatim to students. Examiners are instructed to follow the script and to repeat any part of the directions as many times as needed but to not modify the words used. Examiners may use professional judgment to respond to student questions, but they may not reword test items, suggest answers, or evaluate student work during the testing session. A sample of a script is presented in Figure 4.1.

Online Tools Training tutorials and practice tests are provided in each content area to familiarize students/users with the navigation of the online systems, functionality of the testing environment, and different item types. Districts have the following options for training students on interacting with the INSIGHT testing platform and using the tools contained within INSIGHT:

- Online Tools Training (OTT) – OTT gives students/users the ability to use the tools available in the INSIGHT testing platform on a variety of item types that will be used in the operational assessments. Using the OTT allows students/users to become comfortable with using the built-in system tools prior to the summative assessment. There is no limit to the amount of times a student/user can access the OTT.
- Online Tutorials – Online Tutorials give students/users the ability to watch recorded videos that demonstrate the features of INSIGHT and the tools that will be used for the operational assessments.

These options are made available several months in advance of the summative assessments.

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. (114)

To ensure the usefulness and interpretability of test scores and to minimize sources of construct-irrelevant variance, it is essential that the MAP is administered according to the prescribed test schedule. The *Test Coordinator’s Manual* includes instructions for scheduling the test within the state testing window of April 4–May 27, 2016. The *Examiner’s Manuals* contain the schedule for timing each test session and indicate whether timing is to be strictly enforced. The test timing schedule is presented in Table 4.1.

Standard 6.3 Changes or disruptions to standardized test administration procedures or scoring should be documented and reported to the test user. (115)

Test administrators are expected to report testing concerns involving a wide range of improper activities that may occur during testing, including the following: copying and reviewing Grade-Level Assessment questions with students; cueing students during testing either verbally or with written materials on the classroom walls; cueing students nonverbally, such as tapping fingers or nodding the head; using a calculator on parts of the test where it is not allowed; allowing students to correct or complete answers after tests have been submitted; splitting sessions into two parts; ignoring the standardized directions in the online assessment; reading the English Language Arts Assessment to students; paraphrasing parts of the test to students; changing or completing (or allowing other school personnel to change or complete) student answers; allowing accommodations that are not written in the Individualized Education Program (IEP); allowing accommodations for students who do not have an IEP; allowing students to use dictionaries on parts of the Grade-Level Assessment other than the writing prompt; or defining terms on the test.

Testing concerns are gathered from school officials, students, parents, and other interested parties who call DESE to state their issues. A narrative of the conversation is written and read back to them. The superintendent of the district in which the allegation is made is then contacted and read the narrative. A letter is sent to confirm the conversation and to ask the superintendent to investigate the claim. A Quality Assurance—Grade-Level Assessment—Self-Monitoring Report is sent for the superintendent to use for replying to the allegation. A sample district report is shown in Figure 4.2.

Standard 6.4 The testing environment should furnish reasonable comfort with minimal distractions to avoid construct-irrelevant variance. (116)

Section 2.0 in the *Examiner's Manual* overviews the steps that teachers should take to prepare for computer-based testing for administering the MAP online test. These include the following:

- Determine the layout of the physical computer lab.
- Plan seating arrangements. Allow enough space between students to prevent the sharing of answers.
- Eliminate distractions such as bells or telephones.
- Use a Do Not Disturb sign on the door of the testing room.
- Make sure classroom maps, charts, and any other materials that relate to the content and processes of the test are covered, removed, or placed out of the students' view.

Standard 6.6 Reasonable efforts should be made to ensure the integrity of test scores by eliminating opportunities for test takers to attain scores by fraudulent or deceptive means. (116)

The *Examiner's Manual* and the *Test Coordinator's Manual* present instructions for post-test activities to ensure that online tests are submitted and printed test materials are handled properly ensuring the integrity of student information and test scores. Detailed instructions guide test examiners in submitting all online test records. For students who are administered a large-print or Braille version of the MAP, examiners are instructed to transcribe students' responses from the large-print test or Braille test book into the online testing system (INSIGHT) exactly as they responded in the large-print or Braille test book.

Standard 6.7 Test users have the responsibility of protecting the security of test materials at all times. (117)

Throughout the manuals, Test Coordinators and examiners are reminded of test security requirements and procedures to maintain test security. Specific actions that are direct violations of test security are so noted. Detailed information about test security procedures are presented in Section 4.3.

4.2.1 Return Material Forms and Guidelines

The *Test Coordinator's Manual* instructs test coordinators in procedures for organizing and packing materials and returning them to DRC for secure inventory purposes. DESE curriculum and assessment staff have opportunities to review, provide feedback, and give final approval. The purpose of the instructions is to ensure that secure test materials are properly accounted for and organized properly for return shipment. Since the test is administered online except for special cases, only the large print, Braille, and paper-and-pencil printed test books are packed and returned to DRC.

4.2.2 Security Forms

As soon as large-print and Braille test books are received by a district, the District Test Coordinator ensures that the first and last security barcode on the tests match the packing list they received. The District Test Coordinator then packages the tests to be sent to schools. Upon returning test books to DRC, School and District Test Coordinators are required to complete and submit an electronic *Accountability Form* via DRC's eDIRECT portal. This form is pre-populated with the number of each material originally sent to each school. The Test Coordinators then enter the number of materials returned and provides space to districts/schools to document nonstandard situations, including lost, damaged, destroyed, extra, or missing test books. A sample *Test Book Accountability Form* is shown in Figure 4.3.

4.2.3 Interpretive Guides

Essential to making valid interpretations of test scores is an understanding of what the test scores mean and how to interpret score reports. The *Guide to Interpreting Results* is written for Missouri teachers and administrators who receive the MAP score reports from the 2016 administration. More detail about the guide can be found in Chapter 7.

4.3 Test Security Measures

Maintaining the security of all test materials is crucial to preventing the possibility of random or systematic errors, such as unauthorized exposure of test items that would affect the valid interpretation of test scores. Several test security measures are implemented for the MAP. Test security procedures are discussed throughout the *Examiner's Manual* and the *Test Coordinator's Manual*.

Test Coordinators and examiners are instructed to keep all test materials in locked storage, except during actual test administration, and access to secure materials must be restricted to authorized individuals only (e.g., test examiners and the School Test Coordinator). During the testing sessions, test examiners are directly responsible for the security of the MAP and must account for all test materials at all times. The test examiners must supervise the test administrations at all times.

With computer-based testing, test security is maintained by providing individual test tickets for student testing. Test tickets provide the secure login credentials (i.e., username and password) required for a student to use the testing software. Once students have started their tests, the test examiner is responsible for circulating through the room to ensure that all conditions of test security are maintained.

4.4 Test Administration

The 2016 test was administered to students within the state testing window of April 4–May 27, 2016. Schools and districts chose when and how to administer the MAP within this window. Each session within each content area of the MAP was required to be administered in one block of time.

4.4.1 Time

The MAP tests are not timed and sufficient time for students to attempt all items is provided. Nevertheless, the *Examiner's Manuals* provided examiners with timing guidelines for the assessments. For the MAP's sessions, examiners were instructed to allow students to complete the assessment if they were making adequate progress. The timing guideline of the MAP is presented in Table 4.1.

4.4.2 Universal Tools and Accommodations

Universal tools and accommodations are allowed on the MAP. These types of student aids are described below.

- Universal tools are available to all students based on student preference and selection. Some tools, such as a ruler and a digital notepad, are embedded in the online system, while others, such as a physical thesaurus and scratch paper, are external to the system. The availability of particular universal tools varies by item.
- Accommodations are changes in procedures or materials that increase equitable access during the MAP Grade-Level Assessments. Assessment accommodations allow students to access assessment content to show what they know and can do. Accommodations are available for students with documented Individualized Education Programs (IEPs) or 504 Plans and for students with limited English proficiency.

Accommodations may be used with students who qualify under the Individuals with Disabilities Education Act (IDEA) and have an IEP, who qualify under Section 504 of the Americans with Disabilities Act and have a Section 504 plan, or who are identified as English Language Learner (ELL) students. Accommodations must be specified in the qualifying student's individual plan and must be consistent with accommodations used during daily classroom instruction and testing. The use of any accommodation must be indicated on the student information sheet at the time of test administration. AERA, APA, & NCME (2014) Standard 6.2 states the following:

When formal procedures have been established for requesting and receiving accommodations, test takers should be informed of these procedures in advance of testing. (115)

In compliance with this standard, the grade-specific MAP *Examiner's Manual* contains the list of universal tools and accommodations permissible for the MAP assessments. The table of tools and

accommodations presented in the *Examiner's Manual* is shown in Tables 4.2 and 4.3. If a specific accommodation is not on the list of accommodations in the *Examiner's Manual*, the accommodation may still be permitted. However, for accountability purposes, there are some accommodations that will invalidate a student's test results, such as an oral administration of the English Language Arts test or paraphrasing of any of the tests. Detailed information regarding testing accommodations can be found at the DESE website: <http://dese.mo.gov/college-career-readiness/assessment>

Braille and large-print forms are provided for blind or visually impaired students.

Table 4.4 summarizes the numbers of reportable students for whom accommodations or universal tools were indicated by a teacher for the 2016 MAP. The analyses in Table 4.4 are based on reportable data and include only students who used universal tools or accommodations and received a scale score on the English Language Arts or Mathematics MAP. It should be noted that additional ELA accommodations are available to students in Grades 6 through 8 only, resulting in an increased total number of students using ELA accommodations in these grades compared to the number of students using ELA testing accommodations in Grades 3 through 5. For Mathematics, additional accommodations are available for Grades 4 through 8, resulting in an increased total number of students using Mathematics accommodations in these grades compared to the number of students using Mathematics accommodations in Grade 3.

In 2016, the most commonly used accommodations were read aloud (text-to-speech or human reader) for ELA reading passages in Grades 6–8, calculator use for non-calculator allowed items in Grades 4–8 Mathematics, and multiplication table use in Grades 4–8 Mathematics. The separate setting and having the test read aloud (text-to-speech or human reader) were the most frequently used universal tools for both the English Language Arts and Mathematics assessments.

4.5 Summary

In summary, the overall purpose of each of the test administration workshops and the ancillary materials is to keep districts informed about policies and procedures related to testing in general and the MAP in particular. The information imparted is clearly related to standardizing the administration of the MAP, maintaining the security of the assessment, allowing access to the assessments for special populations by clearly delineating appropriate universal tools or accommodations, and providing guidance on appropriate interpretations of the test results. These communication and training efforts by DESE and the ancillary information developed by DRC are in alignment with multiple best practices of the testing industry and, in particular, support the following AERA, APA, & NCME (2014) standards:

- Standard 4.15—The directions for test administration should be presented with sufficient clarity so that it is possible for others to replicate the administration conditions under which the data on reliability, validity, and (where appropriate) norms were obtained. Allowable variations in administration procedures should be clearly described. The process for reviewing requests for additional testing variations should also be documented.
- Standard 4.16—The instructions presented to test takers should contain sufficient detail so that test takers can respond to a task in the manner that the test developer intended. When appropriate, sample materials, practice or sample questions, criteria for scoring, and a

- representative item identified with each item format or major area in the test's specification or domain should be provided to the test takers prior to the administration of the test, or should be included in the testing material as part of the standard administration instructions.
- 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.
 - Standard 6.2—When formal procedures have been established for requesting and receiving accommodations, test takers should be informed of these procedures in advance of testing.
 - Standard 6.3—Changes or disruptions to standardized test administration procedures or scoring should be documented and reported to the test user.
 - Standard 6.4—The testing environment should furnish reasonable comfort with minimal distractions to avoid construct-irrelevant variance.
 - Standard 6.6—Reasonable efforts should be made to ensure the integrity of test scores by eliminating opportunities for test takers to attain scores by fraudulent or deceptive means.
 - Standard 6.7—Test users have the responsibility of protecting the security of test materials at all times.

Table 4.1: MAP Administration Schedule Timing Guidelines by Session (Time in Minutes) *

Grade	Session	English Language Arts	Mathematics
3	1	45–80	35–50
	2	30–50	35–50
	3	15–25	
4	1	45–80	35–50
	2	30–50	35–50
	3	15–25	
5	1	45–80	35–50
	2	25–45	35–50
	3	15–25	
	4	60–90	
6	1	45–80	35–45
	2	30–50	45–60
	3	15–25	
7	1	45–80	20–25
	2	30–50	60–80
	3	15–25	
8	1	45–80	15–20
	2	25–45	65–85
	3	15–25	
	4	60–90	

*All times are estimates and all sessions are untimed.

Table 4.2: MAP Universal Tools

Tool	Description	Code
Bilingual Dictionary	ELL students may have access to a physical Bilingual Dictionary for use ONLY on the Writing Prompt in grades 5 and 8. If the Bilingual Dictionary is electronic, it may not connect to the internet.	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.	N/A
Calculator (For Calculator Allowed Items Only) Grades 6-8	All students may have access to a physical calculator, on items where calculator use is allowed (Session 2, Grades 6-8). The memory of the physical calculator must be cleared before and after testing by the test examiner.	N/A
Color Contrast – Online	The INSIGHT platform allows all students to adjust background or font color based on student needs or preferences.	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.	S102
Color Overlay	All students taking the paper/pencil assessment may have a color transparency placed over the test presented to them based on student needs or preferences.	S103
English Dictionary	All students may have access to a physical English Dictionary for use ONLY on the Writing Prompt in grades 5 and 8. If the English Dictionary is electronic, it may not connect to the internet.	N/A
Grammar Handbook	All students may have access to a physical Grammar Handbook for use ONLY on the Writing Prompt in grades 5 and 8. If the Grammar Handbook is electronic, it may not connect to the internet.	N/A
Graphing Tool	The INSIGHT platform allows all students to use an embedded tool to graph functions.	N/A
Highlighter	The INSIGHT platform allows all students access to a highlighter for marking desired text.	N/A
Keyboard Navigation	The INSIGHT platform allows all students to navigate through the text by using the keyboard.	N/A
Line Guide	The INSIGHT platform allows all students to use an embedded horizontal line that brings focus to a single line of text.	N/A
Magnifier (Zoom)	The INSIGHT platform allows all students to magnify the screen by 1.5 or 2 times the original size.	N/A
Magnification – Assistive Technology	Students with visual impairments may use assistive technology software that magnifies the screen beyond the built in capabilities of the magnifier (zoom) tool. The software can be used in conjunction with the INSIGHT platform. The software must be provided by the district.	S105
Mark For Review	The INSIGHT platform allows all students to mark an item for review.	N/A
Masking – Online	The INSIGHT platform allows all students to block off content that is not of immediate need or that may be distracting by using an embedded masking tool.	N/A
Masking – Paper	All students taking the paper/pencil or Large Print assessments may use a masking tool to block off content that is not of immediate need or that may be distracting.	S107

Table 4.2: MAP Universal Tools (cont.)

Tool	Description	Code
Non-Accommodation Paper Based Assessment	This tool is available for the following scenarios: <ul style="list-style-type: none"> • For students that need to test off-site in a non-district building (e.g. hospital, juvenile facility, etc.), the student may use the Paper/Pencil Based Assessment. • For ELL students who are using the Translation tool (S109) or Read Aloud – Native Language (S111), where the translator needs access to the assessment prior to administration to conduct translation services, choose this tool for just ONE student in the group. That student should still take the assessment online. • For students using Read Aloud – Human Reader (S043) where the examiner needs a paper copy to read from, choose this tool for just ONE student in the group. That student should still take the assessment online. 	S112
Protractor	The INSIGHT platform allows all students to use an embedded protractor on specific items where appropriate.	N/A
Read Aloud (Not Including ELA Reading Passages) – Text-To-Speech	The INSIGHT platform allows all students to have the test directions and items in English Language Arts, Mathematics and Science read aloud via embedded text-to-speech technology. The student can control the speed and volume of the voice. The system also includes a follow along feature, where the word being read is highlighted for the student.	S041
Read Aloud (Not Including ELA Reading Passages) – Human Reader	Any student taking either the online, paper/pencil, Large Print or Braille assessments may have the test directions and items in English Language Arts, Mathematics and Science read aloud by a human reader.	S043
Read Aloud (Not Including ELA Reading Passages) – Assistive Technology	Students with Disabilities that use specific text-to-speech assistive technology software in the everyday classroom may use that technology in conjunction with the INSIGHT testing platform. The software must be provided by the district.	S042
Read Aloud (Not Including ELA Reading Passages) – Native Language	ELL students taking either the online, paper/pencil, Large Print or Braille assessments may have the test directions and items in English Language Arts, Mathematics and Science read aloud in the students’ native language by a human reader.	S111
Ruler	The INSIGHT platform allows all students to use an embedded ruler on specific items where appropriate.	N/A
Scratch Paper (Sticky Notes)	The INSIGHT platform allows all students to use an embedded notepad (called Sticky Notes) to make notes about an item. Electronic notes DO NOT carry over from previous sessions. If a student logs off prior to finishing a session, any electronic notes WILL NOT carry over when the student logs back in. As long as you do not log out or finish the session, they remain.	N/A
Scribe	Students may dictate their responses to a scribe, who must follow the scribing guidelines (http://dese.mo.gov/sites/default/files/asmt-scribing-guidelines.pdf).	S351
Separate Setting	Students may be allowed to test in a separate setting from other students. This includes testing individually or testing as part of a smaller group.	S501
Strikethrough (Cross Off)	The INSIGHT platform allows all students to cross out answer options.	N/A

Table 4.2: MAP Universal Tools (cont.)

Tool	Description	Code
Thesaurus	All students may have access to a physical Thesaurus for use ONLY on the ELA Writing Prompt in grades 5 and 8. If the Thesaurus is electronic, it may not connect to the internet.	N/A
Translation	ELL students may respond to any assessment in their native language. The responses must be translated and transcribed.	S109
Writing Tools	The INSIGHT platform allows all students to use writing tools on specific items where appropriate. The tools include the ability to bold, italicize and underline text, create bullet points, undo/redo typing, and copy/paste text the student has typed.	N/A

Table 4.3: MAP Accommodations for Students with Disabilities

Accommodation	Description	Code
Abacus	Students with this accommodation in their IEP/504 plan may have access to an abacus.	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.	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.	A012
Calculator (For Non-Calculator Allowed Items Only) GRADE 3 ONLY (Invalidation)	Students in 3 rd grade with this accommodation in their IEP/504 plan may have access to a physical calculator, on items where calculator use is not allowed. The memory of the physical calculator must be cleared before and after testing by the test examiner.	A392
Calculator (For Non-Calculator Allowed Items Only) GRADES 4-8	Students in grades 4-8 with this accommodation in their IEP/504 plan may have access to a physical calculator, on items where calculator use is not allowed. The memory of the physical calculator must be cleared before and after testing by the test examiner.	A393
Large Print	Students with visual impairments with this accommodation in their IEP/504 plan may access the assessment via a Large Print version.	A021
Multiplication Table GRADE 3 ONLY (Invalidation)	Students in 3 rd grade with this accommodation in their IEP/504 plan may have access to a single digit multiplication table.	A394
Multiplication Table GRADES 4-8	Students in grades 4-8 with this accommodation in their IEP/504 plan may have access to a single digit multiplication table.	A395
Paper Based Assessment	Students with this accommodation in their IEP/504 plan may take the assessment using the paper/pencil format.	A102
Read Aloud (ELA Reading Passages) – Blind Students	Blind students at any grade level 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.	A046
Read Aloud (ELA Reading Passages) – Text-To-Speech GRADES 3-5 (Invalidation)	Students in grades 3-5 with this accommodation in their IEP/504 plan can have the INSIGHT platform read the ELA Reading Passages via embedded text-to-speech technology. The student can control the speed and volume of the voice. The system also includes a follow along feature, where the word being read is highlighted for the student.	A040
Read Aloud (ELA Reading Passages) – Human Reader GRADES 3-5 (Invalidation)	Students in grades 3-5 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.	A041

Table 4.3: MAP Accommodations for Students with Disabilities (cont.)

Tool	Description	Code
Read Aloud (ELA Reading Passages) – Assistive Technology GRADES 3-5 (Invalidation)	Students in grades 3-5 with this accommodation in their IEP/504 plan, that use specific text-to-speech assistive technology software in the everyday classroom, may use that technology in conjunction with the INSIGHT testing platform to have the ELA Reading Passages read aloud by the software. The software must be provided by the district.	A042
Read Aloud (ELA Reading Passages) – Native Language GRADES 3-5 (Invalidation)	ELL students in grades 3-5 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.	A111
Read Aloud (ELA Reading Passages) – Text-To-Speech GRADES 6-8	Students in grades 6-8 with this accommodation in their IEP/504 plan, can have the INSIGHT platform read the ELA Reading Passages via embedded text-to-speech technology. The student can control the speed and volume of the voice. The system also includes a follow along feature, where the word being read is highlighted for the student.	A043
Read Aloud (ELA Reading Passages) – Human Reader GRADES 6-8	Students in grades 6-8 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.	A045
Read Aloud (ELA Reading Passages) – Assistive Technology GRADES 6-8	Students in grades 6-8 with this accommodation in their IEP/504 plan, that use specific text-to-speech assistive technology software in the everyday classroom, may use that technology in conjunction with the INSIGHT testing platform to have the ELA Reading Passages read aloud by the software. The software must be provided by the district.	A044
Read Aloud (ELA Reading Passages) – Native Language GRADES 6-8	ELL students in grades 6-8 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.	A112
Sign Language	Hearing Impaired students with this accommodation in their IEP/504 plan may have ELA listening items translated into American Sign Language (ASL), Signing Exact English (SEE) or any other form of sign language.	A052
Specialized Calculator (For Calculator Allowed Items Only)	Students with this accommodation in their IEP/504 plan may have access to a specialized calculator, on items where calculator use is allowed (Session 2). 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.	A396
Speech-To-Text – Assistive Technology	Students with this accommodation in their IEP/504 plan, that use specific speech-to-text assistive technology software in the everyday classroom, may use that technology in conjunction with the INSIGHT testing platform. The software must be provided by the district.	A352

Table 4.4: Number and Percentage of Students Using Accommodations or Universal Tools, MAP 2016

Grade	Accommodations	English Language Arts		Mathematics	
		Freq.	Pct.	Freq.	Pct.
3	Braille	3	0%	3	0%
3	Large Print	33	0.05%	33	0.05%
3	Sign Language	16	0.02%	14	0.02%
3	Paper Based Assessment	127	0.18%	136	0.20%
3	Specialized Calculator			5	0.01%
3	Alternate Response Options	46	0.07%	48	0.07%
3	Read Aloud - ELA Reading Passages - Text-To-Speech - GRADES 3-5 ONLY	20	0.03%		
3	Read Aloud - ELA Reading Passages - Human Reader - GRADES 3-5 ONLY	66	0.09%		
3	Read Aloud - ELA Reading Passages - Assistive Technology - GRADES 3-5 ONLY	1	0%		
3	Read Aloud - ELA Reading Passages - Blind Students	5	0.01%		
3	Speech-To-Text - Assistive Technology	9	0.01%	11	0.02%
3	Abacus			21	0.03%
3	Calculator - For Non-Calculator Allowed Items Only - GRADE 3 ONLY			68	0.10%
3	Multiplication Table - GRADE 3 ONLY			82	0.12%
	Universal Tools	Freq.	Pct.	Freq.	Pct.
3	Bilingual Dictionary	13	0.02%	18	0.03%
3	Color Contrast - Paper	5	0.01%	5	0.01%
3	Color Overlay	16	0.02%	15	0.02%
3	Magnification - Assistive Technology	330	0.47%	332	0.48%
3	Masking - Paper	36	0.05%	37	0.05%
3	Read Aloud - Text-To-Speech	18452	26.55%	20039	28.84%
3	Read Aloud - Assistive Technology	43	0.06%	41	0.06%
3	Read Aloud - Native Language	63	0.09%	146	0.21%
3	Scribe	1497	2.15%	1432	2.06%
3	Separate Setting	10416	14.99%	10390	14.95%
3	Translation	38	0.05%	82	0.12%
3	Read Aloud - Human Reader	2701	3.89%	3391	4.88%
3	Non-Accommodation Paper Based Assessment	76	0.11%	88	0.13%

Table 4.4: Number and Percentage of Students Using Accommodations or Universal Tools, MAP 2016 (cont.)

Grade	Accommodations	English Language Arts		Mathematics	
		Freq.	Pct.	Freq.	Pct.
4	Braille	8	0.01%	6	0.01%
4	Large Print	29	0.04%	29	0.04%
4	Sign Language	24	0.04%	12	0.02%
4	Paper Based Assessment	124	0.18%	130	0.19%
4	Specialized Calculator			24	0.04%
4	Alternate Response Options	34	0.05%	34	0.05%
4	Read Aloud - ELA Reading Passages - Text-To-Speech - GRADES 3-5 ONLY	48	0.07%		
4	Read Aloud - ELA Reading Passages - Human Reader - GRADES 3-5 ONLY	48	0.07%		
4	Read Aloud - ELA Reading Passages - Assistive Technology - GRADES 3-5 ONLY	2	0%		
4	Read Aloud - ELA Reading Passages - Blind Students	5	0.01%		
4	Speech-To-Text - Assistive Technology	13	0.02%	14	0.02%
4	Abacus			14	0.02%
4	Calculator - For Non-Calculator Allowed Items Only - GRADES 4-8			1831	2.69%
4	Multiplication Table - GRADES 4-8			2489	3.66%
	Universal Tools	Freq.	Pct.	Freq.	Pct.
4	Bilingual Dictionary	14	0.02%	15	0.02%
4	Color Contrast - Paper	7	0.01%	7	0.01%
4	Color Overlay	14	0.02%	14	0.02%
4	Magnification - Assistive Technology	291	0.43%	294	0.43%
4	Masking - Paper	32	0.05%	31	0.05%
4	Read Aloud - Text-To-Speech	16931	24.91%	18720	27.54%
4	Read Aloud - Assistive Technology	35	0.05%	22	0.03%
4	Read Aloud - Native Language	59	0.09%	145	0.21%
4	Scribe	1462	2.15%	1427	2.10%
4	Separate Setting	10197	15%	10265	15.10%
4	Translation	49	0.07%	87	0.13%
4	Read Aloud - Human Reader	2525	3.72%	3234	4.76%
4	Non-Accommodation Paper Based Assessment	55	0.08%	73	0.11%

Table 4.4: Number and Percentage of Students Using Accommodations or Universal Tools, MAP 2016 (cont.)

Grade	Accommodations	English Language Arts		Mathematics	
		Freq.	Pct.	Freq.	Pct.
5	Braille	7	0.01%	7	0.01%
5	Large Print	34	0.05%	34	0.05%
5	Sign Language	18	0.03%	17	0.03%
5	Paper Based Assessment	112	0.17%	115	0.17%
5	Specialized Calculator			37	0.06%
5	Alternate Response Options	31	0.05%	28	0.04%
5	Read Aloud - ELA Reading Passages - Text-To-Speech -GRADES 6-8	54	0.08%		
5	Read Aloud - ELA Reading Passages - Text-To-Speech -GRADES 3-5 ONLY	54	0.08%		
5	Read Aloud - ELA Reading Passages - Human Reader -GRADES 3-5 ONLY	50	0.07%		
5	Read Aloud - ELA Reading Passages - Assistive Technology -GRADES 3-5 ONLY	1	0%		
5	Read Aloud - ELA Reading Passages - Blind Students	6	0.01%		
5	Speech-To-Text - Assistive Technology	34	0.05%	35	0.05%
5	Abacus			14	0.02%
5	Calculator - For Non-Calculator Allowed Items Only -GRADES 4-8			2519	3.76%
5	Multiplication Table -GRADES 4-8			3018	4.51%
	Universal Tools	Freq.	Pct.	Freq.	Pct.
5	Bilingual Dictionary	118	0.18%	53	0.08%
5	Color Contrast - Paper	19	0.03%	19	0.03%
5	Color Overlay	27	0.04%	29	0.04%
5	Magnification - Assistive Technology	211	0.32%	211	0.32%
5	Masking - Paper	46	0.07%	48	0.07%
5	Read Aloud - Text-To-Speech	15430	23.06%	17202	25.70%
5	Read Aloud - Assistive Technology	31	0.05%	34	0.05%
5	Read Aloud - Native Language	44	0.07%	113	0.17%
5	Scribe	1454	2.17%	1404	2.10%
5	Separate Setting	9692	14.48%	9743	14.56%
5	Translation	33	0.05%	71	0.11%
5	Read Aloud - Human Reader	2203	3.29%	2870	4.29%
5	Non-Accommodation Paper Based Assessment	51	0.08%	62	0.09%

Table 4.4: Number and Percentage of Students Using Accommodations or Universal Tools, MAP 2016 (cont.)

Grade	Accommodations	English Language Arts		Mathematics	
		Freq.	Pct.	Freq.	Pct.
6	Braille	4	0.01%	4	0.01%
6	Large Print	28	0.04%	28	0.04%
6	Sign Language	13	0.02%	13	0.02%
6	Paper Based Assessment	84	0.13%	86	0.13%
6	Specialized Calculator			58	0.09%
6	Alternate Response Options	10	0.02%	9	0.01%
6	Read Aloud - ELA Reading Passages - Text-To-Speech-GRADES 6-8	2447	3.68%		
6	Read Aloud - ELA Reading Passages - Assistive Technology-GRADES 6-8	18	0.03%		
6	Read Aloud - ELA Reading Passages - Human Reader-GRADES 6-8	1637	2.46%		
6	Read Aloud - ELA Reading Passages - Native Language-GRADES 6-8	3	0%		
6	Read Aloud - ELA Reading Passages - Blind Students	6	0.01%		
6	Speech-To-Text - Assistive Technology	44	0.07%	43	0.06%
6	Abacus			15	0.02%
6	Calculator - For Non-Calculator Allowed Items Only-GRADES 4-8			3373	5.07%
6	Multiplication Table-GRADES 4-8			2405	3.62%
	Universal Tools	Freq.	Pct.	Freq.	Pct.
6	Bilingual Dictionary	62	0.09%	66	0.10%
6	Color Contrast - Paper	19	0.03%	19	0.03%
6	Color Overlay	21	0.03%	21	0.03%
6	Magnification - Assistive Technology	256	0.38%	258	0.39%
6	Masking - Paper	19	0.03%	18	0.03%
6	Read Aloud - Text-To-Speech	9551	14.36%	12742	19.16%
6	Read Aloud - Assistive Technology	24	0.04%	51	0.08%
6	Read Aloud - Native Language	34	0.05%	88	0.13%
6	Scribe	831	1.25%	778	1.17%
6	Separate Setting	7506	11.29%	7506	11.29%
6	Translation	38	0.06%	64	0.10%
6	Read Aloud - Human Reader	1200	1.80%	2242	3.37%
6	Non-Accommodation Paper Based Assessment	77	0.12%	84	0.13%

Table 4.4: Number and Percentage of Students Using Accommodations or Universal Tools, MAP 2016 (cont.)

Grade	Accommodations	English Language Arts		Mathematics	
		Freq.	Freq.	Pct.	Pct.
7	Braille	3	0%	3	0%
7	Large Print	42	0.06%	39	0.06%
7	Sign Language	23	0.03%	22	0.03%
7	Paper Based Assessment	168	0.25%	176	0.27%
7	Specialized Calculator			76	0.12%
7	Alternate Response Options	12	0.02%	11	0.02%
7	Read Aloud - ELA Reading Passages - Text-To-Speech-GRADES 6-8	2451	3.71%		
7	Read Aloud - ELA Reading Passages - Assistive Technology-GRADES 6-8	37	0.06%		
7	Read Aloud - ELA Reading Passages - Human Reader-GRADES 6-8	1326	2%		
7	Read Aloud - ELA Reading Passages - Native Language-GRADES 6-8	10	0.02%		
7	Read Aloud - ELA Reading Passages - Blind Students	4	0.01%		
7	Speech-To-Text - Assistive Technology	13	0.02%	10	0.02%
7	Abacus			5	0.01%
7	Calculator - For Non-Calculator Allowed Items Only-GRADES 4-8			3731	5.71%
7	Multiplication Table-GRADES 4-8			1547	2.37%
	Universal Tools	Freq.	Pct.	Freq.	Pct.
7	Bilingual Dictionary	61	0.09%	66	0.10%
7	Color Contrast - Paper	4	0.01%	4	0.01%
7	Color Overlay	11	0.02%	11	0.02%
7	Magnification - Assistive Technology	219	0.33%	220	0.34%
7	Masking - Paper	8	0.01%	7	0.01%
7	Read Aloud - Text-To-Speech	9063	13.70%	12115	18.55%
7	Read Aloud - Assistive Technology	22	0.03%	37	0.06%
7	Read Aloud - Native Language	59	0.09%	123	0.19%
7	Scribe	469	0.71%	418	0.64%
7	Separate Setting	6421	9.71%	6441	9.86%
7	Translation	38	0.06%	76	0.12%
7	Read Aloud - Human Reader	816	1.23%	1561	2.39%
7	Non-Accommodation Paper Based Assessment	74	0.11%	78	0.12%

Table 4.4: Number and Percentage of Students Using Accommodations or Universal Tools, MAP 2016 (cont.)

Grade	Accommodations	English Language Arts		Mathematics	
		Freq.	Pct.	Freq.	Pct.
8	Braille	8	0.01%	8	0.02%
8	Large Print	39	0.06%	34	0.06%
8	Sign Language	17	0.03%	14	0.03%
8	Paper Based Assessment	167	0.25%	168	0.32%
8	Specialized Calculator			73	0.14%
8	Alternate Response Options	16	0.02%	15	0.03%
8	Read Aloud - ELA Reading Passages - Text-To-Speech-GRADES 6-8	2138	3.25%		
8	Read Aloud - ELA Reading Passages - Assistive Technology-GRADES 6-8	29	0.04%		
8	Read Aloud - ELA Reading Passages - Human Reader-GRADES 6-8	1191	1.81%		
8	Read Aloud - ELA Reading Passages - Native Language-GRADES 6-8	19	0.03%		
8	Read Aloud - ELA Reading Passages - Blind Students	7	0.01%		
8	Speech-To-Text - Assistive Technology	16	0.02%	10	0.02%
8	Abacus			10	0.02%
8	Calculator - For Non-Calculator Allowed Items Only-GRADES 4-8			3545	6.71%
8	Multiplication Table-GRADES 4-8			1079	2.04%
	Universal Tools	Freq.	Pct.	Freq.	Pct.
8	Bilingual Dictionary	160	0.24%	87	0.16%
8	Color Contrast - Paper	3	0%	3	0.01%
8	Color Overlay	7	0.01%	7	0.01%
8	Magnification - Assistive Technology	207	0.31%	204	0.39%
8	Masking - Paper	12	0.02%	11	0.02%
8	Read Aloud - Text-To-Speech	8772	13.32%	10117	19.14%
8	Read Aloud - Assistive Technology	30	0.05%	38	0.07%
8	Read Aloud - Native Language	51	0.08%	99	0.19%
8	Scribe	369	0.56%	344	0.65%
8	Separate Setting	6174	9.38%	6006	11.36%
8	Translation	28	0.04%	56	0.11%
8	Read Aloud - Human Reader	734	1.11%	1416	2.68%
8	Non-Accommodation Paper Based Assessment	109	0.17%	108	0.20%

Figure 4.1: Sample Script from *Test Examiner's Manual*

3.1 Specific Administration Information

1. The TE distributes the Student Test Tickets.

You should have received Student Test Tickets for this testing session from your DTC or STC. Before beginning, ensure that you have all of the correct test tickets for the students who will be testing. Note the Test Name and read it aloud where the script states [Test Name].

If students are starting a new session:

SAY You are about to take (the) [Test Name].

If students are resuming a session:

SAY You are about to continue (the) [Test Name].

I will now hand out a Test Ticket to each of you. When you receive your Test Ticket, check that your name appears on the ticket. If your name does not appear, raise your hand.

Distribute test tickets to each student, ensuring that each student is given the correct ticket with his or her name printed on it. Contact your STC or DTC if a needed ticket is missing.

2. The TE directs students to the test sign-in page.

SAY Now select the "MO Online Assessments" icon that appears on your screen.

Students using a laptop or desktop workstation should double click on the icon. Students using a Chromebook or iPad should tap on the icon. Help students if they have trouble activating the icon.



3. The TE instructs students to log in.

SAY At the top of your screen you should see "Missouri Department of Elementary & Secondary Education." Below that, you will see links for the Online Tools Training and Test Sign in for the MAP Grade-Level Assessment Summative test. Please select "Test Sign In."



Figure 4.1: Sample Script from *Test Examiner's Manual* (cont.)

SAY This is the Login screen. Type your username and password from your Test Ticket into the correct boxes on the screen. Then select "Sign In."

Test Ticket information is unique to each student and each session. Assist students as needed; TEs may have to help students type in this information. After the login, make sure all students are on the correct screen. Wait for all students to reach this page.

SAY This is the Welcome screen. Please check that your name appears at the top of the screen. Check that the test name is [Test Name]. Then check that your school, MOSIS ID, and other information are correct. If everything is correct, select "Continue." If your information is not correct, please raise your hand.

If a student's information is incorrect, the TE should contact the STC and/or the DTC.

SAY You are now on the screen that shows the name of the test you are scheduled to take. If you do not see this, please raise your hand. Please select the test link that is shown.

Figure 4.1: Sample Script from *Test Examiner's Manual* (cont.)

SAY Select the NEXT arrow to continue.



SAY The following screens contain the test directions for the test you are taking today. Please read the directions carefully. If you have any questions about the directions, raise your hand. You can find the directions during your test by clicking the HELP button in the top right corner.

SAY During the test, you may see a page with no test questions. Follow the directions on the page to continue taking the test.

If you are unsure of an answer, provide what you think is the best answer; there is no penalty for guessing. If you would like to review that answer at a later time, mark the item for review by clicking the FLAG at the bottom of the screen before going on to the next question. Flagging the item will remind you to go back and decide whether or not you want to change the answer.

You may PAUSE at any point in the test by clicking PAUSE after answering an item. The PAUSE button is used to stop the test. Please raise your hand if you need a break and ask me before you click PAUSE. After pausing, a timer will appear on your screen. After your break, click on the RESUME button to continue. If you pause for more than 20 minutes, you will need to log back in.

Your answers need to be your own work. Please keep your eyes on your own test and remember that there should be no talking.

Read aloud the following paragraph if students are taking Part 1 (Session 1) of an ELA performance task.

SAY Use your scratch paper to take notes you want to keep for Part 2, the essay portion, of this performance task. Any notes you take online using Sticky Notes will not be saved for Part 2.

SAY When you are ready to begin your test, click BEGIN THE TEST.

Figure 4.2: Sample District Report Form



MISSOURI DEPARTMENT OF ELEMENTARY AND SECONDARY EDUCATION
 OFFICE OF COLLEGE AND CAREER READINESS – ASSESSMENT SECTION
QUALITY ASSURANCE – GRADE-LEVEL AND END-OF-COURSE ASSESSMENTS
 SPRING 2016

DIRECTIONS	
<p>IF DISTRICT SELF-MONITORING: The District Test Coordinator completes this form for Quality Assurance (QA) during the Spring 2016 assessment window. Please complete all questions on this form. In addition to completing the questions on this form, the QA visit will include a classroom observation.</p> <p>IF ON-SITE VISIT: A Department of Elementary and Secondary Education (Department) employee or designee completes this form at an onsite Quality Assurance (QA) visit during the Spring 2016 assessment window. Please complete all questions on this form. In addition to completing the questions on this form, the QA visit will include a classroom observation. Note: <u>If the visit is for End-of-Course, the visit MUST be for Algebra I, Biology or English II.</u></p> <p>After the QA process is complete, the District Test Coordinator (Self-Monitoring) OR the Department employee or designee (On-Site Visit) will submit the QA form to the Department by accessing the form electronically at https://www.surveymonkey.com/r/QA-Grade-Level-EOC-Assessments-2016. The questions on that site mirror those on this form. Forms must be entered electronically by June 10, 2016 at the latest.</p> <p>Questions: Contact the Assessment Section at 573-751-3545 or email assessment@dese.mo.gov.</p> <p>Important: To report testing irregularities or concerns immediately to the Department, please contact the Assessment Section at 573-751-3545.</p>	
ABOUT THE VISIT	
<p>As part of the No Child Left Behind (NCLB) Act required monitoring process, the Department uses this document as a tool to monitor and strengthen statewide administration of the Missouri Assessment Program’s Statewide Assessments. The questions are designed to focus attention and help districts examine important areas of assessment training, administration, and test security.</p> <p>The following are components of the self-monitoring and quality assurance processes:</p> <ul style="list-style-type: none"> • documentation of assessment trainings; • interviews with District Test Coordinators and Test Examiners; • classroom visit. 	
DISTRICT INFORMATION	
NAME OF PERSON FILLING OUT THIS FORM:	
DATE OF VISIT:	
SCHOOL DISTRICT NAME:	
COUNTY-DISTRICT CODE:	
BUILDING NAME/CODE:	
DISTRICT TEST COORDINATOR NAME:	
TEST EXAMINER NAME:	
GRADE LEVEL OR EOC CONTENT:	

The Department of Elementary and Secondary Education does not discriminate on the basis of race, color, religion, gender, national origin, age, or disability in its programs and activities. Inquiries related to Department programs and to the location of services, activities, and facilities that are accessible by persons with disabilities may be directed to the Jefferson State Office Building, Office of the General Counsel, Coordinator – Civil Rights Compliance (Title VI/Title IX/504/ADA/Age Act), 6th Floor, 205 Jefferson Street, P.O. Box 480, Jefferson City, MO 65102-0480; telephone number 573-526-4757 or TTY 800-735-2966; email civilrights@dese.mo.gov.

Figure 4.3: Sample Test Book Accountability Form via eDIRECT

Accountability Form

* Indicates required fields

Administration * District School

Show

Enter Counts Summary Status Report

[Instructions](#)

Summary for District 010093 (Spring 2016 Summative Grade-Level Assessments)			
Secure Test Materials		Shipped to School	Returned to DRC
Grade 3 ELA	Braille Test Books		
	Braille Test Administrator's Notes		
	Large Print Test Books	1	1
	Paper-Based PDF (from LP/Braille Kits)	1	1
	Paper-Based PDF (printed from eDIRECT)		1
Grade 3 MA	Braille Test Books		
	Braille Test Administrator's Notes		
	Large Print Test Books	1	1
	Paper-Based PDF (from LP/Braille Kits)	1	1
	Paper-Based PDF (printed from eDIRECT)		1
Grade 4 ELA	Braille Test Books		
	Braille Test Administrator's Notes		
	Large Print Test Books	2	2
	Paper-Based PDF (from LP/Braille Kits)	2	2
	Paper-Based PDF (printed from eDIRECT)		1
Grade 4 MA	Braille Test Books		
	Braille Test Administrator's Notes		
	Large Print Test Books	2	2
	Paper-Based PDF (from LP/Braille Kits)	2	2
	Paper-Based PDF (printed from eDIRECT)		1
	Braille Test Books	1	1

CHAPTER 5: SCORING OF WRITING PROMPTS AND AUTO-SCORED ITEMS

In this chapter, we first describe the scoring process used for the MAP. In particular, we focus on the PAS (Performance Assessment Services) process of handscoring of writing prompts and the automated scoring of technology-enhanced, evidence-based selected response, and short-answer items. At the end of this section, we describe and report the results of the inter-rater reliability study conducted on the handscoring of the MAP writing-prompt items.

Chapter 5 adheres to AERA, APA, & NCME Standards 4.18, 4.20, 6.8, and 6.9. Each of these standards will be presented in the pertinent section of this chapter. Standard 4.18 provides some general guidance for Chapter 5:

Procedures for scoring and, if relevant, scoring criteria, should be presented by the test developer with sufficient detail and clarity to maximize the accuracy of scoring. Instructions for using rating scales or for deriving scores obtained by coding, scaling, or classifying constructed responses should be clear. This is especially critical for extended-response items such as performance tasks, portfolios, and essays. (91)

Chapter 5 explains the procedures used for scoring the MAP writing-prompt items and technology-enhanced, evidence-based selected response, and short-answer items. The scoring criteria used for each item are not presented in this chapter to preserve the integrity of the items for future use.

5.1 Writing Prompt Scoring Process

Writing prompts in ELA Grades 5 and 8 were scored by human readers who were trained by DRC.

5.1.1 Selection of Readers

AERA, APA, & NCME (2014) Standard 4.20 specifies the following:

The process for selecting, training, qualifying, and monitoring scorers should be specified by the test developer. The training materials, such as the scoring rubrics and examples of test takers' responses that illustrate the levels on the rubric score scale, and the procedures for training readers should result in a degree of accuracy and agreement among scorers that allows the scores to be interpreted as originally intended by the test developer. Specifications should also describe processes for assessing scorer consistency and potential drift over time in raters' scoring. (92)

Sections 5.1.1 and 5.1.2 explain how readers are selected and trained for the MAP handscoring process. Section 5.1.3 describes how the scorers are monitored throughout the MAP handscoring process.

DRC strives to develop a highly qualified, experienced core of readers so that the integrity of all projects is appropriately maintained.

Recruitment

The MAP 2016 project was staffed with a large number of readers and team leaders who had previous experience with DRC PAS projects. In addition, DRC worked with Staffordward (a company specializing in staffing practice areas such as clerical and administrative, call centers, accounting, healthcare, scientific, and light-industry) to recruit new team leaders and readers for employment. Recruitment sources included advertisements online and in newspapers in Indianapolis, Indiana, and nearby areas.

DRC requires that all readers and team leaders possess a bachelor's degree or higher. Staffordward screened all new applicants and required them to produce either a transcript or a copy of the degree. Staffordward also required a one- to two-hour interview/screening process. Individuals who did not present proper documentation or had less than desirable work records were eliminated during this process. Staffordward verified that 100% of all potential readers met the degree requirement. All experienced readers and team leaders had already successfully completed the screening process.

The Interview Process

All potential readers completed a pre-interview activity. For some parts of the pre-interview activity, applicants were shown examples of test responses and were supplied with a scoring guide. In a brief introduction, they became acquainted with the application of a rubric. After the introduction, applicants applied the scoring guide to score the sample responses. The applicant's scores were used for discussion during the interview process to determine the applicant's trainability as well as his/her ability to understand and implement the standards set forth in the sample scoring guide.

Staffordward interviewed each applicant and determined the applicant's suitability for a scoring of ELA writing prompts in Grades 5 and 8. Applicants with strong leadership skills were questioned further to determine whether they were qualified to be team leaders.

When Staffordward determined applicants were qualified, the applicants were recommended for employment. Before being hired, all employees were required to read, agree to, and sign a nondisclosure agreement outlining DRC's business ethics and security procedures.

5.1.2 PAS Training Process

AERA, APA, & NCME (2014) Standard 6.9 specifies the following:

Those responsible for test scoring should establish and document quality control processes and criteria. Adequate training should be provided. The quality of scoring should be monitored and documented. Any systematic source of scoring errors should be documented and corrected. (118)

Training Material Development

All materials necessary for scoring were developed by DRC. These materials included the scoring guides and training papers used to complete the handscoring of writing prompts.

Missouri writing prompts were administered for the first time to Missouri students during the Spring 2016 operational test administration. A total of seven writing prompts were administered in Grade 5 and four writing prompts were administered in Grade 8. Once enough student responses were available in Scoreboard, Scoring Directors assembled materials based on the rubrics and presented the materials and annotations to DESE participants in an on-site Rangefinding review.

Rangefinding Activities

Rangefinding was conducted for a single item type—a three-trait extended writing prompt. In preparation for Rangefinding activities, DRC’s scoring directors reviewed approximately 500 to 700 student responses for each writing prompt in order to obtain a representative, in terms of the score points and ways in which students responded to the prompts, sample of papers to be used during Rangefinding. Between 50 and 70 student responses to each prompt were selected for the Rangefinding review.

The Rangefinding took place at DRC’s scoring facilities in Indianapolis, IN from April 27, 2016 to May 4, 2016. A total of nine participants (three from DESE and six from DRC) reviewed all writing prompts in order to ensure consistency between prompt scoring. Sets of annotated student responses were presented to the committee one prompt at a time. Discussions of student responses were conducted in a manner that emphasized the use of rubric and scoring guideline language. Before all responses for an item were reviewed, the PAS scoring directors provided 3 examples of each score point to familiarize the reviewers with the range of responses each prompt elicited. DRC PAS staff recorded the score point decisions made by the DESE representatives in order to include the information in final material preparation. The reasoning/scoring philosophies utilized in arriving at the final scores were also noted in order provide this information during reader training and scoring. After all papers for a prompt were reviewed, the DRC scoring directors and DESE staff collaboratively identified responses that would be utilized as anchors during rater training and scoring. Anchor packets for each prompt consisted of 19 to 20 papers. All score points, the range within a single score point, and most trait score point combinations were represented in the anchor papers. The anchor papers were used in training and qualifying of the readers.

Training and Qualifying Procedures

Handscoring involves training and qualifying team leaders and readers, monitoring scoring accuracy and production, and ensuring security of both the test materials and the scoring facilities. An explanation of the training and qualifying procedures follows.

All readers were trained and qualified on a specific writing prompt to be scored. Readers were trained using the following steps:

- Reviewing writing prompt items
- Reviewing rubrics
- Reviewing anchor papers
- Explaining scoring strategies, followed by a question-and-answer period
- Scoring a training set, followed by sharing established scores
- Qualifying Round 1
- Qualifying Round 2 (if necessary)
- Explaining condition codes and sensitive paper procedures
- Explaining unscannable image procedures

All readers were trained and qualified using the same procedures and criteria. Qualification standards for every writing prompt were predetermined by DESE. In order to score a writing prompt, readers must have met the specific standards for that prompt. Missouri writing prompts were scored using a 4-point rubric for Evidence/Elaboration and Organization/Purpose components and a 2-point rubric for Conventions component. The qualification standards were the following:

- 4-point rubric: 80% exact agreement qualification
- 2-point rubric: 95% exact agreement qualification

Qualification rounds consisted of approximately 10 papers. Readers were given two attempts to qualify on an item. If a reader did not achieve the targeted exact percentage on the first qualification attempt (or had a non-adjacent score), he or she re-trained and was allowed to attempt a second qualification round. Readers failing both qualification attempts were not allowed to score that particular item, but may have been allowed to train and qualify for scoring a different item.

5.1.3 Monitoring the Scoring Process

AERA, APA, & NCME (2014) Standard 6.8 states the following:

Those responsible for test scoring should establish scoring protocols. Test scoring that involves human judgment should include rubrics, procedures, and criteria for scoring. When scoring of complex responses is done by computer, the accuracy of the algorithm and processes should be documented. (118)

This section explains the monitoring procedures that DRC uses to ensure that readers follow established scoring criteria while items are being scored. Detailed scoring rubrics are available for all CR items, which specify the criteria for scoring those CR items.

Daily Accuracy Checks

Throughout the course of handscoring, calibration sets of pre-scored papers (validity papers) were administered daily to each reader to monitor scoring accuracy and to maintain a consistent focus on the established rubrics and guidelines. Validity papers

were selected from live student responses in the Spring 2016 administration. Scoring directors determined the true scores based on papers previously approved by DESE. Readers received 5 validity papers per day. The pre-determined validity paper score was compared to the score the reader assigned. Readers whose daily validity agreement fell below qualification thresholds were counselled and retrained as needed. The scoring platform was designed to allow for routing of these selected responses without readers being able to identify which papers were the validity papers. In other words, validity responses were “blind” to the readers who were not able to distinguish validity responses from live responses.

In addition to the validity process, DRC’s protocol included the use of read-behinds. Team leaders reviewed readers’ scored responses daily to identify a possible reader effect. If team leaders did not agree with any of the scores, they changed the student score to the correct one. Feedback was provided to the readers to rectify any scoring inconsistencies found during the read behind process. Read behind monitoring rates were higher during the initial weeks of scoring and were adjusted according to individual reader’s performance throughout the project. Read behind monitoring rates typically ranged from 1:10 to 1:20.

Approximately 10% of all responses were scored by a second reader to establish inter-rater reliability statistics for all writing prompt items. This procedure is called a “double-blind read,” because the second reader does not know the first reader’s score. Individual reader data, including number of responses scored and exact, adjacent, and nonadjacent agreement rates were reviewed by the scoring directors. Any issues were investigated and resolved by scoring directors in consultation with the scoring project manager.

5.1.4 Security

Security guards were onsite whenever employees were present in the building. All employees were issued photo identification badges and were required to wear them in plain view at all times. Visitors and employees who forgot their badges were issued visitors’ badges and were required to wear them in plain view. All employees and visitors were subject to inspection of their personal effects.

5.2 Technology-Enhanced Item Scoring Process

All technology-enhanced, evidence-based selected response, and short-answer items were processed through DRC’s autoscoring engine and scored according to the assigned scoring rules. DRC ensured that all rubrics and scoring rules were verified for accuracy before scoring any of these items. DRC established an adjudication process for technology-enhanced, evidence-based selected response, and short-answer items to verify that correct answers were identified. DRC’s auto-scoring quality assurance process included the following:

- A scoring rubric was created for each auto-scored item. It was as simple as describing the one and only correct answer for dichotomously scored items (scored as either right or wrong).

- The information from the scoring rubric was entered into the scoring system within the item banking system so that the information resided in one place, along with the item image and other metadata. This scoring information designated specific information that varied by item type. For example, for a drag-and-drop item, the information included which objects are to be placed in which drop region to receive credit.
- The information was then verified by another autoscoring expert.
- After testing started, reports were generated that showed every response, how many students gave that response, and the score the scoring system provided.
- The scoring was then checked against the scoring rubric using two levels of verification.
- If any discrepancies were found, the scoring information was modified and verified again. Scoring was then re-run. This checking and modification process continued until no other issues were found.
- As a final check, a final report was run that showed all student responses, along with their frequencies and received scores.

In case of Braille, large-print or paper-and-pencil non-accommodated form administration, student responses were transcribed (entered) into the online system by a test examiner.

5.3 Multiple-Choice and Multi-Select Item Scoring Process

Responses to multiple-choice and multi-select items were captured during the online test administration. In case of Braille, large-print or paper-and-pencil non-accommodated form administration, student responses to these items were transcribed into the online system by a test examiner.

5.4 Inter-Rater Reliability

Approximately 10% of the writing-prompt responses in ELA Grades 5 and 8 were scored independently by a second reader. The statistics for the inter-rater reliability were calculated for all items at all grades. To determine the reliability of scoring, the percentage of exact agreement and adjacent agreement between the two readers was examined.

For each item, a quadratic weighted kappa statistic was calculated to reflect the level of improvement beyond the chance level in the consistency of scoring. These quadratic weighted kappa values are presented in Table 5.1. To aid in the interpretation of the kappa statistic, the following cutoffs have been suggested (Landis & Koch, 1977; Altman, 1991):

Kappa Value	Strength of Agreement
0	None
<0.20	Poor
0.21–0.40	Fair
0.41–0.60	Moderate
0.61–0.80	Good
0.81–1.00	Very Good

A total of seven writing prompts for Grade 5 and four writing prompts for Grade 8 were scored by human readers across all test forms. Each writing prompt was scored on three components: Conventions, Evidence/Elaboration, and Organization/Purpose. A total of 21 components were scored for Grade 5, and a total of 12 components were scored for Grade 8. As shown in Table 5.1, raters demonstrated at least 99% exact and adjacent agreement for the writing-prompt component scoring. The quadratic weighted kappa values indicate that there was moderate or good inter-rater agreement for all components except for one component in Grade 5 which showed a fair agreement.

5.5 Summary

The information presented in this chapter summarizes the scoring procedures for different types of items and steps taken by DRC to ensure accuracy in the technology-enhanced item scoring and handscoring process. The inter-rater reliability statistics presented in Section 5.4 demonstrate that the handscored items are scored reliably. These efforts by DRC follow multiple best practices of the testing industry and support AERA, APA, & NCME (2014) Standards 4.18, 4.20, 6.8, and 6.9:

- Standard 4.18—Procedures for scoring and, if relevant, scoring criteria, should be presented by the test developer with sufficient detail and clarity to maximize the accuracy of scoring. Instructions for using rating scales or for deriving scores obtained by coding, scaling, or classifying constructed responses should be clear. This is especially critical for extended-response items such as performance tasks, portfolios, and essays.
- Standard 4.20—The process for selecting, training, qualifying, and monitoring scorers should be specified by the test developer. The training materials, such as the scoring rubrics and examples of test takers' responses that illustrate the levels on the rubric score scale, and the procedures for training scorers should result in a degree of accuracy and agreement among scorers that allows the scores to be interpreted as originally intended by the test developer. Specifications should also describe processes for assessing scorer consistency and potential drift over time in raters' scoring.
- Standard 6.8—Those responsible for test scoring should establish scoring protocols. Test scoring that involves human judgment should include rubrics,

- procedures, and criteria for scoring. When scoring of complex responses is done by computer, the accuracy of the algorithm and processes should be documented.
- Standard 6.9—Those responsible for test scoring should establish and document quality control processes and criteria. Adequate training should be provided. The quality of scoring should be monitored and documented. Any systematic source of scoring errors should be documented and corrected.

Table 5.1: Inter-rater Reliability, English Language Arts

Grade	Form	Component	Item #	Score Range	% Exact	% Adjacent	% Exact & Adjacent*	Quadratic Weighted Kappa
5	1	Conventions	55	0–2	77.1%	22.6%	99.7%	0.54
	1	Evidence/Elaboration		0–4	68.2%	30.9%	99.1%	0.67
	1	Organization/Purpose		0–4	68.3%	30.6%	99.0%	0.61
	2	Conventions	55	0–2	83.6%	16.1%	99.7%	0.50
	2	Evidence/Elaboration		0–4	69.9%	29.0%	98.9%	0.66
	2	Organization/Purpose		0–4	68.6%	31.0%	99.6%	0.60
	3	Conventions	55	0–2	71.1%	28.1%	99.2%	0.56
	3	Evidence/Elaboration		0–4	70.2%	29.0%	99.1%	0.69
	3	Organization/Purpose		0–4	70.9%	28.3%	99.2%	0.68
	4	Conventions	55	0–2	80.3%	19.7%	100.0%	0.61
	4	Evidence/Elaboration		0–4	71.4%	28.2%	99.6%	0.72
	4	Organization/Purpose		0–4	74.3%	25.3%	99.6%	0.72
	5	Conventions	55	0–2	72.4%	26.8%	99.2%	0.39
	5	Evidence/Elaboration		0–4	61.8%	36.2%	98.0%	0.64
	5	Organization/Purpose		0–4	65.0%	33.5%	98.5%	0.65
	6	Conventions	55	0–2	83.5%	16.5%	100.0%	0.58
	6	Evidence/Elaboration		0–4	73.6%	26.4%	100.0%	0.75
	6	Organization/Purpose		0–4	74.4%	25.6%	100.0%	0.74
7	Conventions	55	0–2	82.8%	17.2%	100.0%	0.65	
7	Evidence/Elaboration		0–4	70.3%	29.4%	99.7%	0.68	
7	Organization/Purpose		0–4	78.8%	21.0%	99.7%	0.73	
8	1	Conventions	55	0–2	72.6%	25.9%	98.5%	0.56
	1	Evidence/Elaboration		0–4	69.0%	30.4%	99.4%	0.69
	1	Organization/Purpose		0–4	71.0%	28.4%	99.4%	0.68
	2	Conventions	55	0–2	85.0%	14.8%	99.8%	0.49
	2	Evidence/Elaboration		0–4	63.2%	35.7%	99.0%	0.68
	2	Organization/Purpose		0–4	66.9%	31.7%	98.6%	0.69
	3	Conventions	55	0–2	85.4%	14.4%	99.7%	0.42
	3	Evidence/Elaboration		0–4	66.4%	32.5%	98.9%	0.65
	3	Organization/Purpose		0–4	66.4%	32.7%	99.1%	0.63
	4	Conventions	55	0–2	86.7%	13.1%	99.9%	0.45
	4	Evidence/Elaboration		0–4	70.1%	29.5%	99.6%	0.74
	4	Organization/Purpose		0–4	69.7%	30.0%	99.7%	0.73

* The percent perfect & adjacent may not add up to 100 due to the percent discrepant (the cases where the assigned score varied by more than 1 point).

CHAPTER 6: OPERATIONAL DATA ANALYSES

This chapter of the MAP Technical Report describes the analyses that occurred on the ELA and Mathematics operational data. These analyses include a classical item analysis and examination of the raw scores and an item response theory (IRT) analysis involving calibration and vertical scale development. These analyses were conducted using the calibration sample, and some were replicated when complete operational data became available.

In this section, we first present the classical item statistics, including aggregate raw score statistics and individual item-level statistics. Next, we discuss the IRT models used for calibrating the data and address the purpose of data calibration and scaling for each content area. The calibration samples are presented next, followed by the data calibration results, including the model-data fit for the Missouri data. If the IRT models fit the empirical item response distributions for the population (i.e., Missouri students) for which generalizations are made, then the claim is strengthened that the scores are valid indicators of an underlying ability. The lowest obtainable scale score (LOSS) and highest obtainable scale score (HOSS) for the MAP tests are presented.

Chapter 6 demonstrates adherence in the MAP program to AERA, APA, & NCME (2014) Standards 1.8, 4.14, 5.2, and 7.2. Each standard will be explicated within the appropriate section of this chapter. Standard 7.2 provides general guidance that is relevant to this chapter:

The population for whom a test is intended and specifications for the test should be documented. (126)

In Section 6.3, we will discuss the calibration sample and compare it to the general population. Chapter 3 presents the test specifications. Information regarding reported data is discussed in detail in Chapter 7.

6.1 Classical Item Statistics

In this section, we present summary test statistics for ELA and Mathematics. This is followed by item-level statistics for each grade/content area of MAP. These statistics were produced using sample data.

6.1.1 Test-Level Statistics

Tables 6.1 and 6.2 present the number of items and score points on each test, as well as the mean and standard deviation of the raw scores and p -values as well as the mean and standard deviation of the item-total test correlations for each test form at each grade level of ELA and Mathematics, respectively. The mean p -value is the average of all item p -values of a specific grade/content area and it is explained in the next section. The mean item-total test correlation is the average of item-total test correlations for all items of a specific grade/content area.

6.1.2 Item-Level Statistics

Tables 6.3 through 6.8 present the item statistics for each operational item by grade for ELA. The data for Grades 5 and 8 ELA writing prompts are shown for the three components that were scored separately. Tables 6.9 through 6.14 show the operational item statistics for each item by grade for Mathematics. The tables include form number, session number, item number on the test, p -value, item-total correlation (R_{it}), omit rates, and adjusted N count for each item by grade and content area. Note that the item numbers in these tables are not always consecutive because statistics for the field test items that were embedded in the ELA and Mathematics tests are not included in the tables.

p-value: The p -value is a measure of item difficulty. For a dichotomous item, the p -value is calculated from the number of students who correctly responded to an item divided by the total number of students who attempted the item. The value is reported as a proportion. For a constructed-response item, the p -value is calculated from the average score for the item divided by the maximum points possible and is also reported as a proportion.

In terms of p -values, test scores tend to be more precise when their average p -values are in the mid-0.50s to low 0.70s. However, in building a criterion-referenced test, it is important to select items on the basis of content rather than on purely statistical criteria. As shown in Tables 6.1 and 6.2, the average p -values associated with the ELA forms range from 0.53 (Grade 3) to 0.63 (Grade 5) and the average p -values associated with the Mathematics forms range from 0.36 (Grade 8) to 0.56 (Grade 3). A trend of higher mean p -values for lower grade levels and lower mean p -values for higher grade levels was observed for Mathematics.

It is important that one examines the range of p -values and not just the average p -value to determine whether a test measures well. It is desirable for the test to measure well throughout the range of skills present at a given grade. That is, it is important that the items measure the performance of both low-scoring and high-scoring students as well as the performance of students in the center of the distribution. Having a range of p -values also helps to prevent floor and ceiling effects so that the test does not have large numbers of students at the minimum or maximum possible scores. The ELA forms have items with p -values ranging from 0.06 to 0.93 (see Tables 6.3 through 6.8) across all grade levels. The p -values on the Mathematics forms range from 0.03 to 0.92 (see Tables 6.9 through 6.14). Items with low p -values were reviewed by test development experts after the test administration to confirm that the items function as intended. Overall, this broad range of p -values indicates that the items measure well throughout the range of skills and abilities at a given grade.

Item-Total Correlations: An item-total correlation is the correlation between an item and the total test score, where the item score is excluded from the total score. It indicates how well an item differentiates between low- and high-achieving students. In general, items with correlations below 0.20 are said to be poorly discriminating. Over 95% of ELA items and 90% of Mathematics items in the MAP had item-test

correlations above this threshold. Any item with an item-total correlation below the 0.20 threshold was further analyzed to ensure that the item was correctly keyed.

Omit Rates: The omit rate for each item indicates the percentage of students who did not answer the item. Omit rates can be used to examine possible speededness issues on tests. A test may be speeded if students do not have adequate time to answer all questions on the test. As a rule of thumb, an item is said to have a high omit rate if more than 5% of students failed to respond to the item.

This examination of omit rates complies with Standard 4.14 of the AERA, APA, & NCME (2014) *Standards for Educational and Psychological Testing*. This standard is concerned with the speededness of a test:

For a test that has a time limit, test development research should examine the degree to which scores include a speed component and should evaluate the appropriateness of that component, given the domain the test is designed to measure. (90)

The results presented in Tables 6.3 through 6.14 show that omit rates were under 2.7% for ELA and under 1.5% for Mathematics items.

6.2 Vertical Scaling Design

A common item-linking design was implemented to facilitate Missouri vertical scale development. In this design, samples of students were administered test forms with embedded test items from adjacent grades. These off-grade level items were used for linking adjacent grades but did not contribute to the test score. Using off-grade level items for linking adjacent grades is possible because of normal overlap in content and difficulty across adjacent grades. The content of the off-grade level items conformed to the Missouri Learning Standards for each grade. The linking items were selected to ensure that the tests for all grades were anchored and continuous, and conformed to the learning standards assessed in Grades 3–8 ELA and Mathematics tests.

For ELA, either 10 or 11 items below and above grade level were administered to student samples in Grades 4 through 7. Grade 3 students were administered above grade level items only and Grade 8 students were administered below grade level items only. The off-grade level items were administered in six different forms in Grades 4–7 and in three different forms in Grades 3 and 8.

For Mathematics, ten items below and above grade level were administered to student samples in Grades 4 through 7. The exception was Grade 6, in which students were administered eight items from Grade 7. Similar to the ELA design, Grade 3 students were administered above grade level items and Grade 8 students were administered below grade level items only. The off-grade level items were administered in four different forms in Grades 4–7 and in two different forms in Grades 3 and 8. All test forms for ELA and Mathematics were administered in a spiraled manner.

The off-grade level items that were to be administered in each grade were selected and their content was matched to the on-grade operational test blueprint as closely as possible while at the same time being appropriate for grades above or below.

For ELA, vertical linking items were selected from three content categories: Reading, Research, and Writing. Due to the test structure and limitations in regard to the total number of items that could be administered to students, no items were selected from the Listening part of the test. Because Listening items are administered in a separate test session and at least four items should be administered with one Listening passage, adding an additional Listening passage to the ELA test would increase the test time beyond acceptable by DESE and recommended by Missouri TAC test time schedule.

For Mathematics, with a few exceptions, the items were selected from all content categories. The exceptions were the Geometry and Statistics and Probability categories in Grade 6, and the Geometry category in Grade 7. No Geometry or Statistics and Probability items from Grade 6 were selected for administration in Grade 5 because these items required students to use a calculator, and calculators were not allowed in the Grade 5 test. No Geometry items from Grade 7 were selected for administration in Grade 6 because it was determined by the content experts that none of the Grade 7 Geometry items were appropriate for Grade 6.

Tables 6.15 and 6.16 show content alignment of operational on-grade level tests with off-grade level linking items across ELA and Mathematics tests, respectively. The percentage of points obtainable across ELA and Mathematics strands (content categories) in the operational assessments as well as the percentage of points obtainable in the vertical linking sets are presented. It should be noted for Mathematics that, while the domain names change between Grade 5 and Grade 6, there is continuity of the construct being measured by the Mathematics assessment between all grades. The diagram on the next page shows the progression of the mathematics concepts in the Common Core Standards environment and the continuity of the domains in mathematics. The diagram was constructed based on the work of the University of Arizona's, Institute for Mathematics and Education (<http://math.arizona.edu/~ime/progressions/>). The Missouri Learning Standards are the same as Common Core Standards.

Missouri Learning Standards - Mathematics Standard Progression

Grades					
3	4	5	6	7	8
Number and Operations in Base Ten			Ratios and Proportional Relationship		
Number and Operations - Fractions			The Number System		
Operations and Algebraic Thinking			Expressions and Equations		
					Functions
Geometry					
Measurement and Data			Statistics and Probability		

6.2.1 Evaluation of Student Performance on Linking Items

Classical item analysis was performed on the data used for vertical scale development. Tables 6.17 to 6.21 present the item analysis results for on-grade level operational items and the same items administered off-grade level for ELA, and Tables 6.22 to 6.26 show similar item analysis results for Mathematics. The following information is provided in Tables 6.17 to 6.26: item type, item classification by test strand (or content category), item difficulty (p -value) on- and off-grade level, item-total test correlation on- and off-grade level, omit rates on- and off-grade level, and the number of students who took each item on- and off-grade level. The table headers are labeled as follows: PvalGx is the item p -value, RitGx is the item-total test correlation, OmitGx is the proportion of students who omitted the item, and NobsGx is the total number of students who took the items (x is the grade level in which the item was administered).

As demonstrated by average p -values of the ELA linking sets in Tables 6.17 to 6.21, when items from adjacent grades were administered to students in a given grade level, the students performed, on average, better on the items from the lower grade level than on the items coming from the higher grade level. The exception to this pattern was Grade 5 students performing, on average, slightly better on Grade 6 items than Grade 6 students. When looking at the average mean item-total test correlations, the items displayed, on average, higher discrimination when administered on-grade level compared to the administration of the same items in adjacent grades. The exception was the average item-total test correlation of Grade 6 items in the vertical linking set administered to Grade 7 students, which was the same in both grades.

A similar pattern was observed for Mathematics vertical linking sets (Tables 6.22 to 6.26). Students in a given grade level tended to perform better, on average, on the below-grade level Mathematics items compared to the above-grade level items. The exception was the linking set of Grade 8 items administered to Grade 7 students on which Grade 7

students performed, on average, better than Grade 8 students. Evaluation of the average item-total test correlations of the linking sets revealed that the items were more discriminating when administered on grade level compared to being administered off-grade level. The exception was the average item-total test correlation of set of Grade 3 items administered to Grade 4 students which was slightly higher for Grade 4 students.

The proportions of students who omitted linking items were very small and comparable in the on- and off-grade level administration for both ELA and Mathematics.

6.3 Item Response Theory

Item parameters for items contained in ELA and Mathematics tests were estimated using a marginal maximum-likelihood procedure to simultaneously estimate the item parameters for multiple-choice (MC) and constructed-response (CR) items using the 3-parameter logistic (3PL) model and 2-parameter partial credit (2PPC) IRT model (Bock & Aitkin, 1981; Thissen, 1982). All non-MC items were treated as CR items in the calibration. Under the 3PL model, the probability that a student with trait or scale score θ will respond correctly to multiple-choice item j is

$$P_j(\theta) = c_j + (1 - c_j) / [1 + \exp(-1.7a_j(\theta - b_j))].$$

In the equation, a_j is the item discrimination, b_j is the item difficulty, and c_j is the probability of a correct response by a very low-ability student. Under the 2PPC model, the probability that a student with trait or scale score θ will respond in category k to partial-credit item j is

$$P_{jk}(\theta) = \exp(z_{jk}) / \sum_{i=1}^{m_j} \exp(z_{ji}),$$

where $z_{jk} = (k-1)f_j - \sum_{i=0}^{k-1} g_{ji}$, and $g_{j0} = \mathbf{0}$ for all j .

The summary output of the 3PL and 2PPC models is in two different metrics. The location and discrimination parameters for the MC items are in the traditional 3PL metric and are labeled b and a , respectively. In the 2PPC model, f (alpha) and g (gamma) are analogous to b and a , where alpha is the discrimination parameter and gamma over alpha (g/f) is the location where adjacent trace lines cross on the ability scale. Because of the different metrics used, the 3PL parameters b and a are not directly comparable to the 2PPC parameters f and g ; however, they can be converted to a common metric. The two metrics are related by $b = g/f$ and $a = f/1.7$ (Burket, 2002). As a result of this procedure, the MC and CR items are placed on the same scale. Note that for the 2PPC model, there are m_j-1 (where m_j is a score level j) independent g 's and one f , for a total of m_j independent parameters estimated for each item, while there is one a and one b per item in the 3PL model.

Using the 3PL/2PPC model for estimation of ELA and Mathematics item parameters was consistent with the past methodology (except for administration year 2014–15) implemented for these content areas. Item parameters estimated after the 2015–16 ELA and Mathematics test administration were used to score Missouri students who took these tests.

6.3.1 Calibration Sample

In this section we describe the calibration sample in adherence to Standard 1.8 of the AERA, APA, & NCME (2014) *Standards*:

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 socio-demographic and developmental characteristics. (25)

ELA and Mathematics test data were analyzed using calibration samples acquired after the testing window ended. The calibration samples contained close to 100% of the student data. Only a very small number of students, for which the completed test data were not available at the time of the data analysis, were excluded from the data analysis. Tables 6.27 and 6.28 show the characteristics of the calibration samples compared to the Spring 2016 census data for ELA and Mathematics, respectively. The characteristics of the Spring 2016 calibration sample were very similar to that of the Spring 2016 Missouri population.

6.3.2 Data Calibration and Scaling

The purpose of scaling a test is to enhance the validity of the test score interpretation by increasing the comparability of test takers' scores. In this section, we explicate the way in which the MAP scales are produced to comply with Standard 5.2 of the AERA, APA, & NCME (2014) *Standards*, which states the following:

The procedures for constructing scales used for reporting scores and the rationale for these procedures should be described clearly. (102)

The MAP scores are produced using the 3PL/2PPC IRT models (explained previously) which assume that each of the items and tasks is an independent indicator of the underlying ability governing the propensity for students to answer an item correctly (or with greater correctness, in the case of the multilevel constructed-response items).

Calibrating and scaling ELA and Mathematics data were performed using PARDUX software (Burket, 2002). PARDUX is designed to produce a single scale by jointly analyzing data resulting from students' responses to both MC items and CR items. In PARDUX, items are calibrated based on IRT, using the 3PL model (Lord & Novick, 1968) for MC items and the 2PPC model (Yen, 1993) for CR items.

In the process of item calibration, the number of estimation cycles was set to 200 with a convergence criterion of 0.001 for all content areas. The maximum value of the a -parameter was set to 5.0, and the range for the b -parameter was set between -7.5 and 7.5 . For all items, the estimated a - and b -parameters were within the prescribed parameter ranges. It should be noted that there was a small number of items with the default value for the c -parameter on the ELA and Mathematics tests. When the PARDUX program encounters difficulty estimating the c -parameter, it assigns a default c -parameter value of 0.20.

New scales were established for ELA and Mathematics after the 2015–16 test administration. The test forms in adjacent grade levels of each content area shared common items and were calibrated concurrently at that grade level.

Concurrent calibration is a method that allows for establishing the common scale in a single step—the calibration phase—by simultaneously estimating parameters for all items at all grades. The estimated parameters in the theta metric are on the same scale. In addition, population ability estimates are obtained for multiple groups. The population mean and standard deviation for the base grade are then used to compute the $M1$ and $M2$ transformation parameters to convert the parameter estimates of the other grades onto the common scale score metric. Tables 6.29 and 6.30 present the sample mean and standard deviation ability estimates for multiple groups, as obtained from the concurrent calibration for ELA and Mathematics, respectively.

After placing item parameters on common scales for ELA and Mathematics, the Grade 5 theta means were re-estimated using only item parameters for on-grade level items. These estimates were then used to identify transformation constants that would allow the transformation of item parameter estimates in a theta metric into a scale score metric and produce a scale with a target mean of 500 and a target standard deviation of 50 for Grade 5 of both ELA and Mathematics assessments.

The following formulae were used to compute transformation constants for the transformation of the base grade item parameter estimates from the theta metric to the scale score metric:

$$M1 = \frac{SD_{ss,5}}{SD_{\theta,5}}, \text{ and}$$

$$M2 = \bar{X}_5 - (\bar{\theta}_5 * M1)$$

where:

$M1$ and $M2$ are the transformation constants,

$SD_{ss,5}$ is the target standard deviation in the scale score metric for the base grade,

$SD_{\theta,5}$ is the estimated standard deviation in the theta metric for the base grade,

$\bar{\theta}_5$ is the estimated population mean in the theta metric for the base grade, and

\bar{X}_5 is the target mean in the scale score metric for the base grade.

The $M1$ and $M2$ transformation constants were then applied to item parameter estimates in the theta metric to transform them into a scale score metric using the following formulas:

$$\begin{aligned}A_{ss} &= a_{\theta} / M1 \\B_{ss} &= M1 * b_{\theta} + M2 \\F_{ss} &= f_{\theta} / M1 \\G_{ss} &= g_{\theta} + (f_{\theta} / M1) * M2 \\C_{ss} &= c_{\theta}\end{aligned}$$

where:

A_{ss} is a discrimination parameter in the scale score metric for MC items,
 B_{ss} is a difficulty parameter in the scale score metric for MC items,
 F_{ss} is a discrimination parameter in the scale score metric for CR items,
 G_{ss} is a difficulty for category m_j in the scale score metric for CR items,
 a_{θ} is a discrimination parameter in the original theta metric for MC items,
 b_{θ} is a difficulty parameter in the original theta metric for MC items,
 f_{θ} is a discrimination parameter in the original theta metric for CR items,
 g_{θ} is a difficulty level for category m_j in the original theta metric for CR items, and
 C_{ss} and c_{θ} are a guessing parameter in the original theta metric.

Table 6.31 presents the initial population mean and standard deviation estimates and the transformation constants used for scale transformation of the base grade (5) for ELA and Mathematics.

Because the parameter estimates in the theta metric were estimated for all grades (within each content area) and were already on the same scale, the same $M1$ and $M2$ transformation parameter constants were applied to all (Grades 3 through 8) item parameter estimates.

6.3.3 Model Fit

A procedure developed by Yen (1981) was used to assess model-to-data fit for all test items. In this procedure, students are rank ordered on the basis of their $\hat{\theta}$ values and sorted into ten cells, with 10% of the sample in each cell. Each item j in each decile i has a response from N_{ij} examinees. The fitted IRT models are used to calculate an expected proportion E_{ijk} of examinees who respond to item j in category k . The observed proportion O_{ijk} is also tabulated for each decile. The fit index for item i is

$$Q_{1j} = \sum_{i=1}^{10} \sum_{k=1}^{m_j} \frac{N_{ij} (O_{ijk} - E_{ijk})^2}{E_{ijk}}$$

Q_{1j} should be approximately chi-square distributed with degrees of freedom (DF) equal to the number of “independent” cells, $10(m_j - 1)$, minus the number of estimated

parameters. For the 3PL model, $m_j = 2$, so $DF = 10(2 - 1) - 3 = 7$. For the 2PPC model, $DF = 10(m_j - 1) - m_j = 9m_j - 10$. Since DF differs between MC and CR items and between CR items with different score levels, m_j , Q_{1j} is transformed, yielding the test statistic

$$Z_j = \frac{Q_{1j} - DF}{\sqrt{2DF}}.$$

This statistic is useful for flagging items that fit relatively poorly. Z_j is sensitive to sample size, and cutoff values for flagging an item based on Z_j have been developed and were used to identify items for the item review. The cutoff value is $(N/1500 \times 4)$ for a given test, where N is the sample size.

Of the 337 ELA items included in the concurrent calibration, 9 items were flagged for poor fit. Of the 9 flagged items, 2 items were linking items. Of the 264 Mathematics items included in the concurrent calibrations, 4 items were flagged for poor fit. Of these 4 items, 1 was a linking item.

Tables 6.32 and 6.33 show the chi-square statistic and the Z -statistic for each flagged item for ELA and Mathematics, respectively. The average percentage correct across ten cells of observed percentage correct and predicted percentage correct is also provided. The difference between the observed and predicted percentages provides an indication of how well the modeled response curves reflect the empirical curves.

Each flagged item was examined more closely by studying its item characteristic curve (ICC) at each nonzero score point. The ICC models the relationship between the examinees' performance on an item and the examinees' underlying ability. In almost all cases for which model misfit occurs, relatively few students occupy the scale score ranges at the lower and upper tails of the distribution. Poor fit may occur in one of these regions of the underlying ability distribution where there are relatively few students. The model tends to show good model-data fit for the flagged items in the middle of the theta distribution, where the majority of students perform.

It is important to notice that while items may be flagged for misfit, these flags may not be of practical importance. Misfitting items that have content validity are often retained for use in one assessment and monitored over a period of usage. A large number of misfitting items in an assessment would indicate that caution should be exercised in the interpretation of the overall score.

In summary, no items flagged for poor fit were excluded from ELA and Mathematics test scaling. Operational items flagged for poor fit contributed to student scores. Linking items flagged for poor fit were retained as part of the linking sets after determining that off-grade level item administration was not a cause of poor fit. On-grade level data calibrations were conducted, and the results indicated that the flagged linking items displayed poor fit when calibrated on-grade level.

6.3.4 Vertical Scale Evaluation

In this section, the results of the vertical scaling of ELA and Mathematics are described and evaluated. The scale evaluation includes examination of the pattern of grade-to-grade growth (means), grade-to-grade variability (standard deviations), and separation of scale score distributions across grades as well as the test characteristic curves (TCCs) and standard error (SE) curves. Only on-grade level operational test items were used in the computation of statistics used in scale evaluation.

ELA Scale

Table 6.34 shows the scale score means, standard deviations, and change in mean from previous grade for ELA. As seen in Table 6.34, the ELA scale score means increase as grade level increases. The standard deviations range from 44.4 for Grade 6 to 53.5 for Grade 7 and do not show a consistent pattern across grades. The mean difference between grades is not uniform across grade levels. Most growth across grades is observed between Grades 3 and 4, followed by growth between Grades 4 and 5 and between Grades 7 and 8. Less growth is observed between Grades 5 and 6 and between Grades 6 and 7.

In addition to the evaluation of grade-to-grade growth using scale score mean changes across grades, the pattern of scale scores at the 10th, 25th, 50th, 75th, and 90th percentiles was examined across grades. Ideally, the scale score associated with each percentile will increase from grade to grade. Table 6.35 summarizes this information for ELA. The data in Table 6.35 show that the scale scores increase as the percentile and grade level increase showing continuous progress upward from Grades 3 through 8 at all selected percentiles except for the 10th percentile for Grades 6 and 7. Higher scale scores for Grade 6 at the lower ability end indicate that lower-ability Grade 6 students may perform better on the ELA assessment compared to lower-ability Grade 7 students.

Figures 6.1 and 6.2 show the TCCs and SE curves for ELA tests. In these figures, in order to maintain the graph clarity, only one Grade 5 test form (Form 1) and one Grade 8 test form (Form 1) are presented. As shown in Figure 6.1, the ELA test TCCs, with the exception of TCCs for Grades 3 and 4, are generally ordinal across grades, indicating that the test difficulty increases as the grade level increases. Grades 3 and 4 TCCs are overlapping or crossing at the upper end of the ability scale, indicating comparable difficulty or the Grade 3 test being more difficult compared to the Grade 4 test for the highest-ability students. Grades 6, 7, and 8 TCCs are either overlapping or crossing at the lower end of the ability scale, indicating that these assessments are of comparable difficulty for the lowest-ability students. However, it should be noted that even if the adjacent grade assessments are of comparable difficulty for some students, the higher grade students are of higher ability as demonstrated by the increasing scale score means across grades in Table 6.34 and the increasing scale scores associated with selected percentiles (refer to Table 6.35).

The standard error curves presented in Figure 6.2 are U-shaped (as expected), indicating smaller errors around ability estimates roughly in the middle of the scale score distribution. The SE is expected to be higher at the top and bottom ends of the ability

scale, where fewer items measuring very high- and very low-achieving students are found. Overall, the standard errors around the scale score were found to be reasonable for ELA tests.

Seven forms, each containing a different writing prompt, were administered to Grade 5 students. The Grade 5 TCCs for the seven test forms, presented in Figure 6.3, demonstrate good alignment of the form difficulty. The standard error curves for the Grade 5 test forms, presented in Figure 6.4, are also aligned.

Four forms, each containing a different writing prompt, were administered to Grade 8 students. The Grade 8 TCCs for the four test forms, presented in Figure 6.5, show good alignment of the form difficulty. The standard error curves for the Grade 8 test forms, presented in Figure 6.6, are also aligned.

Mathematics Scale

A growth pattern similar to the one described in ELA is observed for Mathematics from Grade 3 to Grade 7. The scale score means increase as the grade increases, and most growth is observed between Grades 3 and 4, followed by growth between Grades 4 and 5. Less growth is observed between Grades 5 and 6 and between Grades 6 and 7. Unlike for ELA, almost no growth (as demonstrated by Grades 7 and 8 scale score means in Table 6.36) was observed between Grades 7 and Grade 8. The standard deviations ranged from 48.0 for Grade 6 to 55.9 for Grade 4.

As shown in Table 6.37, there is an upward progression of scale scores across Grades 3 through 7 and all percentiles. The evaluation of growth between Grades 7 and 8 revealed a different pattern. While grade-to-grade growth between the two highest grades was observed at the 25th and 50th percentiles, higher scale scores for Grade 7 were found at and below the 10th percentile and at and above the 75th percentile than for Grade 8. This scale score pattern between Grades 7 and 8 indicates that, while lower-to-middle-ability Grade 8 students performed better on the Mathematics assessment than lower-to-middle-ability Grade 7 students, the opposite may be true for the higher-ability students. While this is not an expected growth pattern, a contributing factor may be the fact that the population of Grade 8 students who are administered the Mathematics tests is not fully comparable to the Grade 7 population from the previous administration year. Rather, the Grade 8 Mathematics test takers are a subpopulation of the Grade 7 students who took the Mathematics test in the previous administration year (Spring 2015).

Missouri Grade 8 students have an option of participating in the Algebra 1 assessment instead of the Mathematics assessment. Annually, approximately 20% of Grade 8 students participate in the Algebra 1 assessment. It was hypothesized that a subpopulation of students taking the Algebra 1 test is of higher ability than the total student population for Grade 8. This hypothesis was tested through evaluation of the Grade 8 students' performance on the Grade 7 Mathematics test in the previous administration. Grade 8 student records from the Spring 2016 administration of the Mathematics assessment were matched to the Grade 7 Mathematics data from the Spring 2015 administration using

unique Missouri Student Information System (MOSIS) IDs that students retain as they progress from grade to grade. Following the data matching, Grade 7 Mathematics mean scale scores and scale score standard deviations were computed for the following groups of students: the total population of students who took the Grade 7 Mathematics test in Spring 2015, a subgroup of students who took the Grade 7 Mathematics test in Spring 2015 and the Grade 8 Mathematics test in Spring 2016 (Matched Students), and a subgroup of students who took the Grade 7 Mathematics test in Spring 2015 but were not found in the Spring 2016 Grade 8 Mathematics data set (Unmatched Students).

The Grade 7 Mathematics scale score summary statistics for these three groups of students are presented in Table 6.38.

Certain limitations of matching students solely on the MOSIS ID and interpreting the data in Table 6.38 should be noted. First, it is possible that not all Unmatched Students took the Algebra 1 test in the 2015–16 school year. Some of them might have moved out of the state or transferred to a nonpublic institution, and, as such, they would not be in the Spring 2016 Grade 8 Mathematics test data. Second, while the Spring 2016 data calibration sample was close to 100% of the student population, the calibration sample did not contain a full 100% of the student records.

It should also be noted that there were 3,268 unique MOSIS IDs in the Spring 2016 Grade 8 Mathematics student data that were not found in the Spring 2015 Grade 7 Mathematics student data, possibly indicating new students in Grade 8 who were either not in the Missouri public school system in Spring 2015 or did not take Grade 7 Mathematics in Spring 2015. The previous performance on the Mathematics test is not available for these students. Also, the 2015–16 Algebra 1 test data were not available to DRC to confirm which students took the Algebra 1 test in the 2015–16 school year.

However, even given these limitations, it was observed that students who took the Grade 7 Mathematics test in Spring 2015 and the Grade 8 Mathematics test in Spring 2016 (Matched Students) tended to be of a lower ability compared to the total population of students who took the Grade 7 Mathematics test in Spring 2015 as measured by the Spring 2015 Grade 7 Mathematics test. The mean scale score for the Spring 2016 Grade 8 students (Matched Students) on the Spring 2015 Grade 7 test was 2509.5 scale score points, while the corresponding mean for the total population of Grade 7 students was 2529.79 scale score points. The mean scale score of Unmatched Students (most of whom were assumed to be taking the Algebra test in the 2015–16 school year) was 2594.12, which was close to one standard deviation above the mean scale score of Matched Students.

This finding appears to support the hypothesis of attrition of higher-ability Grade 8 students from MAP Mathematics. Removing higher-ability students from the population of Grade 8 students taking the Mathematics test, may subsequently contribute to the little or no growth between Grades 7 and 8 that was observed at the upper end of the ability scale.

The Spring 2016 Grade 8 Mathematics results are also, to some degree, supported by the Spring 2015 results. No growth was observed at any of the selected percentiles between Grades 7 and 8 after the Spring 2015 Mathematics test administration; the mean scale score for these grades at all selected percentiles did not differ by more than one scale score point in either direction (see Table 7.12 on page 162 of the Spring 2015 MAP technical report posted at <https://dese.mo.gov/sites/default/files/asmt-gl-2015-tech-report.pdf>).

Figures 6.7 and 6.8 show the TCCs and SE curves for Mathematics tests. As observed in Figure 6.7, the TCCs for Mathematics, with the exception of the Grades 5 and 6 TCCs, are ordinal, indicating increasing difficulty of the assessment as the grade level increases. The crossing of the Grades 5 and 6 TCCs indicates that the Grade 6 assessment is still more difficult for the middle-to-higher-ability students compared to the Grade 5 assessment but appears to be easier than the Grade 5 test for the lower-ability students. However, it should be noted that despite the Grades 5 and 6 tests being of similar difficulty, the Grade 6 students are of higher ability than the Grade 5 students (as demonstrated by the higher scale scores for Grade 6 compared to the scale scores for Grade 5 at selected percentiles; see Table 6.36).

The standard error curves presented in Figure 6.8 are U-shaped (as expected), indicating smaller errors around ability estimates roughly in the middle of the scale score distribution. The SE is expected to be higher at the top and bottom ends of the ability scale, where fewer items measuring these students are found. Overall, the standard errors around the scale score were found to be reasonable for Mathematics tests.

Summary of Vertical Linking Analysis and Results

The concurrent calibration with all available linking items was implemented to develop vertical scales for Missouri ELA and Mathematics assessments. Concurrent calibration is an efficient way of scaling multiple-group data and results in a smaller linking error compared to on-grade level separate calibrations and chain linking. Full linking sets, including items from below- and above-grade level provided the students with an opportunity to demonstrate their ability on a wider range of Missouri Learning Standards compared to linking sets containing items from only below-grade level or only above-grade level. Using linking items from below- and above-grade level in the vertical scale development is also consistent with the scaling approach implemented in the previous ELA and Mathematics MAP program.

In summary, with a few exceptions, the increasing scale score means as the grade level increases, the upward progress of scale scores at selected percentiles, and increasing form difficulty across grade levels provides evidence of the validity of the new MAP ELA and Mathematics vertical scales.

As recommended by Missouri Technical Advisory Committee, alternative options of ELA and Mathematics vertical linking were also attempted. The results of these

alternative scaling approaches as well as a rationale for implementing the concurrent calibration results for MAP operational use are provided in Appendix C of this document.

6.4 Lowest and Highest Obtainable Scale Scores

A maximum likelihood procedure cannot produce scale score estimates for students with perfect scores or scores below the level expected by guessing. In addition, although maximum likelihood estimates are available for students with extreme scores other than zero or perfect, occasionally these estimates have standard errors of measurement that are very large, and differences between these extreme values have little meaning. Therefore, scores are established for these students based on a rational but necessarily non-maximum likelihood procedure. These values, which are set separately by grade, are called the lowest obtainable scale score (LOSS) and the highest obtainable scale score (HOSS). The LOSS and HOSS for ELA and Mathematics were set to increase as the grade level increases while minimizing the standard error around them. Table 6.39 shows the LOSS and HOSS values used for each grade of the ELA and Mathematics MAP tests.

6.5 Item-Pattern Scoring

The MAP scale scores are derived using item-pattern scoring; thus, these scale scores are based on the student's responses to all items on a given test, and scale scores account for the characteristics of the items that are in the test (such as item difficulty). A scale score can be interpreted as a highly probable estimate of a student's ability in a given content area.

Using item-pattern scoring, a student's scale score is based on the student's responses to each item (his/her item-response vector). Each item uses optimal item weights in terms of item information, meaning that items do not contribute equally to the overall scale score. Students with the same raw score may be assigned to different scale scores, depending on which items they answered correctly.

6.6 Summary

In summary, the overall purpose of the operational data analyses is to ensure that the test items, as well as the overall test, are functioning appropriately. It also helps maintain the test scale across years so that test results may be appropriately compared across years. The data analyses undertaken by DRC are in alignment with multiple best practices of the testing industry and, in particular, support the following AERA, APA, & NCME (2014) *Standards*:

- 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 socio-demographic and developmental characteristics.
- Standard 4.14—For a test that has a time limit, test development research should examine the degree to which scores include a speed component and should

evaluate the appropriateness of that component, given the domain the test is designed to measure.

- Standard 5.2—The procedures for constructing scales used for reporting scores and the rationale for these procedures should be described clearly.
- Standard 7.2—The population for whom a test is intended and specifications for the test should be documented. If normative data are provided, the procedures used to gather the data should be explained; the norming population should be described in terms of relevant demographic variables; and the year(s) in which the data were collected should be reported.

Table 6.1: MAP Means and Standard Deviations for Raw Scores and p -Values: English Language Arts 2016

Grade	Total Items	Total Points	Mean Raw Score	Raw Score SD	Mean p -Value	p -Value SD	Mean R_{itt}	R_{itt} SD
3	52	52	27.12	9.98	0.53	0.19	0.37	0.09
4	52	52	31.67	10.19	0.61	0.17	0.39	0.09
5 F1	49	58	36.82	10.09	0.63	0.16	0.38	0.12
5 F2	49	58	36.67	9.88	0.63	0.16	0.37	0.12
5 F3	49	58	32.19	10.78	0.55	0.16	0.39	0.11
5 F4	49	58	37.00	10.15	0.63	0.16	0.38	0.12
5 F5	49	58	36.71	9.99	0.63	0.16	0.37	0.12
5 F6	49	58	36.45	10.12	0.62	0.16	0.38	0.12
5 F7	49	58	36.96	10.13	0.63	0.16	0.38	0.12
5 Average			35.00		0.60		0.38	
6	52	52	28.83	9.61	0.55	0.18	0.36	0.11
7	52	52	28.03	10.51	0.54	0.14	0.38	0.09
8 F1	49	58	31.71	10.79	0.54	0.19	0.40	0.10
8 F2	49	58	34.93	10.31	0.58	0.20	0.39	0.10
8 F3	49	58	34.45	10.14	0.58	0.20	0.39	0.09
8 F4	49	58	34.77	10.31	0.58	0.20	0.39	0.09
8 Average			33.47		0.56		0.39	

Note that Form 3 (F3) in Grade 5 and Form 1 (F1) in Grade 8, in addition to being spiraled with other forms, were administered to students using testing accommodations or universal tools. Students using accommodations or universal tools tend to perform less well on the test compared to students not using accommodations resulting in lower mean raw scores and mean p -values for these forms. Weighted mean raw scores, weighted mean p -values, and average item-total test correlations across all Grade 5 and Grade 8 forms were computed to provide test summary statistics at the grade level for these two grades.

Table 6.2: MAP Means and Standard Deviations for Raw Scores and p -Values: Mathematics 2016

Grade	Total Items	Total Points	Mean Raw Score	Raw Score SD	Mean p -Value	p -Value SD	Mean R_{itt}	R_{itt} SD
3	42	42	23.63	8.74	0.56	0.20	0.41	0.11
4	42	42	21.99	9.29	0.52	0.17	0.43	0.11
5	42	42	18.15	8.20	0.43	0.19	0.38	0.13
6	46	46	21.05	8.60	0.46	0.24	0.39	0.11
7	46	46	17.55	8.82	0.38	0.17	0.38	0.13
8	46	46	16.72	7.28	0.36	0.17	0.30	0.13

Table 6.3: Item Statistics English Language Arts Grade 3

English Language Arts						
Form	Session	Item	<i>p</i> -value	R _{it}	Omit Rate	Adj. N
1	1	1	0.53	0.30	1.49	68,162
1	1	2	0.33	0.37	0.08	69,136
1	1	3	0.76	0.44	0.07	69,142
1	1	4	0.70	0.33	0.08	69,137
1	1	5	0.55	0.47	0.08	69,135
1	1	6	0.47	0.37	0.17	69,073
1	1	7	0.62	0.48	0.10	69,123
1	1	8	0.71	0.44	0.13	69,097
1	1	9	0.25	0.36	0.05	69,156
1	1	10	0.49	0.11	0.11	69,113
1	1	11	0.57	0.30	0.15	69,088
1	1	12	0.52	0.42	0.11	69,114
1	1	13	0.29	0.35	1.28	68,304
1	1	14	0.70	0.50	0.24	69,025
1	1	15	0.29	0.44	0.09	69,129
1	1	16	0.39	0.24	0.17	69,075
1	1	17	0.29	0.42	0.10	69,122
1	1	18	0.83	0.22	0.78	68,652
1	1	19	0.51	0.41	0.16	69,076
1	1	20	0.52	0.35	0.18	69,064
1	2	25	0.39	0.34	0.45	68,879
1	2	26	0.64	0.33	0.06	69,148
1	2	27	0.24	0.31	0.39	68,918
1	2	28	0.64	0.31	0.06	69,148
1	2	29	0.27	0.38	0.07	69,145
1	2	30	0.61	0.41	0.08	69,137
1	2	31	0.35	0.43	0.08	69,132
1	2	32	0.81	0.45	0.11	69,117
1	2	35	0.56	0.51	0.09	69,126
1	2	36	0.55	0.29	0.10	69,122
1	2	37	0.56	0.42	0.20	69,051
1	2	38	0.49	0.33	0.09	69,131
1	2	39	0.78	0.50	0.18	69,062
1	2	40	0.86	0.33	0.10	69,118
1	2	41	0.45	0.22	0.59	68,781
1	2	42	0.66	0.35	0.07	69,140
1	2	43	0.89	0.36	0.10	69,122
1	2	44	0.16	0.30	0.21	69,046
1	2	45	0.30	0.15	0.11	69,114
1	2	46	0.19	0.41	0.36	68,942

Table 6.3: Item Statistics English Language Arts Grade 3 (cont.)

English Language Arts						
Form	Session	Item	<i>p</i> -Value	R_{it}	Omit Rate	Adj. N
1	2	47	0.46	0.30	0.10	69,118
1	2	48	0.48	0.48	0.10	69,120
1	2	49	0.69	0.54	0.12	69,104
1	2	50	0.51	0.32	0.13	69,097
1	3	51	0.22	0.39	0.04	69,161
1	3	52	0.61	0.32	0.07	69,145
1	3	53	0.39	0.40	0.04	69,160
1	3	54	0.63	0.32	0.07	69,140
1	3	55	0.69	0.50	0.09	69,127
1	3	56	0.68	0.43	0.09	69,129
1	3	57	0.53	0.47	0.08	69,134
1	3	58	0.56	0.49	0.06	69,146

Table 6.4: Item Statistics English Language Arts Grade 4

English Language Arts						
Form	Session	Item	<i>p</i> -Value	R_{it}	Omit Rate	Adj. N
1	1	1	0.83	0.46	0.02	67,658
1	1	2	0.55	0.56	0.10	67,607
1	1	3	0.83	0.46	0.04	67,647
1	1	4	0.31	0.47	0.39	67,412
1	1	5	0.54	0.40	0.04	67,643
1	1	6	0.67	0.49	0.10	67,604
1	1	7	0.76	0.37	0.05	67,641
1	1	8	0.66	0.28	0.07	67,629
1	1	9	0.77	0.39	0.36	67,427
1	1	10	0.75	0.42	0.06	67,633
1	1	11	0.48	0.31	0.10	67,604
1	1	12	0.51	0.55	0.07	67,628
1	1	13	0.66	0.47	0.07	67,624
1	1	14	0.71	0.38	0.06	67,635
1	1	15	0.44	0.27	0.07	67,629
1	1	16	0.78	0.42	0.08	67,619
1	1	17	0.79	0.49	0.08	67,620
1	1	18	0.56	0.43	0.08	67,618
1	1	19	0.28	0.44	0.05	67,639
1	1	20	0.79	0.48	0.09	67,612
1	2	25	0.93	0.29	0.01	67,666
1	2	26	0.28	0.32	0.03	67,651
1	2	27	0.45	0.25	0.03	67,651
1	2	28	0.93	0.31	0.03	67,654
1	2	29	0.44	0.32	0.04	67,649
1	2	30	0.93	0.39	0.04	67,647
1	2	31	0.40	0.53	0.14	67,575
1	2	32	0.76	0.45	0.09	67,614
1	2	35	0.52	0.33	0.09	67,614
1	2	36	0.51	0.43	0.05	67,636
1	2	37	0.62	0.46	0.08	67,619
1	2	38	0.70	0.32	0.06	67,635
1	2	39	0.64	0.35	0.09	67,612
1	2	40	0.80	0.42	0.05	67,637
1	2	41	0.33	0.28	0.09	67,610
1	2	42	0.62	0.28	0.05	67,638
1	2	43	0.28	0.20	0.07	67,627
1	2	44	0.47	0.36	0.06	67,633
1	2	45	0.64	0.57	0.08	67,620
1	2	46	0.77	0.49	0.08	67,617

Table 6.4: Item Statistics English Language Arts Grade 4 (cont.)

English Language Arts						
Form	Session	Item	<i>p</i> -Value	R _{it}	Omit Rate	Adj. N
1	2	47	0.50	0.40	0.34	67,440
1	2	48	0.59	0.28	0.08	67,618
1	2	49	0.64	0.34	0.08	67,620
1	2	50	0.86	0.39	0.05	67,637
1	3	51	0.52	0.26	0.04	67,643
1	3	52	0.41	0.48	0.04	67,646
1	3	53	0.58	0.51	0.04	67,649
1	3	54	0.63	0.37	0.07	67,628
1	3	55	0.52	0.47	0.06	67,631
1	3	56	0.51	0.35	0.04	67,645
1	3	57	0.60	0.35	0.09	67,610
1	3	58	0.66	0.42	0.14	67,580

Table 6.5: Item Statistics English Language Arts Grade 5

English Language Arts						
Form	Session	Item	<i>p</i> -Value	R_{it}	Omit Rate	Adj. N
All	1	1	0.54	0.39	0.03	66,614
All	1	2	0.77	0.42	0.02	66,623
All	1	3	0.61	0.44	0.08	66,584
All	1	4	0.17	0.32	0.04	66,609
All	1	5	0.76	0.28	0.06	66,596
All	1	6	0.49	0.19	0.07	66,591
All	1	7	0.38	0.13	0.08	66,585
All	1	8	0.57	0.47	0.02	66,621
All	1	9	0.82	0.44	0.08	66,579
All	1	10	0.71	0.38	0.06	66,596
All	1	11	0.73	0.25	0.09	66,577
All	1	12	0.43	0.45	0.05	66,600
All	1	13	0.48	0.40	0.29	66,442
All	1	14	0.52	0.51	0.07	66,590
All	1	15	0.65	0.51	0.07	66,591
All	1	16	0.32	0.24	0.07	66,587
All	1	17	0.61	0.62	0.30	66,433
All	1	18	0.62	0.43	0.11	66,562
All	1	19	0.65	0.54	0.09	66,572
All	1	20	0.58	0.37	0.12	66,557
All	2	25	0.50	0.04	0.03	66,612
All	2	26	0.69	0.27	0.06	66,596
All	2	27	0.51	0.38	0.16	66,531
All	2	28	0.64	0.39	0.06	66,598
All	2	29	0.45	0.57	0.15	66,535
All	2	30	0.86	0.38	0.05	66,599
All	2	31	0.74	0.42	0.06	66,593
All	2	32	0.74	0.46	0.06	66,597
All	2	35	0.69	0.27	0.05	66,599
All	2	36	0.82	0.43	0.12	66,557
All	2	37	0.28	0.21	0.16	66,529
All	2	38	0.81	0.45	0.06	66,594
All	2	39	0.47	0.44	0.11	66,562
All	2	40	0.75	0.45	0.06	66,593
All	2	41	0.41	0.36	0.08	66,580
All	2	42	0.49	0.31	0.07	66,586
All	2	43	0.71	0.46	0.10	66,571
All	2	44	0.51	0.47	0.11	66,561
All	2	45	0.56	0.45	1.06	65,930
All	2	46	0.60	0.37	0.07	66,587

Table 6.5: Item Statistics English Language Arts Grade 5 (cont.)

English Language Arts						
Form	Session	Item	<i>p</i> -Value	R_{it}	Omit Rate	Adj. N
All	3	47	0.75	0.34	0.04	66,606
All	3	48	0.59	0.53	0.02	66,619
All	3	49	0.39	0.40	0.04	66,607
All	3	50	0.83	0.46	0.06	66,597
All	3	51	0.71	0.21	0.07	66,590
All	3	52	0.41	0.38	0.05	66,605
All	3	53	0.45	0.43	0.03	66,613
All	3	54	0.62	0.35	0.21	66,496
1	4	55A	0.64	0.53	0.00	7,501
1	4	55B	0.64	0.52	0.00	7,501
1	4	55C	0.85	0.49	0.00	7,501
2	4	55A	0.60	0.46	0.00	7,506
2	4	55B	0.62	0.46	0.00	7,506
2	4	55C	0.91	0.42	0.00	7,506
3	4	55A	0.59	0.56	0.00	25,557
3	4	55B	0.59	0.55	0.00	25,557
3	4	55C	0.77	0.49	0.00	25,557
4	4	55A	0.65	0.56	0.00	7,430
4	4	55B	0.64	0.57	0.00	7,430
4	4	55C	0.84	0.47	0.00	7,430
5	4	55A	0.64	0.52	0.00	7,446
5	4	55B	0.64	0.51	0.00	7,446
5	4	55C	0.86	0.44	0.00	7,446
6	4	55A	0.62	0.52	0.00	7,469
6	4	55B	0.63	0.53	0.00	7,469
6	4	55C	0.9	0.45	0.00	7,469
7	4	55A	0.66	0.54	0.00	3,726
7	4	55B	0.67	0.52	0.00	3,726
7	4	55C	0.83	0.51	0.00	3,726

Note: Writing prompt statistics are presented separately for the three traits: A–Organization/Purpose, B–Evidence/Elaboration, and C–Conventions. The omit rate for writing item traits is not available because condition codes are given at the item level. Condition codes at the item level are converted to a score of 0 at the trait level. The omit rates for writing prompts at the item level were inspected and were found to be smaller than 1% in Grade 5.

Table 6.6: Item Statistics English Language Arts Grade 6

English Language Arts						
Form	Session	Item	<i>p</i> -Value	R_{it}	Omit Rate	Adj. N
1	1	1	0.75	0.49	0.31	63,690
1	1	2	0.65	0.31	0.09	63,834
1	1	3	0.84	0.35	0.03	63,870
1	1	4	0.71	0.33	0.06	63,851
1	1	5	0.58	0.33	0.04	63,861
1	1	6	0.52	0.44	0.02	63,878
1	1	7	0.63	0.36	0.08	63,839
1	1	8	0.49	0.47	0.03	63,868
1	1	9	0.67	0.49	0.05	63,854
1	1	10	0.52	0.18	0.10	63,828
1	1	11	0.61	0.49	0.05	63,857
1	1	12	0.56	0.39	0.09	63,833
1	1	13	0.15	0.35	0.05	63,858
1	1	14	0.21	0.37	0.28	63,710
1	1	15	0.12	0.23	0.04	63,862
1	1	16	0.51	0.37	0.07	63,842
1	1	17	0.71	0.34	0.08	63,840
1	1	18	0.68	0.55	0.04	63,862
1	1	19	0.52	0.36	0.11	63,820
1	1	20	0.65	0.43	0.11	63,817
1	2	25	0.67	0.43	0.04	63,866
1	2	26	0.79	0.39	0.09	63,830
1	2	27	0.42	0.38	0.04	63,864
1	2	28	0.66	0.26	0.08	63,837
1	2	29	0.37	0.11	0.09	63,834
1	2	30	0.65	0.14	0.15	63,795
1	2	31	0.66	0.42	0.07	63,846
1	2	32	0.50	0.35	0.14	63,798
1	2	35	0.59	0.33	0.12	63,810
1	2	36	0.06	0.08	0.08	63,839
1	2	37	0.67	0.34	0.10	63,827
1	2	38	0.45	0.23	0.08	63,841
1	2	39	0.42	0.22	0.09	63,834
1	2	40	0.61	0.45	0.07	63,845
1	2	41	0.65	0.40	0.21	63,753
1	2	42	0.42	0.11	0.07	63,844
1	2	43	0.51	0.29	0.15	63,793
1	2	44	0.73	0.45	0.10	63,826
1	2	45	0.58	0.55	0.07	63,843
1	2	46	0.53	0.47	0.12	63,812

Table 6.6: Item Statistics English Language Arts Grade 6 (cont.)

English Language Arts						
Form	Session	Item	<i>p</i> -Value	R_{it}	Omit Rate	Adj. N
1	2	47	0.41	0.34	0.10	63,827
1	2	48	0.77	0.40	0.13	63,807
1	2	49	0.34	0.38	0.18	63,776
1	2	50	0.31	0.24	0.15	63,796
1	3	51	0.31	0.35	0.04	63,862
1	3	52	0.72	0.35	0.03	63,872
1	3	53	0.82	0.42	0.06	63,850
1	3	54	0.83	0.38	0.05	63,855
1	3	55	0.66	0.51	0.08	63,837
1	3	56	0.28	0.47	0.05	63,858
1	3	57	0.61	0.31	0.04	63,865
1	3	58	0.76	0.47	0.25	63,729

Table 6.7: Item Statistics English Language Arts Grade 7

English Language Arts						
Form	Session	Item	<i>p</i> -Value	R_{it}	Omit Rate	Adj. N
1	1	1	0.63	0.39	2.67	61,776
1	1	2	0.69	0.37	0.08	63,420
1	1	3	0.63	0.39	0.06	63,431
1	1	4	0.64	0.26	0.09	63,415
1	1	5	0.26	0.12	0.07	63,428
1	1	6	0.80	0.41	0.11	63,401
1	1	7	0.65	0.28	0.08	63,417
1	1	8	0.58	0.50	0.04	63,445
1	1	9	0.72	0.43	2.45	61,917
1	1	10	0.58	0.33	0.16	63,369
1	1	11	0.71	0.42	0.08	63,422
1	1	12	0.29	0.38	0.09	63,412
1	1	13	0.45	0.32	0.09	63,411
1	1	14	0.48	0.44	0.07	63,427
1	1	15	0.57	0.45	0.12	63,394
1	1	16	0.56	0.36	0.13	63,390
1	1	17	0.40	0.48	0.13	63,390
1	1	18	0.71	0.48	0.23	63,323
1	1	19	0.44	0.32	0.15	63,376
1	1	20	0.48	0.30	0.16	63,369
1	2	25	0.20	0.20	0.17	63,362
1	2	26	0.67	0.38	0.07	63,428
1	2	27	0.43	0.59	0.15	63,373
1	2	28	0.65	0.52	0.06	63,434
1	2	29	0.57	0.22	0.10	63,409
1	2	30	0.73	0.43	0.34	63,253
1	2	31	0.63	0.42	0.09	63,413
1	2	32	0.47	0.46	0.05	63,438
1	2	35	0.46	0.44	0.12	63,397
1	2	36	0.48	0.33	0.13	63,388
1	2	37	0.63	0.32	0.12	63,394
1	2	38	0.51	0.50	0.09	63,411
1	2	39	0.51	0.33	0.13	63,388
1	2	40	0.31	0.33	0.11	63,402
1	2	41	0.57	0.32	0.10	63,407
1	2	42	0.65	0.34	0.24	63,318
1	2	43	0.43	0.34	0.23	63,325
1	2	44	0.76	0.48	0.14	63,379
1	2	45	0.79	0.38	0.14	63,384
1	2	46	0.45	0.26	0.12	63,393

Table 6.7: Item Statistics English Language Arts Grade 7 (cont.)

English Language Arts						
Form	Session	Item	<i>p</i> -Value	R_{it}	Omit Rate	Adj. N
1	2	47	0.30	0.38	0.16	63,367
1	2	48	0.47	0.40	0.15	63,375
1	2	49	0.55	0.33	0.14	63,378
1	2	50	0.51	0.27	0.15	63,374
1	3	51	0.39	0.48	0.07	63,428
1	3	52	0.48	0.39	0.05	63,439
1	3	53	0.55	0.57	0.09	63,414
1	3	54	0.44	0.41	0.09	63,414
1	3	55	0.66	0.31	0.16	63,370
1	3	56	0.49	0.50	0.06	63,429
1	3	57	0.40	0.48	0.08	63,419
1	3	58	0.69	0.31	0.13	63,388

Table 6.8: Item Statistics English Language Arts Grade 8

English Language Arts						
Form	Session	Item	<i>p</i> -Value	R_{it}	Omit Rate	Adj. N
All	1	1	0.50	0.18	0.04	63,442
All	1	2	0.74	0.39	0.07	63,425
All	1	3	0.66	0.50	0.03	63,448
All	1	4	0.74	0.48	0.07	63,425
All	1	5	0.85	0.37	0.11	63,398
All	1	6	0.44	0.29	0.04	63,442
All	1	7	0.37	0.34	0.08	63,419
All	1	8	0.58	0.36	0.07	63,426
All	1	9	0.43	0.46	0.15	63,374
All	1	10	0.45	0.48	0.08	63,417
All	1	11	0.61	0.46	0.11	63,400
All	1	12	0.57	0.53	0.08	63,420
All	1	13	0.65	0.45	0.11	63,396
All	1	14	0.51	0.39	0.34	63,251
All	1	15	0.65	0.50	0.14	63,376
All	1	16	0.39	0.23	0.12	63,392
All	1	17	0.57	0.39	0.41	63,209
All	1	18	0.23	0.43	0.11	63,397
All	1	19	0.49	0.56	0.10	63,402
All	1	20	0.59	0.61	0.21	63,333
All	2	25	0.17	0.33	0.10	63,407
All	2	26	0.76	0.43	0.11	63,399
All	2	27	0.47	0.32	0.29	63,281
All	2	28	0.35	0.31	0.05	63,435
All	2	29	0.64	0.41	0.06	63,428
All	2	30	0.90	0.38	0.08	63,417
All	2	31	0.93	0.35	0.09	63,410
All	2	32	0.57	0.31	0.10	63,405
All	2	35	0.71	0.37	0.09	63,409
All	2	36	0.10	0.35	0.33	63,257
All	2	37	0.45	0.42	0.09	63,410
All	2	38	0.27	0.29	0.25	63,307
All	2	39	0.20	0.14	0.12	63,391
All	2	40	0.61	0.38	0.14	63,382
All	2	41	0.38	0.43	0.14	63,377
All	2	42	0.57	0.43	0.16	63,368
All	2	43	0.39	0.51	0.29	63,284
All	2	44	0.42	0.39	0.25	63,311
All	2	45	0.71	0.46	0.15	63,370
All	2	46	0.74	0.40	0.14	63,376

Table 6.8: Item Statistics English Language Arts Grade 8 (cont.)

English Language Arts						
Form	Session	Item	<i>p</i> -Value	R_{it}	Omit Rate	Adj. N
All	3	47	0.60	0.24	0.05	63,437
All	3	48	0.88	0.38	0.07	63,421
All	3	49	0.66	0.25	0.06	63,431
All	3	50	0.50	0.42	0.05	63,436
All	3	51	0.39	0.38	0.04	63,443
All	3	52	0.80	0.39	0.07	63,421
All	3	53	0.70	0.40	0.10	63,406
All	3	54	0.71	0.39	0.14	63,381
1	4	55A	0.58	0.58	0.00	26,143
1	4	55B	0.58	0.57	0.00	26,143
1	4	55C	0.81	0.5	0.00	26,143
2	4	55A	0.71	0.55	0.00	14,937
2	4	55B	0.72	0.56	0.00	14,937
2	4	55C	0.92	0.43	0.00	14,937
3	4	55A	0.65	0.53	0.00	14,924
3	4	55B	0.66	0.53	0.00	14,924
3	4	55C	0.93	0.36	0.00	14,924
4	4	55A	0.70	0.55	0.00	7,464
4	4	55B	0.71	0.55	0.00	7,464
4	4	55C	0.93	0.41	0.00	7,464

Note: Writing prompt statistics are presented separately for the three traits: A–Organization/Purpose, B–Evidence/Elaboration, and C–Conventions. The omit rate for writing item traits is not available because condition codes are given at the item level. Condition codes at the item level are converted to a score of 0 at the trait level. The omit rates for writing prompts at the item level were inspected and were found to be smaller than 1% in Grade 8.

Table 6.9: Item Statistics Mathematics Grade 3

Mathematics						
Form	Session	Item	<i>p</i>-Value	R_{it}	Omit Rate	Adj. N
1	1	2	0.63	0.45	0.09	69,251
1	1	3	0.77	0.43	0.04	69,286
1	1	4	0.76	0.46	0.09	69,252
1	1	6	0.73	0.45	0.09	69,251
1	1	7	0.53	0.43	0.07	69,266
1	1	8	0.84	0.40	0.23	69,154
1	1	9	0.45	0.40	0.09	69,255
1	1	11	0.83	0.43	0.07	69,263
1	1	12	0.53	0.37	0.11	69,236
1	1	13	0.55	0.44	0.07	69,263
1	1	14	0.70	0.39	0.14	69,216
1	1	15	0.61	0.58	0.08	69,262
1	1	16	0.42	0.37	0.11	69,235
1	1	17	0.46	0.24	0.07	69,265
1	1	18	0.45	0.35	0.23	69,154
1	1	19	0.18	0.28	0.09	69,254
1	1	20	0.40	0.45	0.11	69,235
1	1	21	0.30	0.40	0.08	69,259
1	1	22	0.72	0.50	0.13	69,227
1	1	23	0.47	0.49	0.11	69,235
1	1	24	0.46	0.39	0.11	69,238
1	2	26	0.45	0.61	0.04	69,283
1	2	27	0.89	0.33	0.08	69,256
1	2	28	0.63	0.43	0.11	69,241
1	2	30	0.57	0.47	0.10	69,246
1	2	31	0.62	0.36	0.07	69,267
1	2	32	0.59	0.59	0.08	69,261
1	2	33	0.80	0.43	0.07	69,268
1	2	34	0.56	0.35	0.13	69,225
1	2	35	0.39	0.19	0.08	69,261
1	2	36	0.66	0.47	0.12	69,234
1	2	37	0.44	0.42	0.10	69,244
1	2	38	0.69	0.49	0.14	69,217

Table 6.9: Item Statistics Mathematics Grade 3 (cont.)

Mathematics						
Form	Session	Item	<i>p</i>-Value	R_{it}	Omit Rate	Adj. N
1	2	39	0.19	0.26	0.12	69,232
1	2	40	0.68	0.50	0.10	69,246
1	2	41	0.81	0.35	0.11	69,239
1	2	42	0.81	0.46	0.13	69,224
1	2	43	0.10	0.05	0.10	69,246
1	2	44	0.66	0.56	0.10	69,247
1	2	45	0.49	0.49	0.11	69,235
1	2	46	0.10	0.33	0.16	69,205
1	2	47	0.71	0.48	0.09	69,251

Table 6.10: Item Statistics Mathematics Grade 4

Mathematics						
Form	Session	Item	<i>p</i>-Value	R_{it}	Omit Rate	Adj. N
1	1	2	0.32	0.47	0.06	67,830
1	1	3	0.45	0.29	0.06	67,826
1	1	4	0.57	0.34	0.07	67,821
1	1	6	0.67	0.53	0.07	67,819
1	1	7	0.73	0.44	0.05	67,836
1	1	8	0.62	0.51	0.05	67,835
1	1	9	0.75	0.39	0.04	67,839
1	1	11	0.38	0.32	0.07	67,822
1	1	12	0.61	0.40	0.08	67,816
1	1	13	0.47	0.60	0.06	67,830
1	1	14	0.41	0.30	0.09	67,808
1	1	15	0.42	0.36	0.09	67,807
1	1	16	0.32	0.47	0.05	67,833
1	1	17	0.50	0.61	0.08	67,818
1	1	18	0.51	0.56	0.07	67,821
1	1	19	0.41	0.45	0.11	67,796
1	1	20	0.60	0.47	0.14	67,773
1	1	21	0.63	0.32	0.11	67,793
1	1	22	0.69	0.40	0.13	67,783
1	1	23	0.66	0.40	0.07	67,824
1	1	24	0.44	0.47	0.09	67,811
1	2	26	0.88	0.32	0.09	67,810
1	2	27	0.65	0.42	0.04	67,842
1	2	28	0.47	0.50	0.07	67,823
1	2	30	0.44	0.60	0.10	67,798
1	2	31	0.60	0.48	0.06	67,829
1	2	32	0.69	0.40	0.06	67,831
1	2	33	0.31	0.36	0.05	67,832
1	2	34	0.40	0.29	0.11	67,797
1	2	35	0.52	0.58	0.07	67,820
1	2	36	0.29	0.47	0.06	67,828
1	2	37	0.74	0.43	0.06	67,830
1	2	38	0.07	0.34	0.72	67,383

Table 6.10: Item Statistics Mathematics Grade 4 (cont.)

Mathematics						
Form	Session	Item	<i>p</i>-Value	R_{it}	Omit Rate	Adj. N
1	2	39	0.43	0.49	0.07	67,822
1	2	40	0.72	0.44	0.06	67,830
1	2	41	0.35	0.53	0.07	67,821
1	2	42	0.49	0.62	0.10	67,801
1	2	43	0.26	0.21	0.06	67,827
1	2	44	0.57	0.52	0.09	67,806
1	2	45	0.61	0.42	0.09	67,811
1	2	46	0.54	0.09	0.10	67,803
1	2	47	0.82	0.36	0.07	67,821

Table 6.11: Item Statistics Mathematics Grade 5

Mathematics						
Form	Session	Item	<i>p</i>-Value	R_{it}	Omit Rate	Adj. N
1	1	2	0.83	0.29	0.07	66,798
1	1	3	0.15	0.52	0.06	66,808
1	1	4	0.56	0.19	0.08	66,790
1	1	6	0.38	0.38	0.08	66,791
1	1	7	0.47	0.59	0.06	66,804
1	1	8	0.64	0.39	0.05	66,813
1	1	9	0.33	0.56	0.07	66,800
1	1	11	0.18	0.54	0.09	66,783
1	1	12	0.39	0.32	0.09	66,785
1	1	13	0.73	0.41	0.05	66,812
1	1	14	0.32	0.62	0.14	66,750
1	1	15	0.74	0.43	0.07	66,802
1	1	16	0.64	0.11	0.07	66,802
1	1	17	0.48	0.54	0.05	66,814
1	1	18	0.45	0.48	0.17	66,733
1	1	19	0.46	0.56	0.08	66,790
1	1	20	0.56	0.42	0.12	66,763
1	1	21	0.07	0.23	0.12	66,766
1	1	22	0.42	0.28	0.13	66,758
1	1	23	0.46	0.27	0.09	66,789
1	1	24	0.46	0.53	0.10	66,776
1	2	26	0.55	0.35	0.07	66,797
1	2	27	0.38	0.51	0.05	66,810
1	2	28	0.26	0.15	0.07	66,801
1	2	30	0.15	0.41	0.05	66,811
1	2	31	0.15	0.46	0.26	66,673
1	2	32	0.40	0.50	0.22	66,702
1	2	33	0.48	0.37	0.06	66,803
1	2	34	0.55	0.27	0.09	66,783
1	2	35	0.51	0.45	0.07	66,797
1	2	36	0.73	0.19	0.07	66,801
1	2	37	0.22	0.50	0.83	66,293
1	2	38	0.72	0.33	0.07	66,796

Table 6.11: Item Statistics Mathematics Grade 5 (cont.)

Mathematics						
Form	Session	Item	<i>p</i>-Value	R_{it}	Omit Rate	Adj. N
1	2	39	0.47	0.47	0.07	66,797
1	2	40	0.12	0.28	0.07	66,799
1	2	41	0.52	0.31	0.07	66,796
1	2	42	0.40	0.18	0.16	66,738
1	2	43	0.65	0.42	0.09	66,783
1	2	44	0.28	0.44	0.12	66,768
1	2	45	0.04	0.29	0.13	66,761
1	2	46	0.47	0.33	0.09	66,784
1	2	47	0.42	0.21	0.11	66,775

Table 6.12: Item Statistics Mathematics Grade 6

Mathematics						
Form	Session	Item	<i>p</i>-Value	R_{it}	Omit Rate	Adj. N
1	1	2	0.54	0.43	0.09	66,297
1	1	3	0.30	0.15	0.05	66,321
1	1	4	0.15	0.45	0.09	66,295
1	1	6	0.86	0.35	0.06	66,312
1	1	7	0.32	0.45	0.05	66,321
1	1	8	0.61	0.44	0.06	66,313
1	1	9	0.50	0.32	0.09	66,295
1	1	11	0.12	0.39	0.07	66,306
1	1	12	0.32	0.56	0.18	66,238
1	1	13	0.56	0.33	0.08	66,301
1	1	14	0.91	0.37	0.07	66,307
1	1	15	0.92	0.32	0.08	66,304
1	1	16	0.30	0.14	0.10	66,290
1	1	17	0.39	0.50	0.12	66,275
1	1	18	0.35	0.24	0.11	66,282
1	1	19	0.55	0.52	0.38	66,105
1	1	20	0.20	0.49	0.11	66,285
1	1	21	0.63	0.33	0.11	66,285
1	1	22	0.64	0.42	0.09	66,292
1	2	24	0.68	0.38	0.05	66,322
1	2	25	0.39	0.29	0.08	66,301
1	2	26	0.27	0.44	0.10	66,291
1	2	28	0.76	0.29	0.09	66,293
1	2	29	0.14	0.37	0.06	66,317
1	2	30	0.56	0.41	0.11	66,279
1	2	31	0.73	0.36	0.08	66,302
1	2	32	0.92	0.30	0.14	66,265
1	2	33	0.37	0.46	0.08	66,303
1	2	34	0.60	0.51	0.12	66,274
1	2	35	0.33	0.32	0.08	66,301
1	2	36	0.06	0.18	0.11	66,279
1	2	37	0.43	0.38	0.06	66,315
1	2	38	0.72	0.47	0.11	66,282

Table 6.12: Item Statistics Mathematics Grade 6 (cont.)

Mathematics						
Form	Session	Item	<i>p</i>-Value	R_{it}	Omit Rate	Adj. N
1	2	39	0.65	0.45	0.09	66,298
1	2	40	0.21	0.15	0.10	66,288
1	2	41	0.64	0.44	0.10	66,287
1	2	42	0.09	0.45	0.25	66,186
1	2	43	0.48	0.42	0.10	66,291
1	2	44	0.65	0.54	0.17	66,241
1	2	45	0.37	0.54	0.18	66,234
1	2	46	0.26	0.53	0.31	66,149
1	2	47	0.67	0.39	0.17	66,242
1	2	48	0.07	0.17	0.10	66,291
1	2	49	0.15	0.45	0.14	66,261
1	2	50	0.51	0.34	0.18	66,238
1	2	51	0.17	0.56	0.13	66,266

Table 6.13: Item Statistics Mathematics Grade 7

Mathematics						
Form	Session	Item	<i>p</i> -Value	R_{it}	Omit Rate	Adj. N
1	1	2	0.43	0.38	0.04	65,120
1	1	3	0.16	0.31	0.04	65,121
1	1	4	0.37	0.51	0.05	65,114
1	1	5	0.53	0.55	0.12	65,070
1	1	6	0.42	0.38	0.05	65,117
1	1	7	0.18	0.14	0.08	65,097
1	1	8	0.12	0.42	0.37	64,904
1	1	9	0.15	0.43	0.04	65,119
1	1	10	0.34	0.38	0.05	65,117
1	1	11	0.51	0.28	0.08	65,096
1	1	12	0.41	0.35	0.13	65,061
1	1	13	0.27	0.14	0.06	65,106
1	1	14	0.20	0.41	0.05	65,115
1	2	16	0.43	0.39	0.09	65,091
1	2	17	0.46	0.60	0.08	65,098
1	2	18	0.32	0.40	0.14	65,060
1	2	20	0.61	0.45	0.16	65,047
1	2	21	0.22	0.45	0.13	65,065
1	2	22	0.42	0.18	0.17	65,039
1	2	23	0.19	0.39	0.14	65,059
1	2	25	0.29	0.23	0.16	65,045
1	2	26	0.49	0.43	0.14	65,056
1	2	27	0.78	0.40	0.18	65,030
1	2	28	0.33	0.31	0.10	65,083
1	2	30	0.67	0.23	0.50	64,825
1	2	31	0.59	0.38	0.16	65,047
1	2	32	0.51	0.43	0.15	65,052
1	2	33	0.54	0.53	0.25	64,983
1	2	34	0.12	0.33	0.16	65,044
1	2	35	0.59	0.53	0.13	65,061
1	2	36	0.23	0.56	0.29	64,957
1	2	37	0.67	0.43	0.17	65,039
1	2	38	0.22	-0.04	0.13	65,062

Table 6.13: Item Statistics Mathematics Grade 7 (cont.)

Mathematics						
Form	Session	Item	<i>p</i>-Value	R_{it}	Omit Rate	Adj. N
1	2	39	0.43	0.48	0.15	65,051
1	2	40	0.53	0.30	0.17	65,040
1	2	41	0.29	0.44	0.24	64,993
1	2	42	0.55	0.23	0.21	65,008
1	2	43	0.67	0.26	0.23	64,997
1	2	44	0.32	0.52	0.24	64,990
1	2	45	0.08	0.41	0.27	64,972
1	2	46	0.47	0.22	0.51	64,819
1	2	47	0.31	0.40	0.22	65,003
1	2	48	0.18	0.56	0.59	64,762
1	2	49	0.50	0.50	0.20	65,016
1	2	50	0.25	0.62	0.51	64,816
1	2	51	0.25	0.29	0.18	65,028

Table 6.14: Item Statistics Mathematics Grade 8

Mathematics						
Form	Session	Item	<i>p</i>-Value	R_{it}	Omit Rate	Adj. N
1	1	2	0.21	0.04	0.12	52,628
1	1	3	0.45	0.30	0.07	52,654
1	1	4	0.42	0.34	0.09	52,646
1	1	5	0.42	0.36	0.09	52,644
1	1	6	0.05	0.33	0.43	52,463
1	1	7	0.36	0.19	0.08	52,650
1	1	8	0.35	0.36	0.08	52,652
1	1	9	0.28	0.53	0.65	52,352
1	1	10	0.42	0.30	0.12	52,631
1	1	11	0.03	0.24	0.59	52,381
1	2	13	0.34	0.39	0.10	52,638
1	2	14	0.59	0.23	0.13	52,624
1	2	15	0.54	0.37	0.14	52,617
1	2	17	0.07	0.37	0.38	52,491
1	2	18	0.09	0.25	0.09	52,645
1	2	19	0.56	0.33	0.17	52,601
1	2	20	0.16	0.43	1.02	52,154
1	2	22	0.17	0.19	0.18	52,597
1	2	23	0.46	0.22	0.17	52,601
1	2	24	0.36	0.25	0.17	52,604
1	2	25	0.62	0.29	0.28	52,546
1	2	27	0.21	0.15	0.17	52,601
1	2	28	0.43	0.47	0.16	52,610
1	2	29	0.32	0.01	0.14	52,616
1	2	30	0.40	0.45	0.82	52,261
1	2	31	0.45	0.11	0.19	52,594
1	2	32	0.29	0.28	0.15	52,612
1	2	33	0.20	0.48	1.02	52,155
1	2	34	0.45	0.23	0.16	52,609
1	2	35	0.57	0.24	0.20	52,585
1	2	36	0.70	0.40	0.18	52,599
1	2	37	0.32	0.11	0.25	52,562
1	2	38	0.48	0.39	0.23	52,570

Table 6.14: Item Statistics Mathematics Grade 8 (cont.)

Mathematics						
Form	Session	Item	<i>p</i>-Value	R_{it}	Omit Rate	Adj. N
1	2	39	0.72	0.37	0.24	52,567
1	2	40	0.44	0.31	0.30	52,534
1	2	41	0.51	0.39	0.25	52,562
1	2	42	0.20	0.48	0.25	52,562
1	2	43	0.35	0.23	0.28	52,547
1	2	44	0.21	0.18	0.24	52,567
1	2	45	0.27	0.05	0.23	52,572
1	2	46	0.37	0.29	0.24	52,565
1	2	47	0.27	0.39	1.08	52,124
1	2	48	0.62	0.47	0.25	52,562
1	2	49	0.15	0.49	1.28	52,017
1	2	50	0.65	0.32	0.22	52,575
1	2	51	0.23	0.28	0.35	52,507

Table 6.15: ELA Test Blueprint and Vertical Linking Set Content Coverage

Grade	Item Set	Content Categories (Strands)				Total
		Reading	Research	Writing	Listening	
3	OP	38%	15%	31%	15%	100%
3	VS set in G4	45%	18%	36%	0	100%
4	OP	38%	15%	31%	15%	100%
4	VS set in G3	45%	18%	36%	0	100%
4	VS set in G5	40%	20%	40%	0	100%
5	OP	34%	14%	38%	14%	100%
5	VS set in G4	40%	20%	40%	0	100%
5	VS set in G6	45%	18%	36%	0	100%
6	OP	38%	15%	31%	15%	100%
6	VS set in G5	40%	20%	40%	0	100%
6	VS set in G7	43%	19%	38%	0	100%
7	OP	38%	15%	31%	15%	100%
7	VS set in G6	40%	20%	40%	0	100%
7	VS set in G8	40%	20%	40%	0	100%
8	OP	34%	14%	38%	14%	100%
8	VS set in G7	40%	20%	40%	0	100%

Table 6.16: Mathematics Test Blueprint and Vertical Linking Set Content Coverage

Grade	Item Set	Content Categories										Total
		OA	NBT	NF	MD	GE	RP	NS	EE	SP	FN	
3	OP	36%	14%	17%	24%	10%						100%
3	VS set in G4	30%	10%	20%	30%	10%						100%
4	OP	24%	19%	29%	19%	10%						100%
4	VS set in G3	20%	20%	30%	20%	10%						100%
4	VS set in G5	20%	20%	30%	20%	10%						100%
5	OP	14%	19%	38%	17%	12%						100%
5	VS set in G4	20%	20%	30%	20%	10%						100%
5	VS set in G6	20%	20%	30%	20%	10%						100%
6	OP					13%	13%	28%	33%	13%		100%
6	VS set in G5						20%	40%	40%			100%
6	VS set in G7					10%	20%	20%	40%	10%		100%
7	OP					15%	22%	17%	28%	17%		100%
7	VS set in G6						13%	37%	37%	13%		100%
7	VS set in G8					20%	20%	20%	20%	20%		100%
8	OP					24%		9%	33%	13%	22%	100%
8	VS set in G7					30%		10%	30%	10%	20%	100%

Note: Content categories are as follows: OA = Operations and Algebraic Thinking; NBT = Numbers and Operations in Base Ten; NF = Numbers and Operations—Fractions; MD = Measurement and Data; GE = Geometry; RP = Ratios and Proportional Relationships; NS = The Number System; EE = Expressions and Equations; SP = Statistics and Probability; and FN = Functions.

Table 6.17: ELA Grade 3 vs. Grade 4 Vertical Linking Item Statistics

Item Grade	Item Type	Strand	Item Statistics in Administration Grade							
			PvalG3	PvalG4	RitG3	RitG4	OmitG3	OmitG4	Nobs G3	Nobs G4
3	TE	Writing	0.48	0.70	0.48	0.36	0.00	0.00	69,120	7,307
3	MC	Writing	0.49	0.58	0.33	0.34	0.00	0.00	69,131	24,810
3	TE	Writing	0.56	0.71	0.42	0.35	0.00	0.00	69,051	7,341
3	MC	Research	0.81	0.89	0.45	0.38	0.00	0.00	69,117	24,808
3	MC	Research	0.64	0.78	0.33	0.31	0.00	0.00	69,148	7,309
3	MC	Reading	0.47	0.52	0.37	0.33	0.00	0.00	69,073	32,096
3	MC	Reading	0.49	0.50	0.11	0.08	0.00	0.00	69,113	24,796
3	MC	Reading	0.71	0.76	0.44	0.43	0.00	0.00	69,097	32,099
3	ESR	Reading	0.25	0.39	0.36	0.39	0.00	0.00	69,156	7,307
3	MC	Reading	0.62	0.61	0.48	0.47	0.00	0.00	69,123	32,092
3	TE	Writing	0.19	0.40	0.42	0.44	0.00	0.00	68,942	7,340
3		AVERAGE	0.52	0.62	0.38	0.35	0.00	0.00		
4	MC	Writing	0.67	0.77	0.44	0.49	0.00	0.00	13,571	67,617
4	MC	Writing	0.72	0.80	0.39	0.42	0.00	0.00	13,496	67,637
4	TE	Research	0.88	0.93	0.33	0.31	0.00	0.00	13,570	67,654
4	MC	Research	0.84	0.93	0.34	0.29	0.00	0.00	32,493	67,666
4	MC	Reading	0.45	0.66	0.33	0.47	0.00	0.00	32,451	67,624
4	MC	Reading	0.40	0.44	0.21	0.27	0.00	0.00	13,557	67,629
4	TE	Reading	0.29	0.51	0.47	0.55	0.00	0.00	46,010	67,628
4	MC	Reading	0.54	0.71	0.32	0.38	0.00	0.00	46,000	67,635
4	MC	Reading	0.32	0.48	0.21	0.31	0.00	0.00	45,988	67,604
4	TE	Writing	0.65	0.64	0.25	0.34	0.00	0.00	13,487	67,620
4	TE	Writing	0.50	0.62	0.36	0.46	0.00	0.00	32,438	67,619
4		AVERAGE	0.57	0.68	0.33	0.39	0.00	0.00		

Table 6.18: ELA Grade 4 vs. Grade 5 Vertical Linking Item Statistics

Item Grade	Item Type	Strand	PvalG4	PvalG5	RitG4	RitG5	OmitG4	OmitG5	Nobs G4	Nobs G5
4	TE	Writing	0.64	0.80	0.57	0.47	0.00	0.00	67,620	7,421
4	MC	Writing	0.51	0.65	0.43	0.44	0.00	0.00	67,636	7,467
4	TE	Writing	0.51	0.64	0.40	0.31	0.00	0.00	67,440	7,454
4	MC	Research	0.44	0.45	0.32	0.28	0.00	0.00	67,649	23,210
4	MC	Research	0.77	0.84	0.45	0.42	0.00	0.00	67,614	7,426
4	MC	Reading	0.67	0.64	0.49	0.46	0.00	0.00	67,604	30,621
4	MC	Reading	0.75	0.73	0.42	0.43	0.00	0.00	67,633	30,621
4	MC	Reading	0.76	0.73	0.37	0.38	0.00	0.00	67,641	30,620
4	MC	Reading	0.66	0.66	0.28	0.32	0.00	0.00	67,629	30,628
4	TE	Writing	0.33	0.33	0.28	0.26	0.00	0.00	67,610	23,185
4		AVERAGE	0.60	0.65	0.40	0.38	0.00	0.00		
5	MC	Writing	0.45	0.49	0.19	0.31	0.00	0.00	7,326	66,586
5	MC	Research	0.64	0.69	0.21	0.27	0.00	0.00	7,236	66,596
5	MC	Research	0.56	0.64	0.34	0.39	0.00	0.00	7,301	66,598
5	MC	Research	0.73	0.81	0.41	0.45	0.00	0.00	7,328	66,594
5	TE	Writing	0.37	0.41	0.22	0.36	0.00	0.00	7,300	66,580
5	MC	Reading	0.55	0.62	0.37	0.43	0.00	0.00	14,537	66,562
5	MC	Reading	0.28	0.32	0.16	0.24	0.00	0.00	14,538	66,587
5	MC	Reading	0.54	0.58	0.28	0.37	0.00	0.00	7,300	66,557
5	MC	Reading	0.60	0.66	0.48	0.54	0.00	0.00	7,236	66,572
5	TE	Reading	0.45	0.61	0.55	0.62	0.00	0.00	14,499	66,433
5	TE	Writing	0.81	0.82	0.38	0.43	0.00	0.00	7,238	66,557
5		AVERAGE	0.54	0.60	0.32	0.40	0.00	0.00		

Table 6.19: ELA Grade 5 vs. Grade 6 Vertical Linking Item Statistics

Item Grade	Item Type	Strand	PvalG5	PvalG6	RitG5	RitG6	OmitG5	OmitG6	Nobs G5	Nobs G6
5	MC	Writing	0.71	0.86	0.46	0.32	0.00	0.00	66,571	7,866
5	TE	Writing	0.51	0.66	0.47	0.42	0.00	0.00	66,561	7,865
5	MC	Writing	0.75	0.84	0.45	0.40	0.00	0.00	66,593	18,208
5	TE	Research	0.51	0.48	0.38	0.29	0.00	0.00	66,531	18,200
5	MC	Research	0.74	0.74	0.42	0.30	0.00	0.00	66,593	7,816
5	TE	Reading	0.48	0.48	0.41	0.40	0.00	0.00	66,442	25,961
5	MC	Reading	0.43	0.41	0.45	0.43	0.00	0.00	66,600	18,197
5	MC	Reading	0.73	0.75	0.25	0.24	0.00	0.00	66,577	26,013
5	MC	Reading	0.52	0.52	0.51	0.48	0.00	0.00	66,590	26,012
5	MC	Reading	0.65	0.66	0.51	0.49	0.00	0.00	66,591	7,813
5	TE	Writing	0.47	0.58	0.44	0.33	0.00	0.00	66,562	7,818
5		AVERAGE	0.59	0.64	0.43	0.37	0.00	0.00		
6	MC	Research	0.76	0.79	0.46	0.39	0.00	0.00	7,501	63,830
6	ESR	Writing	0.53	0.58	0.44	0.55	0.00	0.00	7,443	63,843
6	TE	Writing	0.62	0.53	0.46	0.48	0.00	0.00	7,496	63,812
6	MC	Writing	0.45	0.42	0.07	0.11	0.00	0.00	7,503	63,844
6	MC	Writing	0.05	0.06	0.04	0.08	0.00	0.00	7,442	63,839
6	MC	Research	0.76	0.67	0.46	0.42	0.00	0.00	7,495	63,846
6	MC	Reading	0.60	0.65	0.41	0.43	0.00	0.00	14,991	63,817
6	ESR	Reading	0.69	0.68	0.53	0.55	0.00	0.00	15,001	63,862
6	MC	Reading	0.50	0.52	0.30	0.36	0.00	0.00	14,994	63,820
6	MC	Reading	0.74	0.71	0.38	0.34	0.00	0.00	14,994	63,840
6		AVERAGE	0.57	0.56	0.35	0.37	0.00	0.00		

Table 6.20: ELA Grade 6 vs. Grade 7 Vertical Linking Item Statistics

Item Grade	Item Type	Strand	PvalG6	PvalG7	RitG6	RitG7	OmitG6	OmitG7	Nobs G6	Nobs G7
6	MC	Writing	0.77	0.85	0.40	0.34	0.00	0.00	63,807	7,953
6	MC	Research	0.67	0.66	0.43	0.41	0.00	0.00	63,866	17,675
6	TE	Writing	0.31	0.42	0.24	0.23	0.00	0.00	63,796	7,973
6	MC	Writing	0.61	0.77	0.45	0.42	0.00	0.00	63,845	7,987
6	TE	Research	0.50	0.52	0.35	0.30	0.00	0.00	63,798	7,937
6	MC	Reading	0.71	0.61	0.33	0.38	0.00	0.00	63,851	25,608
6	TE	Reading	0.65	0.57	0.31	0.36	0.00	0.00	63,834	17,647
6	TE	Reading	0.75	0.71	0.49	0.50	0.00	0.02	63,690	25,101
6	MC	Reading	0.84	0.77	0.35	0.38	0.00	0.00	63,870	25,612
6	MC	Reading	0.58	0.56	0.33	0.33	0.00	0.00	63,861	7,949
6	TE	Writing	0.45	0.48	0.23	0.19	0.00	0.00	63,841	17,674
6		AVERAGE	0.62	0.63	0.35	0.35	0.00	0.00		
7	MC	Writing	0.84	0.79	0.31	0.38	0.00	0.00	7,836	63,384
7	TE	Writing	0.31	0.30	0.30	0.38	0.00	0.00	7,852	63,367
7	MC	Writing	0.58	0.63	0.19	0.32	0.00	0.00	7,853	63,394
7	MC	Research	0.61	0.57	0.21	0.22	0.00	0.00	7,829	63,409
7	TE	Research	0.66	0.73	0.46	0.43	0.00	0.00	7,836	63,253
7	MC	Reading	0.50	0.65	0.27	0.28	0.00	0.00	15,655	63,417
7	MC	Reading	0.69	0.80	0.42	0.41	0.00	0.00	15,663	63,401
7	ESR	Reading	0.45	0.58	0.50	0.50	0.00	0.00	15,667	63,445
7	TE	Reading	0.68	0.72	0.40	0.44	0.01	0.02	15,601	61,917
7	TE	Writing	0.62	0.65	0.26	0.34	0.00	0.00	7,823	63,318
7		AVERAGE	0.59	0.64	0.33	0.37	0.00	0.00		

Table 6.21: ELA Grade 7 vs. Grade 8 Vertical Linking Item Statistics

Item Grade	Item Type	Strand	PvalG7	PvalG8	RitG7	RitG8	OmitG7	OmitG8	Nobs G7	Nobs G8
7	MC	Writing	0.45	0.54	0.26	0.21	0.00	0.00	63,393	14,921
7	TE	Research	0.20	0.22	0.20	0.24	0.00	0.00	63,362	14,918
7	MC	Writing	0.48	0.51	0.34	0.34	0.00	0.00	63,388	14,916
7	MC	Writing	0.51	0.56	0.33	0.22	0.00	0.00	63,388	24,211
7	MC	Writing	0.47	0.59	0.40	0.39	0.00	0.00	63,375	14,900
7	MC	Research	0.63	0.70	0.42	0.41	0.00	0.00	63,413	24,236
7	MC	Reading	0.57	0.59	0.45	0.35	0.00	0.00	63,394	39,138
7	MC	Reading	0.71	0.71	0.42	0.38	0.00	0.00	63,422	39,140
7	MC	Reading	0.58	0.58	0.33	0.26	0.00	0.00	63,369	39,146
7	TE	Reading	0.29	0.31	0.38	0.37	0.00	0.00	63,412	39,151
7		AVERAGE	0.49	0.53	0.35	0.32	0.00	0.00		
8	MC	Writing	0.67	0.71	0.29	0.37	0.00	0.00	7,957	63,409
8	MC	Research	0.56	0.64	0.36	0.41	0.00	0.00	7,948	63,428
8	TE	Research	0.93	0.93	0.31	0.35	0.00	0.00	7,955	63,410
8	TE	Writing	0.38	0.39	0.43	0.51	0.00	0.00	7,939	63,284
8	MC	Writing	0.60	0.61	0.33	0.38	0.00	0.00	7,916	63,382
8	MC	Writing	0.77	0.74	0.33	0.40	0.00	0.00	7,914	63,376
8	MC	Reading	0.40	0.51	0.13	0.18	0.00	0.00	15,895	63,442
8	MC	Reading	0.64	0.74	0.42	0.40	0.00	0.00	15,888	63,425
8	ESR	Reading	0.53	0.66	0.52	0.50	0.00	0.00	15,900	63,448
8	MC	Reading	0.63	0.75	0.49	0.48	0.00	0.00	15,874	63,425
8		AVERAGE	0.61	0.67	0.36	0.40	0.00	0.00		

Table 6.22: Mathematics Grade 3 vs. Grade 4 Vertical Linking Item Statistics

Item Grade	Item Type	Strand	PvalG3	PvalG4	RitG3	RitG4	OmitG3	OmitG4	Nobs G3	Nobs G4
3	MC	NF	0.45	0.67	0.35	0.44	0.00	0.00	69,154	10,010
3	MC	MD	0.18	0.28	0.28	0.40	0.00	0.00	69,254	10,005
3	MC	NBT	0.45	0.42	0.40	0.39	0.00	0.00	69,255	29,274
3	MC	GE	0.53	0.58	0.43	0.39	0.00	0.00	69,266	29,270
3	MC	NF	0.89	0.91	0.33	0.24	0.00	0.00	69,256	29,255
3	MC	OA	0.40	0.59	0.45	0.39	0.00	0.00	69,235	10,011
3	MC	MD	0.47	0.52	0.39	0.39	0.00	0.00	69,238	29,285
3	MC	OA	0.42	0.53	0.37	0.40	0.00	0.00	69,235	10,009
3	MC	MD	0.19	0.27	0.26	0.39	0.00	0.00	69,232	10,011
3	MC	OA	0.63	0.72	0.43	0.39	0.00	0.00	69,241	29,275
3		AVERAGE	0.46	0.55	0.37	0.38	0.00	0.00		
4	MC	OA	0.59	0.72	0.27	0.44	0.00	0.00	18,131	67,830
4	MC	OA	0.40	0.45	0.16	0.30	0.00	0.00	38,557	67,826
4	MC	NBT	0.79	0.73	0.42	0.44	0.00	0.00	18,131	67,836
4	MC	NF	0.36	0.67	0.41	0.53	0.00	0.00	38,523	67,819
4	MC	NF	0.36	0.74	0.11	0.43	0.00	0.00	18,131	67,830
4	MC	NF	0.40	0.52	0.43	0.58	0.00	0.00	18,129	67,820
4	MC	MD	0.24	0.31	0.16	0.36	0.00	0.00	18,130	67,832
4	MC	NBT	0.14	0.32	0.25	0.47	0.00	0.00	38,545	67,830
4	MC	MD	0.51	0.62	0.49	0.51	0.00	0.00	38,559	67,835
4	MC	GE	0.28	0.65	0.13	0.42	0.00	0.00	38,543	67,842
4		AVERAGE	0.41	0.57	0.28	0.45	0.00	0.00		

Note: Content categories are as follows: OA = Operations and Algebraic Thinking; NBT = Numbers and Operations in Base Ten; NF = Numbers and Operations–Fractions; MD = Measurement and Data; GE = Geometry; RP = Ratios and Proportional Relationships; NS = The Number System; EE = Expressions and Equations; SP = Statistics and Probability; and FN = Functions.

Table 6.23: Mathematics Grade 4 vs. Grade 5 Vertical Linking Item Statistics

Item Grade	Item Type	Strand	PvalG4	PvalG5	RitG4	RitG5	OmitG4	OmitG5	Nobs G4	Nobs G5
4	MC	NBT	0.60	0.71	0.47	0.40	0.00	0.00	67,773	27,924
4	MC	NBT	0.42	0.53	0.36	0.34	0.00	0.00	67,807	10,187
4	MC	MD	0.47	0.52	0.50	0.44	0.00	0.00	67,823	27,933
4	MC	NF	0.47	0.60	0.60	0.51	0.00	0.00	67,830	10,188
4	MC	NF	0.35	0.40	0.53	0.56	0.00	0.00	67,821	27,903
4	MC	MD	0.61	0.63	0.42	0.24	0.00	0.00	67,811	10,193
4	MC	OA	0.41	0.41	0.29	0.38	0.00	0.00	67,797	27,930
4	MC	GE	0.38	0.39	0.32	0.31	0.00	0.00	67,822	27,922
4	MC	NF	0.44	0.57	0.60	0.49	0.00	0.00	67,798	10,185
4	MC	OA	0.26	0.32	0.21	0.23	0.00	0.00	67,827	10,194
4		AVERAGE	0.44	0.51	0.43	0.39	0.00	0.00		
5	MC	OA	0.47	0.52	0.25	0.31	0.00	0.00	10,122	66,796
5	MC	NF	0.33	0.47	0.19	0.47	0.00	0.00	10,119	66,797
5	MC	MD	0.59	0.56	0.06	0.19	0.00	0.00	9,979	66,790
5	MC	GE	0.49	0.46	0.18	0.27		0.00	9,982	66,789
5	MC	MD	0.33	0.39	0.16	0.32	0.00	0.00	10,118	66,785
5	MC	NF	0.55	0.55	0.13	0.27	0.00	0.00	9,974	66,783
5	MC	NF	0.35	0.47	0.49	0.56	0.00	0.00	10,120	66,790
5	MC	OA	0.39	0.51	0.31	0.45	0.00	0.00	9,976	66,797
5	MC	NBT	0.54	0.64	0.33	0.39	0.00	0.00	9,979	66,813
5	MC	NBT	0.82	0.83	0.30	0.29	0.00	0.00	10,117	66,798
5		AVERAGE	0.49	0.54	0.24	0.35	0.00	0.00		

Note: Content categories are as follows: OA = Operations and Algebraic Thinking; NBT = Numbers and Operations in Base Ten; NF = Numbers and Operations–Fractions; MD = Measurement and Data; GE = Geometry; RP = Ratios and Proportional Relationships; NS = The Number System; EE = Expressions and Equations; SP = Statistics and Probability; and FN = Functions.

Table 6.24: Mathematics Grade 5 vs. Grade 6 Vertical Linking Item Statistics

Item Grade	Item Type	Strand	PvalG5	PvalG6	RitG5	RitG6	OmitG5	OmitG6	Nobs G5	Nobs G6
5	MS	OA	0.33	0.31	0.56	0.53	0.00	0.00	66,800	24,592
5	TE	NF	0.32	0.27	0.62	0.50	0.00	0.00	66,750	11,261
5	MC	OA	0.74	0.81	0.43	0.38	0.00	0.00	66,802	11,260
5	MC	MD	0.28	0.27	0.44	0.40	0.00	0.00	66,768	24,564
5	MC	NF	0.42	0.48	0.21	0.29	0.00	0.00	66,775	11,261
5	MC	NBT	0.65	0.72	0.42	0.39	0.00	0.00	66,783	24,579
5	SA	NBT	0.45	0.52	0.48	0.39	0.00	0.00	66,733	24,565
5	MS	NF	0.15	0.16	0.52	0.46	0.00	0.00	66,808	11,266
5	TE	MD	0.22	0.18	0.50	0.40	0.01	0.02	66,293	24,187
5	MS	GE	0.12	0.12	0.28	0.23	0.00	0.00	66,799	11,270
5		AVERAGE	0.37	0.38	0.45	0.40	0.00	0.00		
6	MC	EE	0.23	0.35	-0.04	0.24	0.00	0.00	10,199	66,282
6	MC	NS	0.54	0.61	0.36	0.45	0.00	0.00	10,279	66,313
6	MC	NS	0.87	0.86	0.31	0.35	0.00	0.00	10,281	66,312
6	MC	EE	0.69	0.63	0.16	0.33	0.00	0.00	10,195	66,285
6	MC	RP	0.43	0.50	0.21	0.32	0.00	0.00	10,201	66,295
6	MC	NS	0.96	0.93	0.20	0.32	0.00	0.00	10,203	66,304
6	MC	NS	0.67	0.64	0.33	0.42	0.00	0.00	10,201	66,292
6	MC	RP	0.93	0.91	0.27	0.37	0.00	0.00	10,281	66,307
6	MS	EE	0.26	0.32	0.38	0.45	0.00	0.00	10,281	66,321
6	MC	EE	0.35	0.54	0.24	0.43	0.00	0.00	10,282	66,297
6		AVERAGE	0.59	0.63	0.24	0.37	0.00	0.00		

Note: Content categories are as follows: OA = Operations and Algebraic Thinking; NBT = Numbers and Operations in Base Ten; NF = Numbers and Operations–Fractions; MD = Measurement and Data; GE = Geometry; RP = Ratios and Proportional Relationships; NS = The Number System; EE = Expressions and Equations; SP = Statistics and Probability; and FN = Functions.

Table 6.25: Mathematics Grade 6 vs. Grade 7 Vertical Linking Item Statistics

Item Grade	Item Type	Strand	PvalG6	PvalG7	RitG6	RitG7	OmitG6	OmitG7	Nobs G6	Nobs G7
6	MC	NS	0.56	0.51	0.41	0.34	0.00	0.00	66,279	23,898
6	MC	EE	0.39	0.35	0.29	0.25	0.00	0.00	66,301	23,890
6	MC	RP	0.15	0.12	0.45	0.40	0.00	0.00	66,295	23,922
6	MC	RP	0.31	0.30	0.14	0.05	0.00	0.00	66,290	11,246
6	MC	EE	0.33	0.45	0.32	0.34	0.00	0.00	66,301	11,240
6	MC	NS	0.37	0.41	0.54	0.50	0.00	0.00	66,234	11,236
6	SA	GE	0.09	0.11	0.45	0.51	0.00	0.01	66,186	23,776
6	SA	EE	0.26	0.42	0.53	0.46	0.00	0.01	66,149	11,188
6	MS	SP	0.06	0.07	0.18	0.20	0.00	0.00	66,279	11,236
6	MS	EE	0.14	0.17	0.37	0.42	0.00	0.00	66,317	23,917
6		AVERAGE	0.27	0.29	0.37	0.35	0.00	0.00		
7	MC	RP	0.59	0.61	0.37	0.46	0.00	0.00	22,416	65,047
7	MC	NS	0.20	0.34	0.18	0.38	0.00	0.00	11,212	65,117
7	MC	NS	0.47	0.43	0.35	0.38	0.00	0.00	11,199	65,120
7	MC	SP	0.62	0.55	0.19	0.23	0.00	0.00	22,414	65,008
7	MC	EE	0.36	0.27	0.10	0.14	0.00	0.00	11,213	65,106
7	MC	EE	0.46	0.51	0.12	0.28	0.00	0.00	11,203	65,096
7	MS	EE	0.08	0.15	0.33	0.43	0.00	0.00	11,199	65,119
7	MC	NS	0.21	0.18	0.09	0.14	0.00	0.00	11,213	65,097
7		AVERAGE	0.37	0.38	0.22	0.30	0.00	0.00		

Note: Content categories are as follows: OA = Operations and Algebraic Thinking; NBT = Numbers and Operations in Base Ten; NF = Numbers and Operations—Fractions; MD = Measurement and Data; GE = Geometry; RP = Ratios and Proportional Relationships; NS = The Number System; EE = Expressions and Equations; SP = Statistics and Probability; and FN = Functions.

Table 6.26: Mathematics Grade 7 vs. Grade 8 Vertical Linking Item Statistics

Item Grade	Item Type	Strand	PvalG7	PvalG8	RitG7	RitG8	OmitG7	OmitG8	Nobs G7	Nobs G8
7	MC	SP	0.50	0.57	0.50	0.37	0.00	0.00	65,016	16,144
7	MC	RP	0.42	0.40	0.18	0.10	0.00	0.00	65,039	26,676
7	MC	EE	0.31	0.34	0.40	0.30	0.00	0.00	65,003	16,156
7	MC	GE	0.32	0.39	0.40	0.38	0.00	0.00	65,060	16,146
7	MC	GE	0.53	0.51	0.30	0.14	0.00	0.00	65,040	26,668
7	SA	NS	0.12	0.08	0.42	0.26	0.00	0.01	64,904	26,540
7	MS	NS	0.20	0.16	0.42	0.24	0.00	0.00	65,115	16,165
7	SA	RP	0.25	0.27	0.62	0.47	0.01	0.01	64,816	16,063
7	MS	EE	0.12	0.10	0.33	0.22	0.00	0.00	65,044	26,682
7	MS	SP	0.08	0.07	0.41	0.34	0.00	0.00	64,972	26,668
7		AVERAGE	0.28	0.29	0.40	0.28	0.00	0.00		
8	MC	NS	0.40	0.36	0.21	0.19	0.00	0.00	11,240	52,650
8	MC	EE	0.58	0.59	0.20	0.23	0.00	0.00	11,236	52,624
8	MC	EE	0.58	0.46	0.18	0.22	0.00	0.00	11,243	52,601
8	MC	EE	0.33	0.36	0.30	0.36	0.00	0.00	11,249	52,652
8	MC	GE	0.45	0.45	0.16	0.23	0.00	0.00	11,228	52,609
8	MC	GE	0.37	0.32	-0.06	0.01	0.00	0.00	11,248	52,616
8	MC	SP	0.48	0.54	0.33	0.37	0.00	0.00	11,223	52,617
8	MC	FN	0.43	0.45	0.01	0.11	0.00	0.00	11,232	52,594
8	MC	FN	0.77	0.70	0.40	0.40	0.00	0.00	11,233	52,599
8	MC	GE	0.27	0.27	-0.02	0.05	0.00	0.00	11,234	52,572
8		AVERAGE	0.47	0.45	0.17	0.22	0.00	0.00		

Note: Content categories are as follows: OA = Operations and Algebraic Thinking; NBT = Numbers and Operations in Base Ten; NF = Numbers and Operations–Fractions; MD = Measurement and Data; GE = Geometry; RP = Ratios and Proportional Relationships; NS = The Number System; EE = Expressions and Equations; SP = Statistics and Probability; and FN = Functions.

Table 6.27: Summary of Calibration and Census Data: ELA

	Calibration Sample		Census Data (2016)		Difference
	N	%	N	%	(Calib. % – Census %)
ELA, Grade 3					
All Students	69,190	100.0%	69,524	100.00%	
Gender					
Male	35,206	50.9%	35,398	50.90%	0.0%
Female	33,984	49.1%	34,126	49.10%	0.0%
Race/Ethnicity					
White	48,830	70.6%	48,827	70.20%	0.4%
Black	11,576	16.7%	11,562	16.60%	0.1%
Hispanic	4,297	6.2%	4,464	6.40%	-0.2%
Asian/Pacific Islander	1,429	2.1%	1,476	2.10%	0.0%
American Indian	274	0.4%	273	0.40%	0.0%
Other	2,784	4.0%	2,922	4.20%	-0.2%
ELA, Grade 4					
All Students	67,673	100.0%	67,988	100.00%	
Gender					
Male	34,659	51.2%	34,842	51.20%	0.0%
Female	33,014	48.8%	33,146	48.80%	0.0%
Race/Ethnicity					
White	48,327	71.4%	48,265	71.00%	0.4%
Black	11,077	16.4%	11,086	16.30%	0.1%
Hispanic	4,209	6.2%	4,393	6.50%	-0.3%
Asian/Pacific Islander	1,455	2.2%	1,487	2.20%	0.0%
American Indian	239	0.4%	241	0.40%	0.0%
Other	2,366	3.5%	2,516	3.70%	-0.2%
ELA, Grade 5					
All Students	66,635	100.0%	66,957	100.00%	
Gender					
Male	34,021	51.1%	34,202	51.10%	0.0%
Female	32,614	48.9%	32,755	48.90%	0.0%
Race/Ethnicity					
White	48,170	72.3%	48,151	71.90%	0.4%
Black	10,497	15.8%	10,523	15.70%	0.1%
Hispanic	4,089	6.1%	4,236	6.30%	-0.2%
Asian/Pacific Islander	1,456	2.2%	1,497	2.20%	0.0%
American Indian	275	0.4%	272	0.40%	0.0%
Other	2,148	3.2%	2,278	3.40%	-0.2%

Table 6.27: Summary of Calibration and Census Data: ELA (cont.)

	Calibration Sample		Census Data (2016)		Difference (Calib. % – Census %)
	N	%	N	%	
ELA, Grade 6					
All Students	63,889	100.0%	66,519	100.00%	
Gender					
Male	32,314	50.6%	34,009	51.10%	-0.5%
Female	31,575	49.4%	32,510	48.90%	0.5%
Race/Ethnicity					
White	46,411	72.6%	48,215	72.50%	0.1%
Black	10,267	16.1%	10,599	15.90%	0.2%
Hispanic	3,676	5.8%	3,981	6.00%	-0.2%
Asian/Pacific Islander	1,467	2.3%	1,495	2.20%	0.1%
American Indian	270	0.4%	282	0.40%	0.0%
Other	1,798	2.8%	1,947	2.90%	-0.1%
ELA, Grade 7					
All Students	63,470	100.0%	66,161	100.00%	
Gender					
Male	32,056	50.5%	33,818	51.10%	-0.6%
Female	31,414	49.5%	32,343	48.90%	0.6%
Race/Ethnicity					
White	46,435	73.2%	48,222	72.90%	0.3%
Black	10,080	15.9%	10,488	15.90%	0.0%
Hispanic	3,570	5.6%	3,878	5.90%	-0.3%
Asian/Pacific Islander	1,439	2.3%	1,482	2.20%	0.1%
American Indian	244	0.4%	261	0.40%	0.0%
Other	1,702	2.7%	1,830	2.80%	-0.1%
ELA, Grade 8					
All Students	63,468	100.0%	65,859	100.00%	
Gender					
Male	32,250	50.8%	33,833	51.40%	-0.6%
Female	31,218	49.2%	32,026	48.60%	0.6%
Race/Ethnicity					
White	46,338	73.0%	47,975	72.80%	0.2%
Black	10,134	16.0%	10,486	15.90%	0.1%
Hispanic	3,587	5.7%	3,864	5.90%	-0.2%
Asian/Pacific Islander	1,454	2.3%	1,465	2.20%	0.1%
American Indian	303	0.5%	317	0.50%	0.0%
Other	1,652	2.6%	1,752	2.70%	-0.1%

Table 6.28: Summary of Calibration and Census Data: Mathematics

	Calibration Sample		Census Data (2016)		Difference
	N	%	N	%	(Calib. % – Census %)
Mathematics, Grade 3					
All Students	69,314	100.0%	69,518	100.00%	
Gender					
Male	35,268	50.9%	35,390	50.90%	0.00%
Female	34,046	49.1%	34,128	49.10%	0.00%
Race/Ethnicity					
White	48,818	70.4%	48,793	70.20%	0.20%
Black	11,594	16.7%	11,561	16.60%	0.10%
Hispanic	4,342	6.3%	4,477	6.40%	-0.10%
Asian/Pacific Islander	1,500	2.2%	1,491	2.10%	0.10%
American Indian	276	0.4%	274	0.40%	0.00%
Other	2,784	4.0%	2,922	4.20%	-0.20%
Mathematics, Grade 4					
All Students	67,869	100.0%	67,990	100.00%	
Gender					
Male	34,770	51.2%	34,844	51.20%	0.0%
Female	33,099	48.8%	33,146	48.80%	0.0%
Race/Ethnicity					
White	48,348	71.2%	48,250	71.00%	0.2%
Black	11,142	16.4%	11,086	16.30%	0.1%
Hispanic	4,264	6.3%	4,401	6.50%	-0.2%
Asian/Pacific Islander	1,506	2.2%	1,498	2.20%	0.0%
American Indian	240	0.4%	241	0.40%	0.0%
Other	2,369	3.5%	2,514	3.70%	-0.2%
Mathematics, Grade 5					
All Students	66,846	100.0%	66,953	100.00%	
Gender					
Male	34,137	51.1%	34,200	51.10%	0.0%
Female	32,709	48.9%	32,753	48.90%	0.0%
Race/Ethnicity					
White	48,207	72.1%	48,133	71.90%	0.2%
Black	10,558	15.8%	10,516	15.70%	0.1%
Hispanic	4,146	6.2%	4,252	6.40%	-0.2%
Asian/Pacific Islander	1,506	2.3%	1,503	2.20%	0.1%
American Indian	277	0.4%	272	0.40%	0.0%
Other	2,152	3.2%	2,277	3.40%	-0.2%

Table 6:28: Summary of Calibration and Census Data: Mathematics (cont.)

	Calibration Sample		Census Data (2016)		Difference
	N	%	N	%	(Calib. % - Census %)
Mathematics, Grade 6					
All Students	66,355	100.0%	66,504	100.00%	
Gender					
Male	33,896	51.1%	33,986	51.10%	0.0%
Female	32,459	48.9%	32,518	48.90%	0.0%
Race/Ethnicity					
White	48,209	72.7%	48,202	72.50%	0.2%
Black	10,627	16.0%	10,603	15.90%	0.1%
Hispanic	3,878	5.8%	3,995	6.00%	-0.2%
Asian/Pacific Islander	1,486	2.2%	1,476	2.20%	0.0%
American Indian	276	0.4%	283	0.40%	0.0%
Other	1,879	2.8%	1,945	2.90%	-0.1%
Mathematics, Grade 7					
All Students	65,148	100.0%	65,334	100.00%	
Gender					
Male	33,252	51.0%	33,368	51.10%	-0.1%
Female	31,896	49.0%	31,966	48.90%	0.1%
Race/Ethnicity					
White	47,540	73.0%	47,594	72.80%	0.2%
Black	10,477	16.1%	10,451	16.00%	0.1%
Hispanic	3,747	5.8%	3,866	5.90%	-0.1%
Asian/Pacific Islander	1,369	2.1%	1,368	2.10%	0.0%
American Indian	263	0.4%	260	0.40%	0.0%
Other	1,752	2.7%	1,795	2.70%	0.0%
Mathematics, Grade 8					
All Students	52,692	100.0%	52,870	100.00%	
Gender					
Male	27,502	52.2%	27,615	52.20%	0.0%
Female	25,190	47.8%	25,255	47.80%	0.0%
Race/Ethnicity					
White	37,817	71.8%	37,873	71.60%	0.2%
Black	9,220	17.5%	9,220	17.40%	0.1%
Hispanic	3,102	5.9%	3,201	6.10%	-0.2%
Asian/Pacific Islander	908	1.7%	894	1.70%	0.0%
American Indian	274	0.5%	275	0.50%	0.0%
Other	1,371	2.6%	1,407	2.70%	-0.1%

Table 6.29: ELA Population Ability Estimates across Multiple Groups on All Items

Estimates	Grade					
	3	4	5 (base)	6	7	8
N-Count	69,190	67,673	66,635	63,889	63,470	63,468
Mean Theta	-1.28	-0.58	-0.22	0.00	0.21	0.54
Theta SD	1.25	1.26	1.29	1.13	1.35	1.3

Table 6.30: Mathematics Population Ability Estimates across Multiple Groups on All Items

Estimates	Grade					
	3	4	5 (base)	6	7	8
N-Count	69,314	67,869	66,846	66,355	65,148	52,692
Mean Theta	-1.16	-0.57	-0.12	0.04	0.18	0.07
Theta SD	1.15	1.43	1.18	1.17	1.36	1.68

Table 6.31: Transformation Constants for ELA and Mathematics Base Grades

Content Area and Grade	Target Scale Properties in Scale Score Metric		Estimated Population Ability in Theta Metric		Transformation Constants	
	Mean	SD	Mean	SD	M1	M2
ELA 5	500	50	-0.21	1.275	39.21569	508.23529
Math 5	500	50	-0.11	1.169	42.77160	504.70488

Table 6.32: ELA Items Flagged for Poor Fit

Item Position in Calib.	Item ID	Item Grade	Model	ChiSqr	Chi DF	Total N	Z Score	Z Obsd	Z Pred	Obsd-Pred
41	692626	3	2PPC	928.53	8	69,186	230.13	0.4433	0.4436	-0.0003
108	755385	4	2PPC	883.05	8	67,647	218.76	0.5099	0.5112	-0.0014
113*	693154	5	2PPC	1201.33	8	73,934	298.33	0.4039	0.4068	-0.0029
119	701085	5	2PPC	752.26	8	66,630	186.06	0.1707	0.1769	-0.0062
173*	693930	6	3PL	1554.65	7	71,331	413.63	0.0606	0.0658	-0.0053
198	699807	6	2PPC	1142.38	8	63,885	283.60	0.1210	0.1252	-0.0042
264	755285	7	2PPC	1813.21	8	63,468	451.30	0.4567	0.4580	-0.0013
303	698853	8	2PPC	890.99	8	63,458	220.75	0.5858	0.5851	0.0007
312	755270	8	2PPC	1245.79	8	63,458	309.45	0.2666	0.2694	-0.0027

Note: * in the first column indicates a linking item.

Table 6.33: Mathematics Items Flagged for Poor Fit

Item Position in Calib.	Item ID	Item Grade	Model	ChiSqr	Chi DF	TotalN	Z Score	Z Obsd	Z Pred	Obsd-Pred
106	686764	5	3PL	2568.49	7	66,812	684.59	0.6408	0.5470	0.0938
126	689401	5	2PPC	5349.15	8	66,812	1335.29	0.4007	0.3977	0.003
139*	686030	6	3PL	9267.35	7	90,262	2474.93	0.1433	0.2528	-0.1095
182	686972	7	3PL	679.28	7	65,138	179.68	0.1579	0.1621	-0.0042

Note: An * in the first column indicates a linking item.

Table 6.34: ELA Scale Score Means and Standard Deviations

Grade	Scale Statistics		Mean Difference between Grades (Scale Score Points)
	Mean	SD	
3	458.41	50.02	
4	485.86	49.93	27.64
5	499.62	51.08	13.76
6	508.66	44.40	9.04
7	517.14	53.54	8.48
8	529.75	51.18	12.60

Table 6.35: ELA Scale Scores at Different Percentiles across Grades

Grade	Percentile				
	10 th	25 th	50 th	75 th	90 th
3	396	427	460	491	520
4	421	455	489	519	545
5	435	468	503	534	559
6	452	480	510	538	564
7	447	482	520	554	583
8	466	498	531	564	593

Table 6.36: Mathematics Scale Score Means and Standard Deviations

Grade	Scale Statistics		Mean Difference between Grades (Scale Score Points)
	Mean	SD	
3	456.01	48.59	
4	481.93	55.94	25.92
5	499.97	49.86	18.05
6	507.16	48.02	7.19
7	514.69	50.24	7.53
8	515.07	49.06	0.38

Table 6.37: Mathematics Scale Scores at Different Percentiles across Grades

Grade	Percentile				
	10 th	25 th	50 th	75 th	90 th
3	395	427	460	488	514
4	420	456	489	517	541
5	437	470	504	533	559
6	446	477	510	540	566
7	454	486	518	549	574
8	451	491	522	547	569

Table 6.38: Spring 2015 Grade 7 Mathematics Scale Score Summary

Student Groups	N-Count	Mean Scale Score	Scale Score Standard Deviation
Total Population (students who took the Grade 7 Mathematics test in Spring 2015)	64,965	2529.79	97.26
Matched Students (students who took the Grade 7 Mathematics test in Spring 2015 and Grade 8 Mathematics test in Spring 2016)	49,385	2509.50	87.33
Unmatched Students (students who took the Grade 7 Mathematics test in Spring 2015 and are not in the Spring 2016 Mathematics data)	15,580	2594.12	99.11

Table 6.39: ELA and Mathematics Lowest and Highest Obtainable Scores

Grade	ELA		Mathematics	
	LOSS	HOSS	LOSS	HOSS
3	230	730	290	650
4	240	740	320	680
5	250	780	340	710
6	260	790	350	730
7	280	810	360	740
8	290	820	390	770

Figure 6.1: ELA Test Characteristic Curves

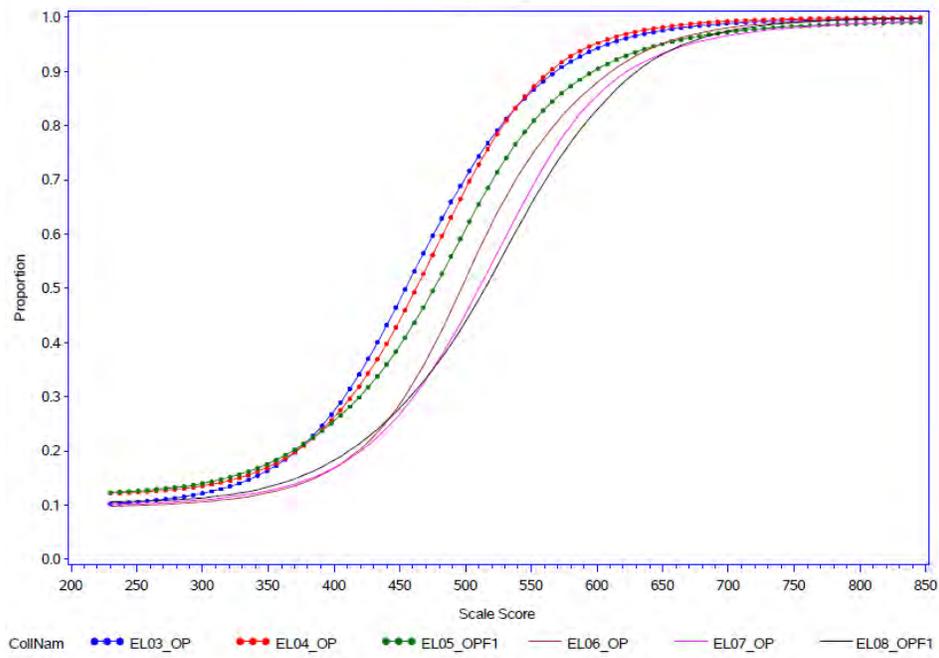


Figure 6.2: ELA Standard Error Curves

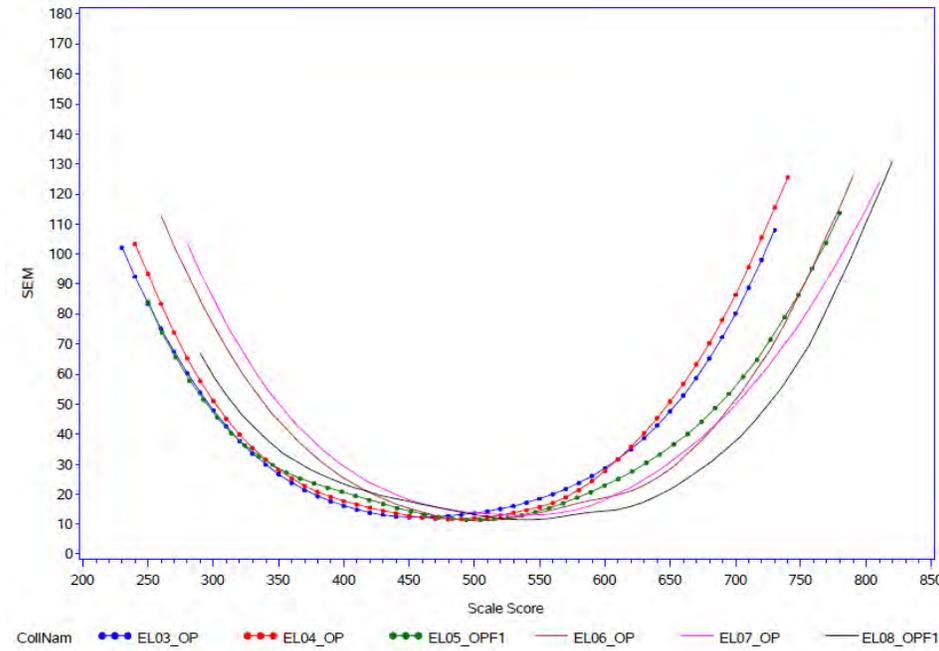


Figure 6.3: ELA Test Characteristic Curves for Grade 5 Forms

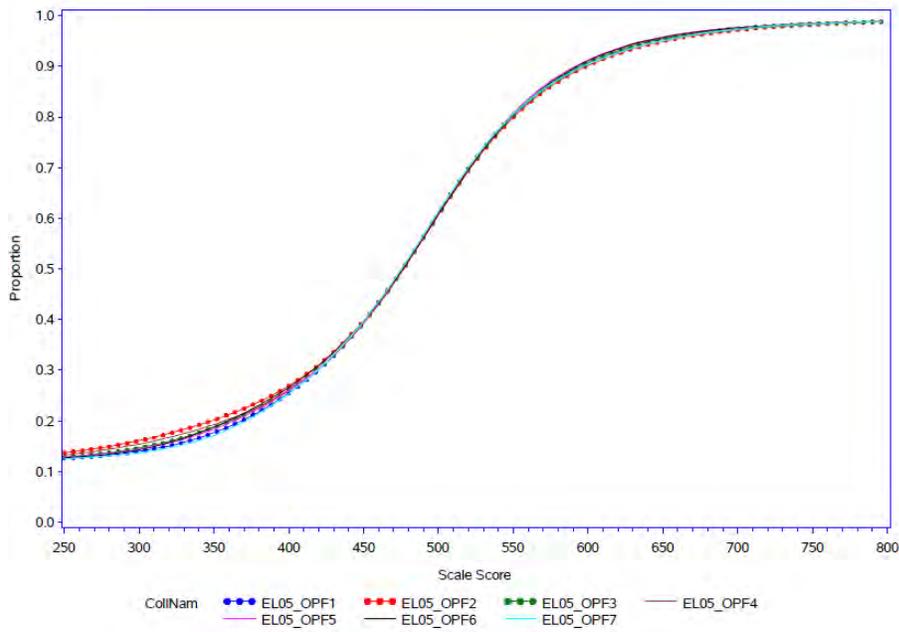


Figure 6.4: ELA Standard Error Curves for Grade 5 Forms

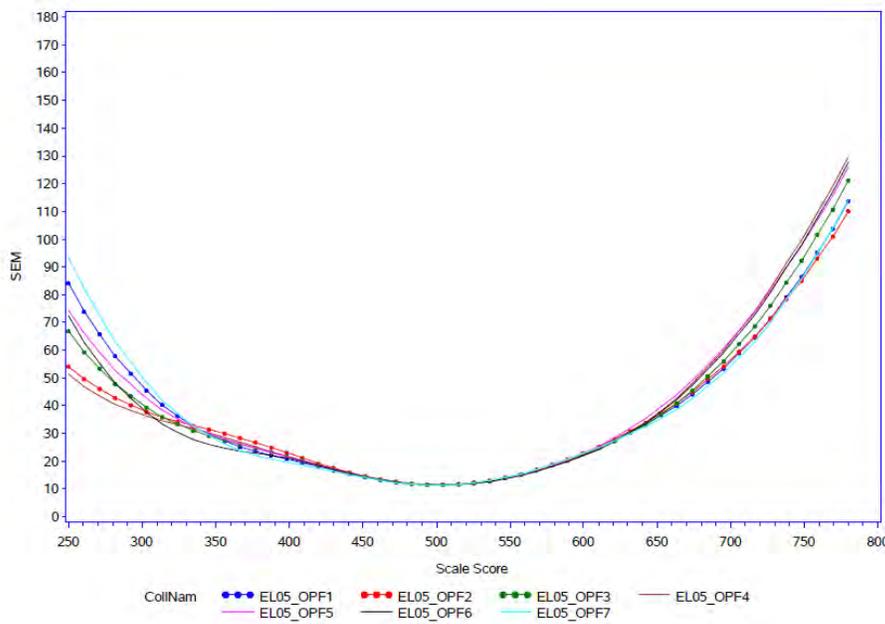


Figure 6.5: ELA Test Characteristic Curves for Grade 8 Forms

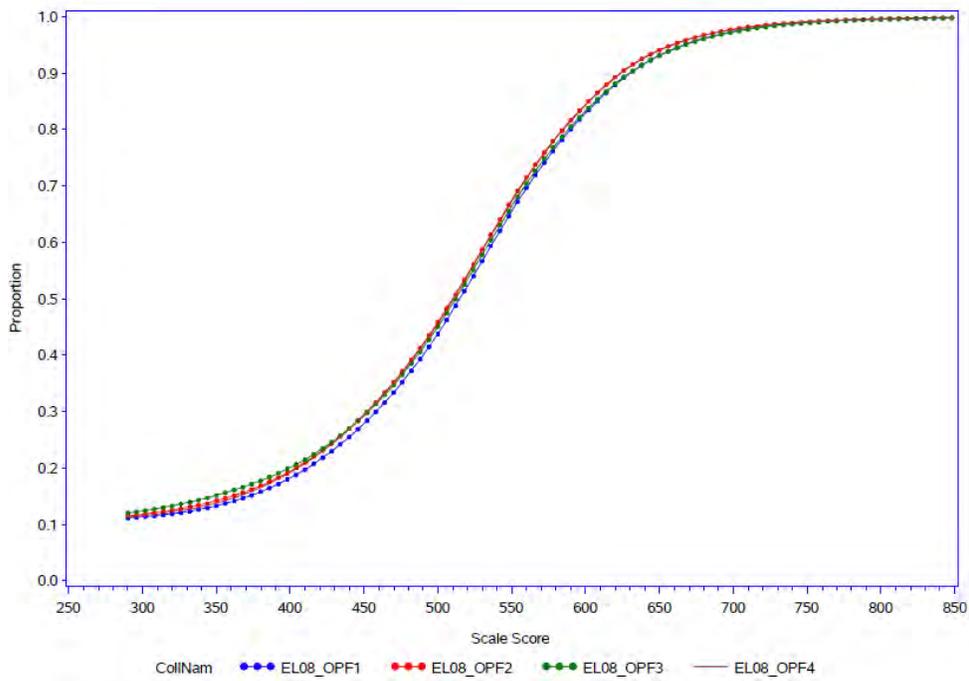


Figure 6.6: ELA Standard Error Curves for Grade 8 Forms

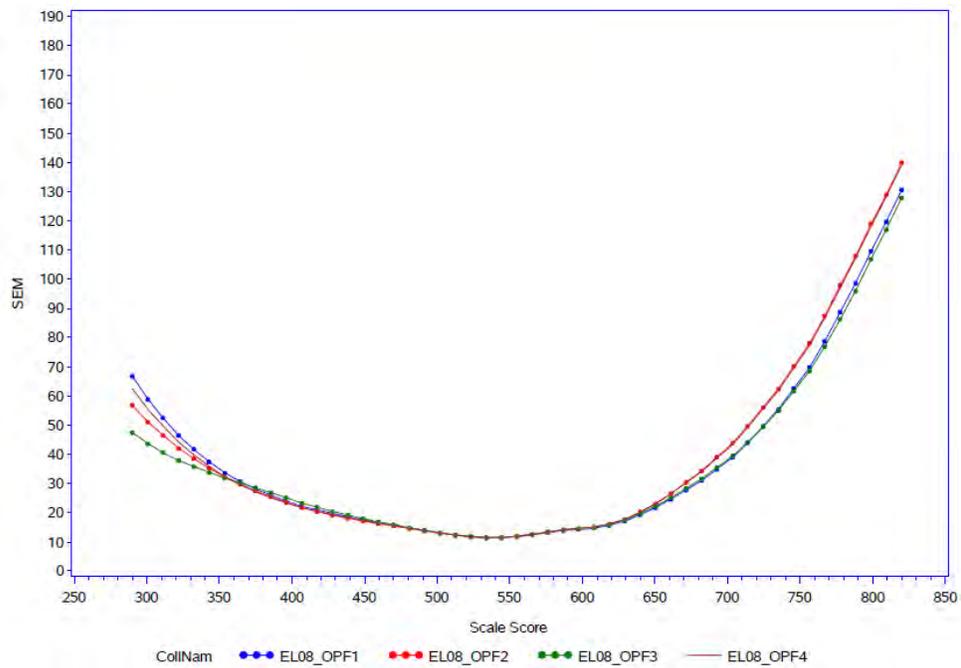


Figure 6.7: Mathematics Test Characteristic Curves

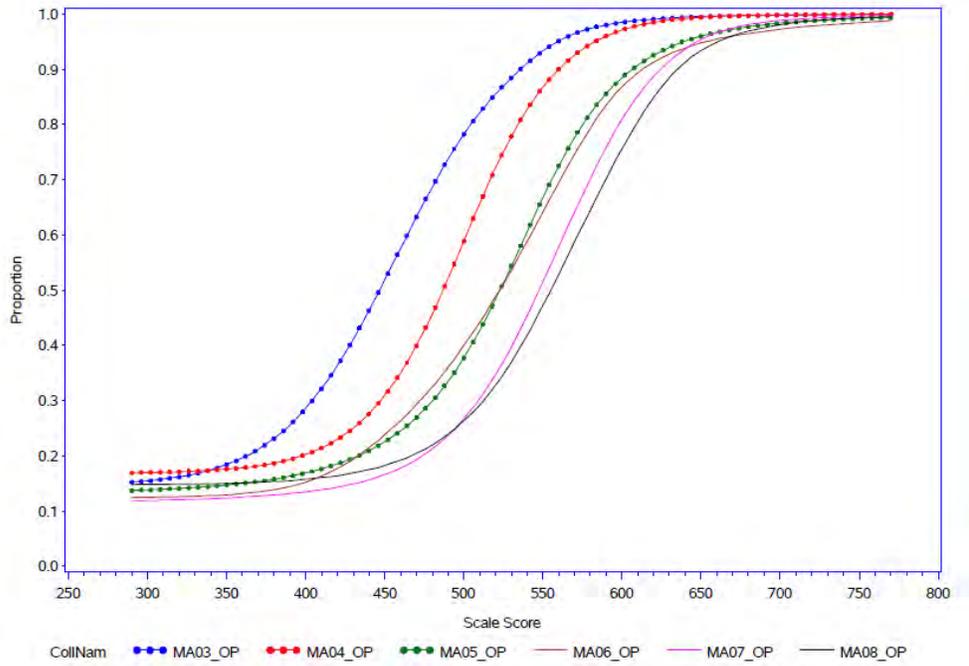
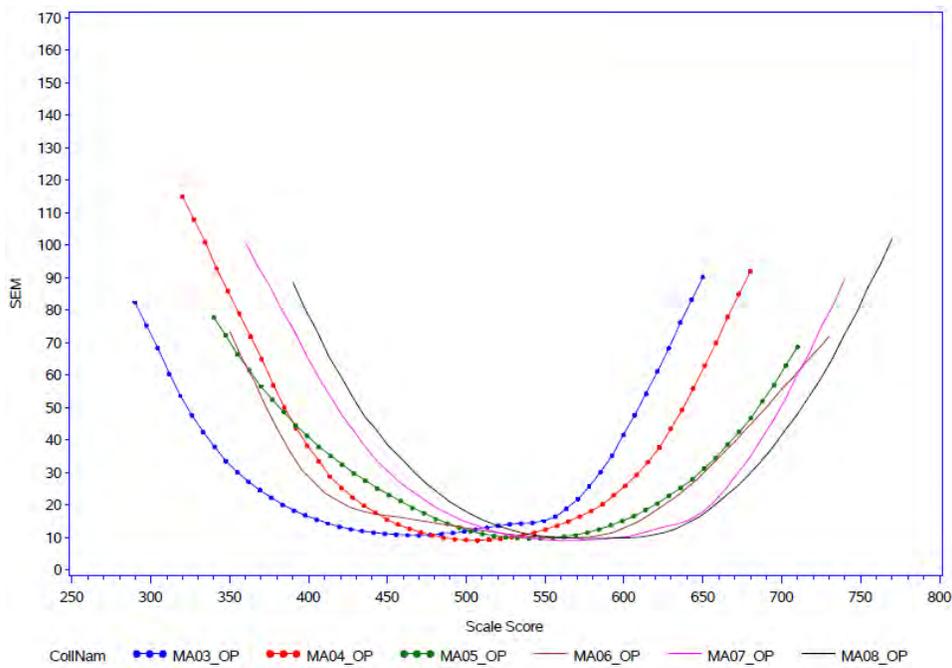


Figure 6.8: Mathematics Standard Error Curves



CHAPTER 7: TEST RESULTS

This chapter of the Technical Report contains information on the results of the Spring 2016 administration of the ELA and Mathematics MAP. The scale score results are presented here. Achievement-level information is also provided. Presenting the results by achievement level translates the quantitative scale provided through scale scores into a qualitative description of student achievement: *Below Basic*, *Basic*, *Proficient*, and *Advanced*.

While the scale score provides an essential quantitative reference to student achievement, the achievement-level information plainly outlines the meaning of the scores to parents, students, and educators. When combined, scale scores and achievement levels provide a comprehensive set of tools to assess Missouri student achievement by content and grade level.

This chapter also provides descriptions of the score reports, data structure, and interpretive guide. The AERA, APA, & NCME (2014) standards addressed in Chapter 7 are 5.1, 6.10, 7.0, and 12.18. Each standard will be presented in the pertinent section of this chapter.

Results presented in this Chapter are based on Missouri student census data. The results presented here may differ slightly from the official state summary report of all student populations due to ongoing resolution of test materials and student information. The results in the tables in this chapter are presented as evidence of reliability and validity of the intended interpretation of scores from the MAP assessments and should not be used for state accountability purposes.

7.1 Test Completion

The following are subgroups reported during the administration of the MAP tests (other demographic information is collected separately and merged into the MAP data after DRC sends DESE the General Research File):

- Gender: Female and Male
- Race/Ethnicity: White, Black, Hispanic, Asian/Pacific Islander, American Indian, and Other
- Accommodations: Students receiving testing accommodations

For the purposes of this report, test completion rate is defined as the percentage of students who received a valid scale score given the total number of students eligible to take the online test or receive a test book. These test completion rates are summarized in Tables 7.1 through 7.10. The tables show both the percentage of students classified as reportable and the number of students classified as accountable. Reportable students include all students with a valid scale score (teacher-invalidated students are excluded). The Accountable columns show the total number of students eligible to take an online

test or receive a test book. These include students who should have received a MAP scale score but who did not take the test and could not be assigned a scale score. It should be noted that approximately 20% of Grade 8 students took the Algebra 1 assessment instead of Mathematics. Exclusion of these students from the Mathematics assessment may affect the state level student performance in Mathematics.

7.2 Current Administration Data

The ELA and Mathematics MAP assessments were administered to students in Grades 3 through 8. Tables 7.11 and 7.12 provide a summary of the scale scores based on the state population for the 2016 administration of the ELA and Mathematics assessments, respectively.

7.3 Cross-Year, Cross-Sectional Comparisons

It is often desirable to examine the scores of students across time and monitor group performance. This is possible if the test content and the construct measured by the test are comparable from year to year and if the scores are reported on the same scale in multiple years. This was not the case for 2015–16 ELA and Mathematics assessments.

While the 2015–16 ELA and Mathematics assessments are comparable content- and construct-wise to the assessments administered in the 2014–15 year, new scales were developed for both ELA and Mathematics after the 2015–16 test administration. Therefore, the test scores for ELA and Mathematics are not directly comparable with the previous year scores and the cross-year scale score summary is not presented for ELA and Mathematics in this report.

Table 7.13 shows the percentage of students in each achievement level from 2005–06 through 2013–14 on the Communication Arts test and the percentage of students in each achievement level after the 2014–15 and 2015–16 ELA test administrations. It should be noted that the ELA test scores were reported on the Smarter Balanced Assessment Consortium (SBAC) scale after the 2014–15 test administration and that students were classified into the achievement levels based on the cut scores established after the 2014 SBAC field test on their item bank. The ELA scores after the 2015–16 test administration were reported on a new Missouri scale, and new cut scores were established by Missouri educators in a process of standard setting in the Summer of 2016 to reflect Missouri student performance on the new assessments. Therefore, the percentages of students in each achievement level after the 2014–15 test administration are not directly comparable to the percentages of students in each achievement level after the 2013–14 test administration; and the percentages of students in each achievement level after the 2015–16 test administration may differ significantly from the percentages of students in each achievement level after the 2014–15 test administration. The past data are provided in the table for reference purpose only and are separated from this year's data by gray horizontal bars.

Table 7.14 shows the percentage of students in each achievement level from 2005–06 through 2015–16 on the Mathematics test. Similar to ELA, the Mathematics test scores

were reported on the SBAC scale after the 2014–15 test administration and students were classified into the achievement levels based on the cut scores established after the 2014 field test by SBAC on their item bank. The Mathematics scores after the 2015–16 test administration were reported on a new Missouri vertical scale and new cut scores were set by Missouri educators in a process of standard setting in Summer of 2016. The past data are provided in the table for reference purpose only and are separated from this year data by gray horizontal bars. It is worth noting that not all Grade 8 students participate in Mathematics assessment. As stated in the previous chapter of this document, approximately 20% of Grade 8 students take the Algebra 1 assessment instead of Mathematics. Exclusion of these students from the Mathematics assessment may affect the state level student performance in Mathematics.

7.4 Reports

Score reports are the primary means of communicating test scores to relevant district personnel (i.e., Test Coordinators or superintendents), teachers, and parents. AERA, APA, & NCME (2014) Standard 6.10 states the following:

When test score information is released, those responsible for testing programs should provide interpretations appropriate to the audience. The interpretations should describe in simple language what the test covers, what scores represent, the precision/reliability of the scores, and how scores are intended to be used. (119)

Standard 5.1 is related in that it states the following:

Test users should be provided with clear explanations of the characteristics, meaning, and intended interpretation of scale scores, as well as their limitations. (102)

Interpretations related to the test scores are disseminated in two ways: (1) the individual score report and (2) the *Guide to Interpreting Results* (DRC, 2016).

In addition to providing interpretation, it is important that the information is understandable by the target audience. Standard 7.0 of the AERA, APA, & NCME (2014) *Standards* states the following:

Information relating to tests should be clearly documented so that those who use tests can make informed decisions regarding which test to use for a specific purpose, how to administer the chosen test, and how to interpret test scores. (125)

In support of Standard 7.0, the *Guide to Interpreting Results* (presented in Appendix D) is accessible to parents, teachers, and laypeople alike.

The individual student report is the primary means for sharing student test results with parents. As such, it should be a stand-alone document from which parents can glean

relevant information so they understand their child’s test score. In the 2015–16 administration year, DRC reported the MAP Grade-Level Assessment through the Missouri MAP Online Reporting System. The MAP online reporting system was delivered on the INSIGHT Online Reporting platform and is a browser-based system designed to deliver online interactive reporting to authorized users at the state and district level for the Missouri public schools

7.4.1 Description of Each Type of Report

In this section, descriptions for the following reports are provided: Student Roster, Individual Student Report, and Student Score Label. In addition, the Missouri Comprehensive Data System is briefly discussed.

In compliance with AERA, APA, & NCME (2014) Standard 12.18, the MAP score reports provide clear information about individual student achievement and groups of students. Standard 12.18 states the following:

In educational settings, score reports should be accompanied by a clear presentation of information on how to interpret the scores, including the degree of measurement error associated with each score or classification level, and by supplementary information related to group summary scores. In addition, dates of test administration and relevant norming studies should be included in score reports. (200)

Student Roster

Available from the Missouri Online Reporting System is a Student Roster that displays a list of students based on the specific report filter options selected, such as test administration, grade, school, district, gender, race/ethnicity, and examiner. Scale scores and achievement level indicators are displayed in a table-type format for the content area chosen. Selecting a student from the roster will open Individual Student Report. A PDF of the data displayed can be printed. A sample Student Roster report is provided in Appendix E, Figure E1.

Individual Student Report

The Individual Student Report (ISR) is another type of report available through the Missouri Online Reporting System. The Individual Student Reports are provided to schools to be sent home to the parents. On the left side of the page, the student’s identifying information and an overview of the performance, including the student’s MAP scale score results for a given content area, are shown. In the middle of the page, a bar graph and the student’s scale score are shown, along with the achievement level associated with that scale score for a given content area. This information is followed by a brief explanation of what the achievement level means. When a student does not receive a scale score, then his or her achievement level will be labeled “Level Not Determined” (LND). Invalidated students are assigned the lowest obtainable scale score (LOSS) for a given content area and the *Below Basic* achievement level. The ISR also

contains a brief explanation of the meaning of the content area achievement level indicators.

On the right side of the page, the content area achievement level descriptors and scale score ranges for each achievement level are listed. A sample ISR is provided in Appendix E, Figure E2.

Student Score Label

The Student Score Label is designed so that each student's test results can be placed in the student's permanent record. A label is provided for every student who participated in the spring administration of the MAP. Each label has a self-adhesive backing so that it can be peeled from the sheet and placed in the student's cumulative school record. The label presents a snapshot of the student's results on the MAP. Separate labels are generated for each grade and content area; thus, a student will have multiple labels—one for each content area administered. The label lists the student's scale score and achievement level for the content area. DRC provided multiple labels per student submitted for scoring. The labels are provided in print only. A sample Student Score Label report is provided in Appendix E, Figure E3.

Missouri Comprehensive Data System

Schools and districts are able to access summary level reports through the online Missouri Comprehensive Data System (MCDS). The MCDS allows school district personnel with appropriate permissions to access MAP data at a variety of levels and 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 the MCDS from the Data Management tab on DESE's home page (<http://dese.mo.gov/>). From there, they access the data portal directly through the MCDS link. Each school and/or district is assigned a user name and password so that it can access the site.

7.5 Data Structures

A data file referred to as General Research File (GRF) was provided to DESE by DRC. It contains one record for every test book submitted; each record contains demographic information for each student as well as item responses, total test raw scores and scale scores, student performance level classification, and percentage correct for each ELA and Mathematics content category.

7.5.1 General Research File

The layout for the state level GRF is included in Appendix E.

7.6 Interpreting Test Results

The student's correct responses to the assessment questions are used to derive a MAP scale score. The scale score describes achievement on a continuum that in most cases spans the complete range of Grades 3–8. These scores range in value from 230 to 820 for

English Language Arts and from 290 to 770 for Mathematics. Scores from adjacent grades may be compared within a content area. Scale scores cannot be compared across content areas. For example, it is appropriate to compare a student’s Grade 5 Mathematics scale score with his or her Grade 6 Mathematics scale score, but it is not appropriate to compare Mathematics and ELA scores. The MAP scale scores determine the student’s achievement level. Student performance can be reported in terms of four performance, or achievement, levels that describe a pathway to proficiency and college and career readiness. Each achievement level represents standards of performance for each assessed content area. Achievement-level scores provide a description of what students can do in terms of the content and skills assessed, as described in the Missouri Learning Standards.

The information on score interpretation is included in the *Guide to Interpreting Results*, which was written for Missouri teachers and administrators who receive score reports from the 2015–16 administration of the MAP. The *Guide to Interpreting Results* was developed collaboratively by DRC and DESE staff. DESE staff had opportunities to review, provide feedback, and give final approval.

This guide has three sections. The first section presents an overview of key terms and test related concepts. The second section discusses assessment terms and types of scores that will be presented on the score reports and presents the achievement-level descriptors for all grade/content areas. The third section presents sample score reports. The 2016 edition of the *Guide to Interpreting Results* is available on the DESE website at <https://dese.mo.gov/sites/default/files/asmt-gl-gir-spring-2016.pdf>.

7.7 Summary

In summary, the overall purpose of reporting test results is to communicate information on student performance to stakeholders. These results are presented in the context of score reports that aid the user in understanding the meaning of the test scores. The reports and ancillary information developed by DRC are in alignment with multiple best practices of the testing industry and, in particular, support the following AERA, APA, & NCME (2014) standards:

- Standard 5.1—Test users should be provided with clear explanations of the characteristics, meaning, and intended interpretation of scale scores, as well as their limitations.
- Standard 6.10—When test score information is released, those responsible for testing programs should provide interpretations appropriate to the audience. The interpretations should describe in simple language what the test covers, what scores represent, the precision/reliability of the scores, and how scores are intended to be used.
- Standard 7.0—Information relating to tests should be clearly documented so that those who use tests can make informed decisions regarding which test to use for a specific purpose, how to administer the chosen test, and how to interpret test scores.
- Standard 12.18—In educational settings, score reports should be accompanied by a clear presentation of information on how to interpret the scores, including the

degree of measurement error associated with each score or classification level, and by supplementary information related to group summary scores. In addition, dates of test administration and relevant norming studies should be included in score reports.

Table 7.1: Test Completion Rates: All Students

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics
3	69,524	99.76%	69,518	99.94%
4	67,988	99.75%	67,990	99.94%
5	66,957	99.78%	66,953	99.93%
6	66,519	99.80%	66,504	99.89%
7	66,161	99.75%	65,334	99.87%
8	65,859	99.76%	52,870*	99.79%

*Grade 8 students had the option of taking Algebra I instead of MAP Grade 8 Mathematics test

Table 7.2: Test Completion Rates: Males

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics
3	35,398	99.75%	35,390	99.94%
4	34,842	99.74%	34,844	99.94%
5	34,202	99.78%	34,200	99.94%
6	34,009	99.77%	33,986	99.87%
7	33,818	99.72%	33,368	99.84%
8	33,833	99.73%	27,615*	99.78%

*Grade 8 students had the option of taking Algebra I instead of MAP Grade 8 Mathematics test

Table 7.3: Test Completion Rates: Females

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics
3	34,126	99.78%	34,128	99.95%
4	33,146	99.76%	33,146	99.94%
5	32,755	99.78%	32,753	99.91%
6	32,510	99.84%	32,518	99.92%
7	32,343	99.78%	31,966	99.91%
8	32,026	99.79%	25,255*	99.80%

*Grade 8 students had the option of taking Algebra I instead of MAP Grade 8 Mathematics test

Table 7.4: Test Completion Rates: White

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics
3	48,827	99.90%	48,793	99.94%
4	48,265	99.92%	48,250	99.95%
5	48,151	99.92%	48,133	99.92%
6	48,215	99.91%	48,202	99.89%
7	48,222	99.86%	47,594	99.86%
8	47,975	99.85%	37,873*	99.81%

*Grade 8 students had the option of taking Algebra I instead of MAP Grade 8 Mathematics test

Table 7.5: Test Completion Rates: Black

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics
3	11,562	99.71%	11,561	99.92%
4	11,086	99.61%	11,086	99.91%
5	10,523	99.71%	10,516	99.93%
6	10,599	99.70%	10,603	99.92%
7	10,488	99.59%	10,451	99.89%
8	10,486	99.64%	9,220*	99.72%

*Grade 8 students had the option of taking Algebra I instead of MAP Grade 8 Mathematics test

Table 7.6: Test Completion Rates: Hispanic

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics
3	4,464	99.24%	4,477	99.93%
4	4,393	99.09%	4,401	99.95%
5	4,236	99.20%	4,252	99.93%
6	3,981	99.27%	3,995	99.92%
7	3,878	99.05%	3,866	99.95%
8	3,864	99.22%	3,201*	99.84%

*Grade 8 students had the option of taking Algebra I instead of MAP Grade 8 Mathematics test

Table 7.7: Test Completion Rates: Asian/Pacific Islander

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics
3	1,476	96.68%	1,491	99.93%
4	1,487	97.38%	1,498	100.00%
5	1,497	97.13%	1,503	99.93%
6	1,495	98.66%	1,476	100.00%
7	1,482	98.92%	1,368	99.93%
8	1,465	99.11%	894*	99.78%

*Grade 8 students had the option of taking Algebra I instead of MAP Grade 8 Mathematics test

Table 7.8: Test Completion Rates: American Indian

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics
3	273	100.00%	274	100.00%
4	241	100.00%	241	100.00%
5	272	100.00%	272	100.00%
6	282	100.00%	283	99.65%
7	261	99.62%	260	100.00%
8	317	99.05%	275*	98.91%

*Grade 8 students had the option of taking Algebra I instead of MAP Grade 8 Mathematics test

Table 7.9: Test Completion Rates: Other Race/Ethnicity

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics
3	2,922	100.00%	2,922	100.00%
4	2,516	99.80%	2,514	99.80%
5	2,278	99.96%	2,277	100.00%
6	1,947	99.74%	1,945	99.74%
7	1,830	99.84%	1,795	99.89%
8	1,752	99.94%	1,407	99.72%

*Grade 8 students had the option of taking Algebra I instead of MAP Grade 8 Mathematics test

Table 7.10: Test Completion Rates: Students Receiving Accommodations

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics
3	250	99.60%	283	99.65%
4	281	99.64%	3,058	99.74%
5	285	99.30%	3,739	99.95%
6	4,184	99.78%	3,919	99.54%
7	3,956	99.52%	4,052	99.68%
8	3,506	99.46%	3,769*	99.60%

*Grade 8 students had the option of taking Algebra I instead of MAP Grade 8 Mathematics test

Table 7.11: State-Level Scale Score Statistics: English Language Arts

Grade	N	Mean SS	S.D. SS	Percentile				
				10th	25th	50th	75th	90th
3	69,331	458.07	50.70	395	427	460	491	520
4	67,804	485.45	50.82	420	455	489	519	545
5	66,785	499.15	52.11	434	468	503	534	559
6	66,372	506.70	45.29	449	478	508	537	563
7	65,979	514.80	54.63	444	479	517	553	582
8	65,691	527.55	52.42	462	495	529	563	592

Table 7.12: State-Level Scale Score Statistics: Mathematics

Grade	N	Mean SS	S.D. SS	Percentile				
				10th	25th	50th	75th	90th
3	69,314	456.01	48.59	395	427	460	488	514
4	67,869	481.93	55.94	420	456	489	517	541
5	66,846	499.97	49.86	437	470	504	533	559
6	66,355	507.16	48.02	446	477	510	540	566
7	65,148	514.69	50.24	454	486	518	549	574
8	52,692*	515.07	49.06	451	491	522	547	569

Table 7.13: Comparison of Percentage of Students in Each Achievement Level, English Language Arts 2006 through 2016 Census Data

Grade	Year	N	No Level	Below Basic	Basic	Proficient	Advanced	Prof. & Adv.
3	2006	65,344	1.3	8.8	47.5	25.7	16.7	42.4
	2007	67,259	1.4	9.4	46.6	25.8	16.8	42.6
	2008	66,357	0.3	9.3	50.2	25.2	15.1	40.3
	2009	67,357	0.3	9.6	49.8	25.1	15.2	40.3
	2010	66,947	0.3	8.2	48.4	26.9	16.2	43.1
	2011	66,487	0.4	7.6	48.4	27.0	16.6	43.6
	2012	66,323	0.3	8.0	46.5	27.2	18.1	45.3
	2013	66,754	0.3	7.8	44.2	27.7	20.1	47.8
	2014	67,211	0.3	9.8	48.3	25.5	16.0	41.6
	2015	67,998	0.2	19.4	23.3	24.0	33.1	57.1
	2016	69,490	0.2	18.5	20.7	42.2	18.4	60.6
4	2006	65,849	1.0	10.6	44.5	28.8	15.0	43.8
	2007	65,982	1.1	10.5	43.4	28.2	16.8	45.1
	2008	67,049	0.3	8.0	46.7	33.4	11.7	45.1
	2009	66,709	0.3	7.6	45.8	33.6	12.7	46.3
	2010	67,510	0.3	8.6	40.2	31.2	19.7	50.9
	2011	67,049	0.4	8.2	39.5	31.6	20.2	51.9
	2012	65,996	0.3	8.3	39.3	31.2	20.9	52.2
	2013	66,085	0.3	8.2	38.8	31.6	21.2	52.8
	2014	66,647	0.3	7.8	46.4	31.5	14.0	45.5
	2015	67,013	0.2	21.8	19.7	25.3	33.1	58.3
	2016	67,966	0.2	15.2	21.4	42.6	20.6	63.2
5	2006	66,704	1.0	9.1	44.8	29.6	15.4	45.0
	2007	66,098	1.0	8.3	42.9	29.8	18.0	47.8
	2008	65,734	0.3	6.4	45.1	32.2	15.9	48.1
	2009	67,307	0.3	6.3	44.6	33.9	14.9	48.8
	2010	66,730	0.3	7.1	41.5	32.1	18.9	51.0
	2011	67,461	0.6	6.9	41.4	32.4	18.7	51.1
	2012	66,675	0.3	7.0	40.9	32.3	19.6	51.8
	2013	65,980	0.3	7.1	40.3	32.2	20.1	52.3
	2014	66,153	0.3	6.2	43.5	33.2	16.8	50.0
	2015	66,416	0.2	18.9	21.9	35.6	23.3	58.9
	2016	66,925	0.2	15.1	22.6	41.7	20.3	62.0

Note: Grey bars separate administrations in which student scores were reported on different scales and students were classified into achievement levels based on different sets of cut scores.

Table 7.13: Comparison of Percentage of Students in Each Achievement Level, English Language Arts 2006 through 2016 Census Data (cont.)

Grade	Year	N	No Level	Below Basic	Basic	Proficient	Advanced	Prof. & Adv.
6	2006	67,709	1.1	11.9	44.8	31.6	10.6	42.2
	2007	67,045	1.2	11.2	44	31.8	11.7	43.6
	2008	65,830	0.2	9.0	43.5	34	13.4	47.4
	2009	65,908	0.3	8.6	43.4	33.8	13.9	47.7
	2010	67,476	0.3	7.8	42.3	33.9	15.7	49.6
	2011	66,633	0.3	7.3	41.9	34.3	16.2	50.5
	2012	67,342	0.3	7.5	42.0	34.7	15.5	50.2
	2013	66,731	0.4	7.2	41.4	34.9	16.1	51.0
	2014	66,019	0.3	8.5	43.8	32.9	14.5	47.5
	2015	66,059	0.2	19.6	25.3	35.0	19.8	54.9
	2016	66,500	0.2	18.6	22.9	41.7	16.6	58.3
7	2006	71,632	1.9	13.7	41.8	30.5	12.2	42.7
	2007	68,404	1.8	13.1	40.7	32.8	11.6	44.4
	2008	66,923	0.3	10.0	40.7	36.1	12.9	49.0
	2009	66,531	0.3	8.7	40.3	37.2	13.6	50.8
	2010	66,279	0.4	9.8	38.1	35.2	16.5	51.7
	2011	67,517	0.4	9.0	36.9	36.0	17.8	53.8
	2012	66,845	0.3	8.7	35.8	36.6	18.7	55.2
	2013	67,319	0.3	9.0	35.7	36.5	18.4	55.0
	2014	66,893	0.4	8.2	36.0	36.9	18.6	55.4
	2015	66,000	0.3	18.4	24.1	38.6	18.5	57.2
	2016	66,143	0.2	23.4	18.3	39.0	19.0	58
8	2006	73,516	1.4	9.1	48.0	26.6	15.0	41.5
	2007	71,200	1.4	8.7	48.3	26.9	14.6	41.6
	2008	67,574	0.4	5.7	45.8	33.1	15.0	48.1
	2009	67,077	0.5	5.3	44.5	33.4	16.3	49.7
	2010	66,463	0.5	4.9	42.8	34.3	17.4	51.8
	2011	66,205	0.5	4.6	42.5	33.9	18.5	52.5
	2012	67,037	0.4	4.3	42.0	34.3	19.0	53.3
	2013	66,710	0.5	4.1	41.5	34.9	19.0	53.9
	2014	67,168	0.5	4.5	44.6	34.1	16.3	50.4
	2015	66,528	0.2	14.7	27.6	40.4	17.1	57.5
	2016	65,845	0.2	19.3	21.2	38.5	20.7	59.2

Note: Grey bars separate administrations in which student scores were reported on different scales and students were classified into achievement levels based on different sets of cut scores.

Table 7.14: Comparison of Percentage of Students in Each Achievement Level, Mathematics 2006 through 2016 Census Data

Grade	Year	N	No Level	Below Basic	Basic	Proficient	Advanced	Prof. & Adv.
3	2006	65,325	0.9	7.2	48.7	33.3	10.0	43.3
	2007	67,257	0.9	7.2	46.9	35.0	10.0	45.0
	2008	66,357	0.1	6.5	49.6	35.0	8.8	43.8
	2009	67,357	0.2	6.8	48.5	35.6	8.8	44.4
	2010	66,947	0.2	6.2	46.6	37.0	10.1	47.1
	2011	66,487	0.3	5.6	44.7	38.1	11.3	49.4
	2012	66,323	0.2	5.4	42.6	39.9	11.9	51.9
	2013	66,754	0.2	5.3	43.8	39.2	11.4	50.7
	2014	67,211	0.2	6.0	43.7	36.6	13.5	50.2
	2015	68,012	0.0	21.4	26.5	30.8	21.2	52.0
	2016	69,492	0.0	18.1	29.4	32.0	20.5	52.5
4	2006	65,845	0.8	8.3	47.5	34.4	9.0	43.4
	2007	65,975	0.9	8.1	46.5	35.2	9.3	44.5
	2008	67,049	0.2	7.6	48.0	36.0	8.2	44.2
	2009	66,709	0.2	7.3	48.2	36.6	7.8	44.4
	2010	67,510	0.2	6.1	45.4	39.3	9.1	48.4
	2011	67,049	0.3	5.6	43.7	39.9	10.5	50.5
	2012	65,996	0.1	5.7	43.7	40.5	10.0	50.5
	2013	66,085	0.1	5.5	44.2	40.7	9.4	50.1
	2014	66,647	0.2	6.6	51.1	34.5	7.6	42.1
	2015	67,023	0.0	16.8	33.6	29.9	19.6	49.6
	2016	67,968	0.1	15.5	31.6	30.6	22.3	52.9
5	2006	66,703	0.9	8.1	47.8	32.7	10.6	43.3
	2007	66,075	0.9	7.6	44.9	33.1	13.4	46.6
	2008	65,734	0.1	7.5	46.5	34.4	11.4	45.8
	2009	67,307	0.2	7.5	45.1	35.6	11.6	47.2
	2010	66,730	0.2	6.2	41.9	36.7	15.1	51.7
	2011	67,461	0.5	6.1	40.9	36.3	16.2	52.5
	2012	66,675	0.2	5.8	39.7	35.9	18.4	54.3
	2013	65,980	0.2	5.9	40.1	35.9	18.0	53.9
	2014	66,153	0.2	7.2	40.5	35.5	16.7	52.2
	2015	66,429	0.0	28.5	31.6	20.1	19.7	39.8
	2016	66,934	0.1	20.7	32.6	28.5	18.2	46.7

Note: Grey bars separate administrations in which student scores were reported on different scales and students were classified into achievement levels based on different sets of cut scores.

Table 7.14: Comparison of Percentage of Students in Each Achievement Level, Mathematics 2006 through 2015 Census Data (cont.)

Grade	Year	N	No Level	Below Basic	Basic	Proficient	Advanced	Prof. & Adv.
6	2006	67,706	1.0	11.1	44.1	34.4	9.5	43.9
	2007	67,039	1.1	11.1	40.0	35.5	12.3	47.8
	2008	65,830	0.2	9.5	39.6	37.8	12.9	50.7
	2009	65,908	0.2	8.9	40.7	37.5	12.6	50.1
	2010	67,476	0.2	7.8	36.6	40.3	15.0	55.4
	2011	66,633	0.2	7.5	35.4	40.5	16.4	56.9
	2012	67,342	0.2	7.4	36.7	39.7	16.0	55.7
	2013	66,731	0.3	7.1	36.4	39.9	16.3	56.2
	2014	66,019	0.3	7.2	36.9	40.3	15.3	55.6
	2015	66,014	0.1	28.7	33.1	21.6	16.5	38.1
2016	66,486	0.1	20.5	36.1	27.9	15.4	43.3	
7	2006	71,575	1.2	17.4	38.5	32.7	10.2	42.9
	2007	68,405	1.2	16.7	37.1	33.2	11.7	44.9
	2008	66,923	0.3	13.9	36.3	36.7	12.8	49.5
	2009	66,531	0.3	12.5	35.2	37.6	14.3	51.9
	2010	66,279	0.3	10.8	34.3	38.8	15.7	54.5
	2011	67,517	0.3	10.5	33.5	39.2	16.6	55.8
	2012	66,845	0.3	9.8	30.3	40.0	19.6	59.6
	2013	67,319	1.5	10.1	31.1	39.1	18.2	57.3
	2014	66,893	1.6	9.6	32.0	38.6	18.2	56.7
	2015	65,036	0.1	31.4	33.2	21.1	14.1	35.3
2016	65,317	0.1	22.4	35.4	26.7	15.4	42.1	
8	2006	73,523	1.3	21.1	37.8	27.6	12.2	39.8
	2007	71,190	1.4	21.4	36.6	26.6	14.0	40.6
	2008	67,574	0.4	18.0	37.7	29.9	13.9	43.8
	2009	67,077	0.5	16.4	36.8	31.5	14.9	46.4
	2010	66,463	0.4	14.9	33.3	32.1	19.2	51.3
	2011	66,205	0.4	15.0	33.9	31.0	19.8	50.8
	2012	67,037	0.3	14.1	33.6	31.8	20.2	52.0
	2013*	52,335	1.4	17.1	41.2	30.2	10.1	40.3
	2014*	52,818	1.6	17.5	38.7	30.9	11.3	42.2
	2015*	52,840	0.2	39.3	32.3	18.1	10.1	28.2
2016*	52,861	0.2	27.9	43.5	19.3	9.0	28.3	

* Algebra I students had the option of taking Algebra EOC instead of MAP Mathematics in Grade 8.

Note: Grey bars separate administrations in which student scores were reported on different scales and students were classified into achievement levels based on different sets of cut scores.

CHAPTER 8: ACHIEVEMENT-LEVEL SETTING

In this chapter, we briefly describe the MAP ELA and Mathematics achievement-level setting (also called standard setting), and we present the cut scores established and the achievement-level descriptors derived from the achievement-level setting.

A Bookmark standard setting was held in 2005 to establish cut scores for the Communication Arts and Mathematics MAP tests (refer to the *Missouri Assessment Program Final Bookmark Standard Setting Technical Report* [2005]). After 14 years of administration of these tests, Missouri students took ELA and Mathematics tests measuring different content and constructs in the 2014–15 test administration. These tests were built using the SBAC item bank and were fully aligned to the Common Core State Standards. The test scores were reported on the scales developed by SBAC, and students were classified into achievement levels based on the cut scores derived after SBAC's field test. A detailed discussion and the results of that standard setting can be found in the SBAC's *2013-14 Technical Report* (2016) posted at http://www.smarterbalanced.org/wp-content/uploads/2015/08/2013-14_Technical_Report.pdf.

New test forms were developed and new scales were established for the MAP ELA and Mathematics tests for the 2015–16 school year. Because the new tests were not linked to the 2014–15 test forms, a standard setting was conducted to establish cut scores on the MAP ELA and Mathematics tests that reflected the content-based expectations on the tests supported by the test data.

8.1 Standard Setting Process

On July 12–14, 2016, the Missouri Department of Elementary and Secondary Education (DESE) and Data Recognition Corporation (DRC) conducted the MAP standard setting for Grades 3–8 in ELA and Mathematics. The purpose of this workshop was to develop achievement standards for ELA and Mathematics, including the development of *cut points*, which divide students into four achievement levels: *Below Basic*, *Basic*, *Proficient*, and *Advanced*.

A committee of 88 Missouri educators participated in the cut point validation. Participants were divided into 12 groups of approximately 7–8 participants each, and each group focused on a single grade and content area combination (e.g., Grade 3 Mathematics, Grade 4 ELA). Participants worked individually and in concert to consider the test items and student data from the Spring 2016 administration of the MAP, the Missouri Learning Standards, and information from Missouri students' performance on current and previous administrations of the MAP.

Throughout the standard setting process, Missouri educators considered the expectations for students in each achievement level and then transformed these expectations into numeric cut points using the Bookmark Standard Setting Procedure (BSSP) which is the most widely used standard setting procedure in large-scale educational assessments (Karantonis & Sireci, 2006; Cizek & Bunch, 2007).

The process of the standard setting adhered to the following AERA, APA, & NCME (2014) standards:

Standard 5.21 When proposed score interpretations involve one or more cut scores, the rationale and procedures used for establishing cut scores should be documented clearly. (107)

Standard 5.22 When cut scores defining pass-fail or proficiency levels are based on direct judgments about the adequacy of item or test performances, the judgmental process should be designed so that the participants providing the judgments can bring their knowledge and experience to bear in a reasonable way. (108)

8.2 Standard Setting Methodology

Prior to the standard setting workshop, DESE worked in collaboration with DRC and Missouri TAC to select the methodology to be used at the standard setting. In recognition of its prior use in Missouri and widespread use across the country, DESE selected the BSSP for the MAP ELA and Mathematics tests. The BSSP is well suited for standard setting for these assessments because (a) the tests are composed of both multiple-choice and constructed-response items, (b) the items are scaled and can be mapped using item-mapping techniques, and (c) the BSSP allows participants to focus on the knowledge, skills, and abilities expected of students in each performance level. The BSSP has been well documented in standard setting literature. Developed in 1996, the BSSP has been implemented in over half of the states in the United States and abroad by DRC and by other major testing firms, making it the most widely used standard setting procedure in K–12 education (Karantonis & Sireci, 2006; Cizek & Bunch, 2007).

8.3 Achievement Level Descriptors

In terms of the validity of the intended interpretation of the MAP scores, it is essential to understand that descriptors and cut scores are established in a collaborative and participatory process. The descriptors clearly establish, in plain language, the proper frame of reference for understanding how to interpret test scores, particularly cut scores. Achievement level descriptors (ALDs) summarize the knowledge, skills, and abilities expected of students in each performance level. DESE provided policy ALDs for MAP ELA and Mathematics. These descriptors, presented in the *Guide to Interpreting Results* (see Appendix D), described DESE's vision for each performance level. At the standard setting, Missouri used the policy ALDs in conjunction with the content standards to consider the content-based expectations for students in each performance level on each MAP test.

8.4 Cut Scores

In this section, we present the cut scores for each grade for ELA and Mathematics. Tables 8.1 and 8.2 show the cut scores for Grades 3 through 8 ELA and Mathematics, respectively.

8.5 Summary

This chapter presented a brief overview of the standard setting process used for establishing the ELA and Mathematics cut scores after the 2015–16 test administration. These procedures are addressed in more detail in the *Missouri Assessment Program Grades 3-8 English Language Arts and Mathematics Standard Setting 2016 Final Technical Report*.

The standard settings undertaken by the DESE and facilitated by DRC supports the following standards from the *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 2014):

- Standard 5.21—When proposed score interpretations involve one or more cut scores, the rationale and procedures used for establishing cut scores should be documented clearly.
- Standard 5.22—When cut scores defining pass-fail or proficiency levels are based on direct judgments about the adequacy of item or test performances, the judgmental process should be designed so that the participants providing the judgments can bring their knowledge and experience to bear in a reasonable way.

Table 8.1: English Language Arts Cut Scores

Grade	Cut Scores		
	Basic	Proficient	Advanced
3	416	447	502
4	436	473	526
5	449	488	541
6	468	499	550
7	476	506	563
8	486	518	570

Table 8.2: Mathematics Cut Scores

Grade	Cut Scores		
	Basic	Proficient	Advanced
3	415	457	495
4	438	486	521
5	463	508	544
6	470	518	555
7	482	528	564
8	496	544	572

CHAPTER 9: EVIDENCE OF CONSTRUCT-RELATED VALIDITY

Evidence of construct-related validity—supporting the intended interpretation of test scores and their use—is the central concept underlying the MAP ELA and Mathematics validation process. In this chapter, DRC presents evidence of construct-related validity through studies of test reliability, evaluation of internal test structure, and evaluation of the relationship of test scores with external variables. All analyses in this chapter are based on reportable census data.

Chapter 9 of this report demonstrates the adherence to AERA, APA, & NCME (2014) Standards 1.13, 1.21, 2.0, 2.3, 2.13, 2.14, 2.16, and 2.19. Each standard will be discussed in the pertinent section of this chapter.

9.1 Minimization of Construct-Irrelevant Variance and Construct Underrepresentation

Minimization of construct-irrelevant variance and construct underrepresentation is addressed in the following steps of the test development process: 1) specification, 2) item writing, 3) review, 4) field testing, 5) test construction, and 6) item calibration (see Chapter 3 for more information on 1 through 5 and Chapter 6 for more information on calibration).

Construct-irrelevant variance refers to error variance that is caused by factors unrelated to the constructs measured by the test. For example, when tests are not administered under standardized conditions (e.g., one administration may be timed, but another administration may be untimed), differences in student performance related to different administration conditions may result. Careful specification of content and review of the items representing that content are first steps in minimizing construct-irrelevant variance. Then, empirical evidence, especially item-level data, is used to infer construct irrelevance.

Construct underrepresentation occurs when the content of the assessment does not reflect the full range of content that the assessment is expected to cover. Specification and review, in which test blueprints are developed and reviewed, as well as the alignment analysis are primary steps in the development process designed to ensure that content is appropriately represented.

9.2 Reliability

Reliability refers to the consistency of students' test scores on parallel forms of a test. A reliable test is one that produces scores that are expected to be relatively stable if the test is administered repeatedly under similar conditions. Often, however, it is impractical to administer multiple forms of the test, and reliability is estimated on a single administration of the test. This type of reliability, known as internal consistency, provides an estimate of how consistently examinees perform across items within a test during a

single test administration (Crocker & Algina, 1986). Reliability is a necessary but not sufficient condition for validity.

The AERA, APA, & NCME (2014) *Standards* indicates the following:

The term *reliability* has been used in two ways in the measurement literature. 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 (e.g., in terms of standard errors, reliability coefficients per se, generalizability coefficients, error/tolerance ratios, item response theory (IRT) information functions, or various indices of classification consistency). (33)

In accordance with the AERA, APA, & NCME (2014) *Standards* and in developing and maintaining tests of the highest quality, DRC has calculated the reliability of each MAP test in a variety of ways: reliability of raw scores, overall standard error of measurement, IRT-based conditional standard error of measurement, and decision consistency of achievement-level classifications. There are several specific AERA, APA, & NCME (2014) standards that this chapter addresses:

Standard 2.0 Appropriate evidence of reliability/precision should be provided for the interpretation for each intended score use. (42)

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. (43)

The total test score reliabilities are discussed in Section 9.2.1 of this chapter. The SEM of the total score is discussed in section 9.2.2. The subscore reliabilities and SEMs are presented in sections 9.4.2 and 9.4.3.

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

The raw score–based SEM is discussed in Section 9.2.2 and is presented in raw score units in Tables 9.1 and 9.2. The conditional SEM is discussed in Section 9.2.3 and is presented in scale score units in Tables 9.3 and 9.4. Note that the SEM associated with any type of score is not reported on Individual Student Reports for the MAP.

Standard 2.19 Each method of quantifying the reliability/precision of scores should be described clearly and expressed in terms of statistics appropriate to the method. The sampling procedures used to select test takers for reliability/precision analyses and the descriptive statistics on these samples, subject to privacy obligations where applicable, should be reported. (47)

Section 9.2 discusses different ways of measuring test reliability, including reliability of raw scores and test form SEM, IRT-based conditional SEM, and decision consistency of achievement-level classifications. These statistics were computed based on Missouri student census data.

9.2.1 Test Reliability

The reliability of raw scores by test form was evaluated using Cronbach's (1951) coefficient alpha, which is a lower-bound estimate of test reliability. The reliability coefficient is a ratio of the variance of true test scores to the variance of the total observed scores, with the values ranging from 0 to 1. The closer the value of the reliability coefficient is to 1, the more consistent the scores are, where 1 refers to a perfectly consistent test. As a rule of thumb, reliability coefficients that are equal to or greater than 0.8 are considered acceptable for tests of moderate lengths.

Cronbach's coefficient alpha was computed using the formula

$$\alpha = \frac{n}{n-1} \left[1 - \frac{\sum_{i=1}^n \sigma_i^2}{\sigma_X^2} \right], \quad (9.1)$$

where n is the number of items on the test, σ_i^2 is the variance of item i , and σ_X^2 is the variance of the total test score.

Total test reliability measures, such as Cronbach's coefficient alpha and SEM, consider the consistency (reliability) of performance over all test questions in a given form, the results of which imply how well the questions measure the content domain and could continue to do so over repeated administrations. The number of items in the test influences these statistics; a longer test can be expected to be more reliable than a shorter test.

The reliability coefficients for the MAP are reported in Tables 9.1 and 9.2 for ELA and Mathematics, respectively. These reliability coefficients were computed using Missouri student census data. The reliability statistics ranged from 0.90 to 0.92 for all ELA forms. For Mathematics, the reliabilities ranged from 0.89 to 0.91, except for the Grade 8 form for which the reliability coefficient was 0.84. These results indicate acceptable reliability coefficients for MAP tests.

The reliability statistics by subgroup are reported and discussed in Chapter 10.

9.2.2 Standard Error of Measurement

The reliability of reported test scores can be characterized by the standard errors associated with the scores. The SEM may be used to determine the range within which a

student's true score is likely to fall. An observed score should be regarded not as a student's true score but as an estimate of a student's true score. It is expected that 68% of the time a student's score obtained from a single test administration would fall within one SEM of the student's true score and that 95% of the time the obtained score would fall within approximately two standard errors of the true score. The SEM is an index of the random variability in test scores and is defined as follows:

$$\text{SEM} = SD\sqrt{1 - R_{xx'}}, \quad (9.2)$$

where SD represents standard deviation of the raw score distribution, and $R_{xx'}$ is estimated by $\hat{\alpha}$, as expressed in formula 9.1.

The SEM at the test level was computed in raw score metric and is also presented in Tables 9.1 and 9.2 for ELA and Mathematics, respectively.

9.2.3 Conditional Standard Error of Measurement

In contrast to SEM, the conditional standard error of measurement (CSEM) expresses the degree of measurement error in scale score units and are conditioned on the ability of the student. We report the CSEM in support of AERA, APA, & NCME (2014) Standard 2.14, which states the following:

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. (46)

In further compliance with Standard 2.14, the CSEM of each cut score is reported in Tables 9.3 and 9.4.

The CSEMs are defined as the reciprocal of the square root of the test information function and can be estimated across all points of the ability continuum (Hambleton & Swaminathan, 1985):

$$\text{CSEM}(\theta_i) = \frac{1}{\sqrt{I(\theta_i)}}, \quad (9.3)$$

where $I(\theta_i)$ is the test information function, as a sum of item information function 2, obtained as

$$I(\theta_i) = \sum_j \frac{p'_{ij}(\theta_i)^2}{p_{ij}(\theta_i)q_{ij}(\theta_i)}, \quad (9.4)$$

where $p'_{ij}(\theta_i)$ is the derivative of $p_{ij}(\theta_i)$, and $q_{ij}(\theta_i) = 1 - p_{ij}(\theta_i)$.

Note that the CSEMs vary in magnitude across the entire range of student ability estimates (i.e., scale scores) and are smaller in the middle of the score distribution and higher at the tails. This pattern is seen for all MAP CSEMs and is to be expected when IRT methods are used. The CSEMs at the three cut scores that define the performance levels are presented in Table 9.3 for ELA and Table 9.4 for Mathematics and range from 11 to 15 scale score points for ELA and from 9 to 20 scale score points for Mathematics.

Figures 9.1 through 9.6 display the CSEM curves, with cut scores indicated, for ELA Grades 3 through 8. For Grades 5 and 8, the CSEM curves for Form 1 are displayed. (Recall from Chapter 6 that the SEM curves for multiple forms in Grades 5 and 8 were aligned within each grade.) Figures 9.7 through 9.12 display the CSEM curves, with cut scores indicated, for Mathematics Grades 3 through 8. The estimates of measurement error tend to be higher at the low and high ends of the scale score range. The measurement error increases when there are few observations at a particular ability level. Generally, there are few students with extreme scores, and these score levels cannot be estimated as accurately as levels toward the middle of the ability range. Figures 9.1 through 9.12 demonstrate that the measurement error is minimized at the cut scores and in the middle of the scale range where the majority of students are located.

9.2.4 Classification Accuracy and Consistency

Classification Consistency: Classification consistency (also known as decision consistency) is defined as the extent to which the classifications of students agree on the basis of two independent administrations of the test or one administration of two parallel test forms. It is difficult, however, to obtain data from repeated administrations of the same form because of cost, time, and students' recall of the first administration. Also, it is difficult to construct two parallel forms. A common practice, therefore, is to estimate decision consistency from one administration of a test. These analyses directly address AERA, APA, & NCME (2014) Standard 2.16:

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. (46)

Classification Accuracy: Classification accuracy is defined as the extent to which the actual classifications of test takers agree with classifications that would be made on the basis of their true scores (Livingston & Lewis, 1995). It is common to estimate classification accuracy by utilizing a psychometric model to find true scores corresponding to observed scores.

In other words, classification *consistency* refers to the agreement between two observed scores, while classification *accuracy* refers to the agreement between the observed score and the true score. A straightforward approach to classification consistency estimation can be expressed in terms of a contingency table representing the probability of a particular classification outcome under specific scenarios. For example, the following table is a contingency table of $(H + 1) \times (H + 1)$, where H is the number of cut scores, such that two cut scores yield a 3×3 contingency table.

Example of Contingency Table with Two Cut Scores

	Level 1	Level 2	Level 3	Sum
Level 1	P_{11}	P_{21}	P_{31}	$P_{.1}$
Level 2	P_{12}	P_{22}	P_{32}	$P_{.2}$
Level 3	P_{13}	P_{23}	P_{33}	$P_{.3}$
Sum	$P_{1.}$	$P_{2.}$	$P_{3.}$	1.0

DRC used a method suggested by Kolen and Kim (2005) for estimating consistency and accuracy that involves the generation of item responses using item parameters based on the IRT model (see also Kim, Choi, Um, & Kim, 2006; Kim, Barton, & Kim, 2007). Two sets of item responses are generated using a set of item parameters and an examinee's ability distribution from a single test administration. These two sets of item responses are considered as an examinee's responses on two administrations of the same form. The procedure is described below and is implemented with KKCLASS software (Kim, 2005).

- Step 1: Obtain item parameters (\mathbf{I}) and ability distribution weight ($\hat{g}(\theta)$) at each quadrature point from a single test.
- Step 2: Compute two raw scores at each quadrature point. At a given quadrature point θ_i , generate two sets of item responses using the item parameters from a test form, assuming that the same test form was administered twice to an examinee with the true ability θ_i .
- Step 3: Construct a classification matrix at each quadrature point. Determine the joint event for the cells in the table above using the raw scores obtained from Step 2.
- Step 4: Repeat Steps 2 and 3 R times and get average values from R replications.
- Step 5: Multiply ability distribution weight ($\hat{g}(\theta)$) by average values in Step 4 for each quadrature point, and sum across all quadrature points. From this final contingency table, decision consistency indices, such as consistency agreement and kappa, can be computed.
- Step 6: Because examinee ability is estimated at each quadrature point, this quadrature point can be considered the true score. Therefore, decision accuracy is computed using both examinee estimated ability (observed score) and quadrature point (true score).

Classification consistency and classification accuracy conditioned on achievement level (Table 9.5) and on cut score (Table 9.6) are presented for the 2016 MAP ELA and Mathematics tests. As shown in Table 9.5, classification accuracy conditioned on achievement level ranges from 0.60 to 0.92 and classification consistency conditioned on achievement level ranges from 0.51 to 0.89 for all ELA achievement levels, with two exceptions. Lower classification consistency values were found for students classified in the *Below Basic* and *Basic* levels in Grade 3. For Mathematics, classification accuracy

conditioned on achievement level ranges from 0.73 to 0.91, and classification consistency conditioned on achievement level ranges from 0.61 to 0.84. The magnitude of classification consistency and accuracy measures is influenced by key features of the test design including the number of items, number of cut scores, test reliability and associated SEM, and student score distribution.

Perhaps the most important indices for accountability systems are those for the accuracy and consistency of classification decisions made at specific cut points. To evaluate decisions at specific cut points, the joint distribution of all the performance levels is collapsed into a dichotomized distribution around that specific cut point. As an example, the dichotomization at the cut point between the *Basic* and *Proficient* classifications was formed. The proportion of correct classifications below this particular cut point is equal to the sum of all the cells at the levels *Below Basic* and *Basic*, and the proportion of correct classifications above that particular cut point is equal to the sum of all the cells at the levels *Proficient* and *Advanced*. Table 9.6 shows the classification accuracy and consistency estimates when conditioned on MAP cut points. The classification accuracy and consistency statistics were at or above 0.86 for all test forms and all cut points. These results suggest that consistent and accurate performance level classifications are being made for students in Missouri based on the MAP.

9.3 Validity Evidence Based on Internal Test Structure

Analyses of the internal structure of a test can indicate the extent to which the relationships among test items conform to the construct the test purports to measure. For example, the MAP Mathematics test is designed to measure a single overall construct—Mathematics achievement; therefore, the items comprising the Mathematics MAP test should only measure Mathematics, not Science, Language, or Reading.

This Technical Report summarizes additional statistics that contribute to the evidence of construct-related validity (Cronbach's coefficient alpha reported previously in this section and item fit reported in Chapter 6) through the evaluation of the test internal structure. The internal consistency coefficient (Cronbach's alpha) is a measure of item homogeneity. In order for a group of items to be homogeneous, they must measure the same construct or represent the same content domain. Because IRT models were used to calibrate test items and to report student scores, item fit is also relevant to construct-related validity. The extent to which test items function as the IRT model prescribes is relevant to the validation of the test score interpretation. As shown in Chapter 6, only nine items were flagged for poor model-data fit for ELA and only four items were flagged for Mathematics across all grade levels.

Principal Components Analysis

As another measure of the test internal structure, DRC examined the unidimensionality of each grade-level MAP test. One of the underlying assumptions of the IRT models used to scale MAP is that the tests being calibrated are unidimensional, that is, items comprising MAP in each grade/content area measure a single content domain. For example,

Mathematics items should measure Mathematics ability and not Reading skills. Standard 1.13 of the AERA, APA, & NCME (2014) *Standards* states the following:

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. (26–27)

In this section, we examine the internal structure by evaluating the unidimensionality assumption through Principal Components Analysis (PCA). This analysis seeks evidence that there exists a single primary factor, the first principal component, which accounts for much of the relationship between items. The presence of a single or dominant factor suggests that a test is sufficiently unidimensional (i.e., measures one underlying construct).

A PCA was conducted on each grade/content area MAP. A large first principal component is evident in each analysis. It is common to have additional eigenvalues greater than 1.0, which may suggest the presence of other factors.

For all grades of ELA and Mathematics, the ratio of the variance accounted for by the first factor to the second and third is sufficiently large to support the claim that these tests are unidimensional (Cattell, 1952). All of the MAP subject area tests exhibit first principal components accounting for more than 17% of the test variance for ELA (see Table 9.7) and for more than 19% of the test variance for Mathematics (see Table 9.8), except Grade 8 (where the first principal component accounts for over 14% of the variance). To further investigate the unidimensionality of the ELA and Mathematics tests, the ratio of the first eigenvalue to the second eigenvalue was explored (see Tables 9.7 and 9.8). These ratios show that the first eigenvalue is at least five times as large as the second eigenvalue for ELA grades and at least four times as large as the second eigenvalue for Mathematics grades. This substantial difference in magnitude indicates that one factor appears to be dominant and that the ELA and Mathematics tests are essentially unidimensional.

This evidence supports the claim that there is a dominant dimension underlying the items/tasks in each test and that scores from each test represent performance primarily determined by that ability. Construct-irrelevant variance, such as factual knowledge irrelevant to doing well in a subject, does not appear to create significant nuisance factors.

9.4 Analyses by Content Strands

Three sets of analyses were conducted at the content strand level for ELA and Mathematics in another attempt to assess the internal structure of MAP. First, correlation coefficients that measure the relationship between the content strand scores were computed. Second, the reliability of each strand was computed. Finally, the SEM was computed for each content strand.

9.4.1 Correlations among Content Strand Subscores

In this section, we report the strength of the interrelationships among the content strands by computing correlation between them. Tables 9.9 and 9.10 report the uncorrected Pearson product-moment (PPM) correlation coefficients and the PPM corrected for attenuation (CAPPM). The PPM among the content strand subscores is presented below the diagonal portion of the matrix and the CAPPM is presented above the diagonal portion of the matrix.

The uncorrected PPM in Tables 9.9 and 9.10 should be interpreted in the context of the reliability coefficient. In general, we expect to see lower PPM coefficients between variables that are less reliable. In most cases, the PPM coefficients show that performance on one content strand is moderately to strongly related to performance on another content strand within the same grade and content area. For ELA, correlations ranged from 0.51 to 0.75 for any pair of content strands. For Mathematics, the correlations ranged from 0.35 to 0.75 for any pair of content strands. It should be noted that the value of the correlation coefficients will be affected by the limited number of items measuring each content strand. So, caution should be used when comparing the PPM coefficients measuring the relationships between content strands to those measuring the relationships between content areas (Table 9.13). We expect to see a more modest relationship reported between the content strands as a consequence of the lower number of items measuring each of the reporting categories. The PPM between two content strand subscores may be artificially low because of measurement error.

AERA, APA, & NCME (2014) Standard 1.21 states the following:

When statistical adjustments, such as those for restriction of range or attenuation, are made, both adjusted and unadjusted coefficients, as well as the specific procedure used, and all statistics used in the adjustment, should be reported. Estimates of the construct-criterion relationship that remove the effects of measurement error on the test should be clearly reported as adjusted estimates.
(29)

We can correct for the attenuation of the PPM statistically using Spearman's formula,

$$CAPPM = \frac{r_{xy}}{\sqrt{r_{xx}r_{yy}}}, \quad (9.5)$$

where r_{xy} is the PPM between two content strands, r_{xx} is the reliability of one of those content strands, and r_{yy} is the reliability for the other content strand.

In Tables 9.9 and 9.10, the CAPPMs indicate strong relationships between the content strands. In some cases, the CAPPM is greater than 1.00. "Disattenuated values greater than 1.00 indicate that measurement error is not randomly distributed" (Schumacker, 1996). The strong relationships suggested by the CAPPM in Tables 9.9 and 9.10 are further evidence of the validity of the test construct. Since the overall content area is

comprised of the content strand subscores and the content area is expected to measure a single dimension, we would expect that these subscores are also highly related.

9.4.2 Reliability and Standard Error of Measurement of Content Strands

Raw score summary statistics (mean and standard deviation), Cronbach's (1951) coefficient alpha, and SEM were computed for each of the content strands by grade and content area using the census data. These statistics are presented in Tables 9.11 and 9.12 for ELA and Mathematics, respectively. Reliability indices, such as Cronbach's coefficient alpha (and resulting SEM), are a function of the number of test items. It is expected that coefficient alpha would be lower for a content strand assessed by a small number of items compared to a content strand assessed by a larger number of items.

9.5 Validity Evidence Based on Relations with Other Variables

Measures of different constructs should not be highly correlated with each other. The relationship between the test scores from the tests measuring different constructs can be assessed by the extent to which measures of constructs that theoretically should not be related to each other are, in fact, observed as not related to each other. Typically, correlation coefficients among measures of unrelated or distantly related constructs are examined in support of divergent evidence.

To assess the divergent evidence of the validity of the intended interpretation of test scores, correlations were computed between the ELA, Mathematics, and Science scale scores for students who took more than one MAP subject area test in 2016. These correlations are based on the reportable census data and the results are shown in Table 9.13. The correlation coefficients ranged from 0.70 (between ELA and Mathematics in Grade 8) to 0.81 (between ELA and Science in Grade 8). The correlation coefficients suggest that individual student scores for ELA, Mathematics, and Science are highly related. Despite high correlations, the tests are not perfectly related to each other, suggesting that different constructs are being tapped; however, the test scores do appear highly related to one another, suggesting they may be tapping into a similar knowledge base or general underlying ability.

9.6 Summary

In summary, the analyses of the internal structure of the test can indicate the degree to which the relationship among test items and test components conform to the test construct which in turn provide a basis for test score interpretation. This chapter of the report includes reliability analysis results indicating that the MAP tests produce scores that would be relatively stable if the test were administered repeatedly under similar conditions. The assumption that the content area MAP tests were unidimensional (that is each grade level test measured one primary dimension) was confirmed through PCA. In addition, the divergent evidence of the validity of the intended interpretation of test scores was evaluated through the correlations computed between the ELA, Mathematics, and Science scale scores. These analyses conducted by DRC are in alignment with multiple best practices of the testing industry but, in particular, support the following

standards from the *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 2014):

- 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.
- Standard 1.21—When statistical adjustments, such as those for restriction of range or attenuation, are made, both adjusted and unadjusted coefficients, as well as the specific procedure used, and all statistics used in the adjustment, should be reported. Estimates of the construct-criterion relationship that remove the effects of measurement error on the test should be clearly reported as adjusted estimates.
- Standard 2.0—Appropriate evidence of reliability/precision should be provided for the interpretation for each intended score use.
- 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.
- Standard 2.13—The standard error of measurement, both overall and conditional (if reported), should be provided in units of each reported score.
- Standard 2.14—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.
- Standard 2.16—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.
- Standard 2.19—Each method of quantifying the reliability/precision of scores should be described clearly and expressed in terms of statistics appropriate to the method. The sampling procedures used to select test takers for reliability/precision analyses and the descriptive statistics on these samples, subject to privacy obligations where applicable, should be reported.

Table 9.1: Reliability in English Language Arts

Grade	Form	Number of Items	Number of Score Points	Cronbach's Alpha	SEM	N-Count
3	1	52	52	0.90	3.09	69,190
4	1	52	52	0.91	3.01	67,673
5	F1	51	58	0.91	3.10	7,501
	F2	51	58	0.90	3.08	7,506
	F3	51	58	0.91	3.19	25,557
	F4	51	58	0.91	3.10	7,430
	F5	51	58	0.90	3.15	7,446
	F6	51	58	0.91	3.09	7,469
	F7	51	58	0.91	3.08	3,726
6	1	52	52	0.90	3.09	63,888
7	1	52	52	0.91	3.17	63,470
8	F1	51	58	0.92	3.10	26,143
	F2	51	58	0.91	3.08	14,937
	F3	51	58	0.91	3.05	14,925
	F4	51	58	0.91	3.09	7,464

Table 9.2: Reliability in Mathematics

Grade	Form	Number of Items	Number of Score Points	Cronbach's Alpha	SEM	N-Count
3	1	42	42	0.91	2.66	69,314
4	1	42	42	0.91	2.73	67,869
5	1	42	42	0.89	2.71	66,846
6	1	46	46	0.90	2.70	66,354
7	1	46	46	0.90	2.82	65,149
8	1	46	46	0.84	2.88	52,693

Table 9.3: Conditional Standard Error of Measurement at the Basic, Proficient & Advanced Cut Scores, English Language Arts

Content Area	Grade	Basic		Proficient		Advanced	
		Cut Score	CSEM	Cut Score	CSEM	Cut Score	CSEM
English Language Arts	3	416	14	447	12	502	14
	4	436	14	473	12	526	13
	5	449	15	488	12	541	13
	6	468	13	499	11	550	14
	7	476	15	506	14	563	14
	8	486	14	518	12	570	13

Table 9.4: Conditional Standard Error of Measurement at the Basic, Proficient & Advanced Cut Scores, Mathematics

Content Area	Grade	Basic		Proficient		Advanced	
		Cut Score	CSEM	Cut Score	CSEM	Cut Score	CSEM
Mathematics	3	415	14	457	11	495	12
	4	438	19	486	10	521	10
	5	463	20	508	11	544	10
	6	470	15	518	12	555	10
	7	482	19	528	11	564	9
	8	496	19	544	11	572	10

Table 9.5: Classification Accuracy and Consistency Conditioned on Level of Achievement

Content Area	Grade	Form	Accuracy				Consistency			
			Below Basic	Basic	Prof.	Adv.	Below Basic	Basic	Prof.	Adv.
English Language Arts	3	1	0.60	0.63	0.82	0.92	0.17	0.47	0.75	0.89
	4	1	0.72	0.67	0.81	0.89	0.55	0.63	0.73	0.82
	5	F1	0.85	0.75	0.80	0.80	0.71	0.67	0.76	0.70
		F2	0.82	0.73	0.80	0.81	0.67	0.65	0.76	0.69
		F3	0.78	0.74	0.81	0.87	0.57	0.69	0.74	0.79
		F4	0.84	0.74	0.80	0.84	0.71	0.65	0.75	0.74
		F5	0.83	0.74	0.80	0.80	0.69	0.65	0.76	0.70
		F6	0.82	0.73	0.80	0.82	0.67	0.65	0.77	0.69
		F7	0.82	0.75	0.79	0.81	0.72	0.65	0.75	0.69
	6	1	0.84	0.69	0.81	0.80	0.76	0.58	0.75	0.72
	7	1	0.88	0.62	0.83	0.85	0.80	0.51	0.75	0.77
	8	F1	0.86	0.69	0.83	0.86	0.80	0.58	0.78	0.80
		F2	0.84	0.70	0.82	0.87	0.77	0.61	0.77	0.79
		F3	0.84	0.70	0.83	0.87	0.77	0.60	0.78	0.79
F4		0.85	0.70	0.82	0.88	0.77	0.55	0.76	0.79	
Mathematics	3	1	0.85	0.78	0.76	0.87	0.80	0.66	0.69	0.80
	4	1	0.85	0.77	0.78	0.88	0.75	0.72	0.68	0.84
	5	1	0.81	0.73	0.75	0.91	0.73	0.64	0.68	0.81
	6	1	0.87	0.76	0.79	0.87	0.77	0.69	0.69	0.80
	7	1	0.84	0.75	0.79	0.86	0.75	0.67	0.70	0.80
	8	1	0.86	0.74	0.74	0.85	0.77	0.70	0.61	0.74

Table 9.6: Classification Accuracy and Consistency at Achievement Cut Points

Content Area	Grade	Form	Accuracy			Consistency		
			Below Basic/ Basic	Basic/ Prof.	Prof./ Adv.	Below Basic/ Basic	Basic/ Prof.	Prof./ Adv.
English Language Arts	3	1	0.99	0.96	0.91	0.99	0.94	0.88
	4	1	0.97	0.93	0.91	0.96	0.91	0.87
	5	F1	0.96	0.94	0.89	0.94	0.92	0.86
		F2	0.96	0.93	0.90	0.94	0.91	0.86
		F3	0.95	0.93	0.92	0.93	0.90	0.89
		F4	0.96	0.94	0.91	0.94	0.91	0.87
		F5	0.96	0.94	0.90	0.94	0.90	0.87
		F6	0.96	0.94	0.90	0.94	0.92	0.86
		F7	0.96	0.94	0.89	0.94	0.91	0.86
	6	1	0.94	0.93	0.92	0.91	0.89	0.90
	7	1	0.94	0.93	0.94	0.92	0.90	0.90
	8	F1	0.94	0.93	0.95	0.91	0.91	0.93
		F2	0.95	0.93	0.93	0.93	0.91	0.90
		F3	0.95	0.93	0.93	0.93	0.91	0.90
F4		0.95	0.93	0.93	0.92	0.90	0.90	
Mathematics	3	1	0.95	0.93	0.94	0.92	0.89	0.91
	4	1	0.94	0.93	0.94	0.92	0.90	0.92
	5	1	0.91	0.92	0.95	0.88	0.89	0.93
	6	1	0.93	0.92	0.96	0.90	0.88	0.94
	7	1	0.91	0.93	0.96	0.88	0.89	0.94
	8	1	0.90	0.92	0.97	0.86	0.89	0.95

Table 9.7: Principal Component Analysis for English Language Arts

Grade	Form	Components	Eigenvalue	Percent of Variance Explained	Cumulative Percent of Variance Explained
3	1	First Component	9.37	18.02	18.02
		Second Component	1.49	2.86	20.89
		Ratio (First/Second)	6.30		
4	1	First Component	10.12	19.46	19.46
		Second Component	1.56	3.01	22.47
		Ratio (First/Second)	6.47		
5	F1	First Component	9.74	19.10	19.10
		Second Component	1.56	3.07	22.17
		Ratio (First/Second)	6.23		
	F2	First Component	9.49	18.60	18.60
		Second Component	1.62	3.18	21.78
		Ratio (First/Second)	5.85		
	F3	First Component	10.07	19.75	19.75
Second Component		1.64	3.21	22.96	
Ratio (First/Second)		6.15			
F4	First Component	9.77	19.15	19.15	
	Second Component	1.40	2.75	21.90	
	Ratio (First/Second)	6.97			
F5	First Component	9.34	18.31	18.31	
	Second Component	1.68	3.29	21.60	
	Ratio (First/Second)	5.57			
F6	First Component	9.77	19.16	19.16	
	Second Component	1.57	3.08	22.25	
	Ratio (First/Second)	6.22			
F7	First Component	9.83	19.27	19.27	
	Second Component	1.60	3.14	22.40	
	Ratio (First/Second)	6.14			

Table 9.7: Principal Component Analysis for English Language Arts (cont.)

Grade	Form	Components	Eigenvalue	Percent of Variance Explained	Cumulative Percent of Variance Explained
6	1	First Component	8.96	17.23	17.23
		Second Component	1.39	2.66	19.89
		Ratio (First/Second)	6.46		
7	1	First Component	9.69	18.64	18.64
		Second Component	1.30	2.50	21.15
		Ratio (First/Second)	7.44		
8	F1	First Component	10.42	20.43	20.43
		Second Component	1.71	3.36	23.79
		Ratio (First/Second)	6.08		
		First Component	9.86	19.33	19.33
	F2	Second Component	1.81	3.55	22.88
		Ratio (First/Second)	5.44		
		First Component	9.73	19.08	19.08
		Second Component	1.73	3.39	22.47
F3	Ratio (First/Second)	5.63			
	First Component	9.83	19.27	19.27	
	Second Component	1.79	3.50	22.77	
	Ratio (First/Second)	5.51			

Table 9.8: Principal Component Analysis for Mathematics

Grade	Form	Components	Eigenvalue	Percent of Variance Explained	Cumulative Percent of Variance Explained
3	1	First Component	9.17	21.83	21.83
		Second Component	1.64	3.91	25.74
		Ratio (First/Second)	5.58		
4	1	First Component	9.75	23.20	23.20
		Second Component	1.43	3.41	26.62
		Ratio (First/Second)	6.80		
5	1	First Component	8.47	20.17	20.17
		Second Component	1.54	3.67	23.84
		Ratio (First/Second)	5.50		
6	1	First Component	9.07	19.71	19.71
		Second Component	2.13	4.64	24.35
		Ratio (First/Second)	4.25		
7	1	First Component	9.12	19.82	19.82
		Second Component	1.61	3.50	23.32
		Ratio (First/Second)	5.67		
8	1	First Component	6.65	14.46	14.46
		Second Component	1.50	3.26	17.72
		Ratio (First/Second)	4.43		

Table 9.9: Uncorrected Correlation Coefficient (below Diagonal) and Corrected Correlation Coefficient (above Diagonal) among Content Strands: English Language Arts

Grade	Form	No.	Content Strand	Number of Items	1	2	3	4
3	1	1	Reading	20	.	0.95	0.93	0.94
		2	Writing	16	0.72	.	0.97	0.93
		3	Research	8	0.64	0.64	.	0.93
		4	Listening	8	0.68	0.66	0.59	.
4	1	1	Reading	20	.	0.95	0.97	0.92
		2	Writing	16	0.75	.	1.01	0.90
		3	Research	8	0.66	0.65	.	0.94
		4	Listening	8	0.68	0.63	0.57	.
5	F1	1	Reading	20	.	0.93	1.00	1.01
		2	Writing	15	0.74	.	1.00	0.97
		3	Research	8	0.67	0.67	.	1.02
		4	Listening	8	0.70	0.67	0.59	.
	F2	1	Reading	20	.	0.89	0.95	0.97
		2	Writing	15	0.69	.	0.90	0.89
		3	Research	8	0.63	0.59	.	0.94
		4	Listening	8	0.67	0.61	0.54	.
	F3	1	Reading	20	.	0.90	0.95	0.97
		2	Writing	15	0.72	.	0.92	0.89
		3	Research	8	0.66	0.64	.	0.94
		4	Listening	8	0.69	0.64	0.58	.
	F4	1	Reading	20	.	0.92	0.96	0.97
		2	Writing	15	0.73	.	0.93	0.90
		3	Research	8	0.64	0.62	.	0.94
		4	Listening	8	0.67	0.62	0.55	.
	F5	1	Reading	20	.	0.88	0.97	0.96
		2	Writing	15	0.69	.	0.91	0.86
		3	Research	8	0.63	0.59	.	0.95
		4	Listening	8	0.66	0.58	0.54	.
	F6	1	Reading	20	.	0.90	0.96	0.96
		2	Writing	15	0.71	.	0.92	0.88
		3	Research	8	0.64	0.61	.	0.95
		4	Listening	8	0.67	0.61	0.56	.
	F7	1	Reading	20	.	0.90	0.96	0.95
		2	Writing	15	0.72	.	0.95	0.90
		3	Research	8	0.64	0.63	.	0.95
		4	Listening	8	0.66	0.62	0.54	.

Table 9.9: Uncorrected Correlation Coefficient (below Diagonal) and Corrected Correlation Coefficient (above Diagonal) among Contents Strands : English Language Arts (cont.)

Grade	Form	No.	Content Strand	Number of Items	1	2	3	4
6	1	1	Reading	20	.	0.94	0.95	0.93
		2	Writing	16	0.71	.	0.97	0.93
		3	Research	8	0.60	0.58	.	0.93
		4	Listening	8	0.68	0.64	0.54	.
7	1	1	Reading	20	.	0.96	0.97	0.94
		2	Writing	16	0.73	.	0.99	0.94
		3	Research	8	0.70	0.68	.	0.95
		4	Listening	8	0.70	0.67	0.64	.
8	F1	1	Reading	20	.	0.92	0.95	0.93
		2	Writing	15	0.75	.	0.96	0.92
		3	Research	8	0.66	0.65	.	0.97
		4	Listening	8	0.66	0.64	0.57	.
	F2	1	Reading	20	.	0.91	0.95	0.91
		2	Writing	15	0.73	.	0.93	0.89
		3	Research	8	0.64	0.61	.	0.96
		4	Listening	8	0.63	0.59	0.53	.
	F3	1	Reading	20	.	0.91	0.94	0.92
		2	Writing	15	0.73	.	0.94	0.89
		3	Research	8	0.63	0.62	.	0.92
		4	Listening	8	0.63	0.60	0.52	.
	F4	1	Reading	20	.	0.89	0.93	0.91
		2	Writing	15	0.72	.	0.92	0.87
		3	Research	8	0.63	0.61	.	0.91
		4	Listening	8	0.63	0.59	0.51	.

Table 9.10: Uncorrected Correlation Coefficient (below Diagonal) and Corrected Correlation Coefficient (above Diagonal) among Content Strands : Mathematics

Grade	Form	No.	Content Strand	Number of Items	1	2	3	4	5
3	1	1	Operations and Algebraic Thinking	15	.	1.00	0.93	0.97	0.91
		2	Numbers and Operations in Base Ten	6	0.75	.	0.95	0.99	0.92
		3	Numbers and Operations - Fractions	7	0.63	0.59	.	0.97	0.96
		4	Measurement and Data	10	0.69	0.65	0.57	.	0.93
		5	Geometry	4	0.59	0.54	0.51	0.53	.
4	1	1	Operations and Algebraic Thinking	10	.	0.99	0.94	0.97	0.85
		2	Numbers and Operations in Base Ten	8	0.67	.	0.95	0.97	0.84
		3	Numbers and Operations - Fractions	12	0.67	0.74	.	0.96	0.86
		4	Measurement and Data	8	0.62	0.68	0.71	.	0.96
		5	Geometry	4	0.39	0.42	0.46	0.46	.
5	1	1	Operations and Algebraic Thinking	6	.	0.95	0.91	0.91	0.96
		2	Numbers and Operations in Base Ten	8	0.60	.	0.89	0.87	0.87
		3	Numbers and Operations - Fractions	16	0.63	0.63	.	0.98	0.89
		4	Measurement and Data	7	0.53	0.52	0.63	.	0.93
		5	Geometry	5	0.52	0.49	0.54	0.47	.
6	1	1	Ratios and Proportional Relationships	6	.	1.02	0.99	0.95	0.97
		2	The Number System	13	0.64	.	0.97	0.94	0.96
		3	Expressions and Equations	15	0.62	0.74	.	0.97	0.97
		4	Geometry	6	0.54	0.64	0.66	.	0.98
		5	Statistics and Probability	6	0.40	0.48	0.49	0.44	.
7	1	1	Ratios and Proportional Relationships	10	.	0.96	0.94	0.94	0.95
		2	The Number System	8	0.64	.	1.00	0.96	0.98
		3	Expressions and Equations	13	0.67	0.67	.	0.98	1.01
		4	Geometry	7	0.59	0.57	0.61	.	0.98
		5	Statistics and Probability	8	0.60	0.58	0.63	0.54	.
8	1	1	The Number System	4	.	0.96	0.86	0.88	0.79
		2	Expressions and Equations	15	0.50	.	0.99	0.95	0.92
		3	Functions	10	0.42	0.62	.	0.93	1.04
		4	Geometry	11	0.38	0.52	0.47	.	0.85
		5	Statistics and Probability	6	0.35	0.52	0.54	0.39	.

Table 9.11: Mean, Standard Deviation, and Standard Error of Measurement of English Language Arts Content Strands

Grade	Form	Strand	Number of Items	Number of Score Points	N Count	Mean	Std. Dev.	Cronbach's Alpha	SEM
3	1	1	20	20	69,190	10.30	4.18	0.78	1.94
		2	16	16	69,190	8.57	3.29	0.74	1.68
		3	8	8	69,190	3.95	1.89	0.60	1.19
		4	8	8	69,190	4.30	2.10	0.68	1.20
4	1	1	20	20	67,673	12.64	4.48	0.84	1.81
		2	16	16	67,673	9.49	3.39	0.74	1.72
		3	8	8	67,673	5.12	1.60	0.56	1.07
		4	8	8	67,673	4.42	2.14	0.66	1.25
5	F1	1	20	20	7,501	12.11	4.19	0.80	1.89
		2	15	22	7,501	14.32	3.79	0.78	1.76
		3	8	8	7,501	5.34	1.80	0.57	1.18
		4	8	8	7,501	5.05	1.88	0.60	1.18
	F2	1	20	20	7,506	12.04	4.18	0.80	1.89
		2	15	22	7,506	14.26	3.58	0.77	1.73
		3	8	8	7,506	5.31	1.79	0.56	1.19
		4	8	8	7,506	5.06	1.89	0.61	1.18
	F3	1	20	20	25,557	10.35	4.37	0.80	1.93
		2	15	22	25,557	12.75	4.02	0.80	1.82
		3	8	8	25,557	4.81	1.92	0.60	1.22
		4	8	8	25,557	4.28	2.02	0.64	1.22
	F4	1	20	20	7,430	12.09	4.16	0.79	1.89
		2	15	22	7,430	14.44	3.86	0.79	1.76
		3	8	8	7,430	5.38	1.78	0.56	1.18
		4	8	8	7,430	5.08	1.87	0.60	1.18
	F5	1	20	20	7,446	12.10	4.12	0.79	1.89
		2	15	22	7,446	14.28	3.87	0.78	1.83
		3	8	8	7,446	5.31	1.76	0.54	1.20
		4	8	8	7,446	5.03	1.88	0.60	1.19
	F6	1	20	20	7,469	11.95	4.22	0.80	1.89
		2	15	22	7,469	14.23	3.75	0.78	1.74
		3	8	8	7,469	5.26	1.80	0.56	1.19
		4	8	8	7,469	5.01	1.90	0.61	1.19
	F7	1	20	20	3,726	12.09	4.24	0.80	1.88
		2	15	22	3,726	14.51	3.78	0.79	1.74
		3	8	8	3,726	5.33	1.77	0.55	1.19
		4	8	8	3,726	5.03	1.87	0.60	1.19
	F8	1	20	20	63,888	11.07	4.21	0.80	1.88
		2	16	16	63,888	8.04	3.23	0.71	1.75
		3	8	8	63,888	4.73	1.79	0.50	1.26
		4	8	8	63,888	4.99	1.94	0.67	1.12

Table 9.11: Mean, Standard Deviation, and Standard Error of Measurement of English Language Arts Content Strands (cont.)

Grade	Form	Strand	Number of Items	Number of Score Points	N Count	Mean	Std. Dev.	Cronbach's Alpha	SEM
6	1	1	20	20	63,888	11.07	4.21	0.80	1.88
		2	16	16	63,888	8.04	3.23	0.71	1.75
		3	8	8	63,888	4.73	1.79	0.50	1.26
		4	8	8	63,888	4.99	1.94	0.67	1.12
7	1	1	20	20	63,470	11.23	4.26	0.79	1.95
		2	16	16	63,470	8.37	3.45	0.73	1.78
		3	8	8	63,470	4.34	2.03	0.65	1.20
		4	8	8	63,470	4.10	2.22	0.70	1.22
8	F1	1	20	20	26,143	10.48	4.77	0.84	1.91
		2	15	22	26,143	11.57	3.92	0.79	1.78
		3	8	8	26,143	4.61	1.73	0.58	1.12
		4	8	8	26,143	5.04	1.89	0.60	1.19
	F2	1	20	20	14,937	11.40	4.60	0.83	1.90
		2	15	22	14,937	13.29	3.84	0.79	1.77
		3	8	8	14,937	4.88	1.64	0.54	1.11
		4	8	8	14,937	5.36	1.77	0.56	1.17
	F3	1	20	20	14,925	11.43	4.59	0.83	1.90
		2	15	22	14,925	12.77	3.65	0.78	1.71
		3	8	8	14,925	4.88	1.65	0.55	1.11
		4	8	8	14,925	5.36	1.78	0.57	1.17
	F4	1	20	20	7,464	11.36	4.60	0.83	1.90
		2	15	22	7,464	13.16	3.86	0.79	1.78
		3	8	8	7,464	4.86	1.65	0.55	1.10
		4	8	8	7,464	5.39	1.79	0.57	1.17

Table 9.12: Mean, Standard Deviation, and Standard Error of Measurement of Mathematics Content Strands

Grade	Form	Strand	Number of Items	Number of Score Points	N Count	Mean	Std. Dev.	Cronbach's Alpha	SEM
3	1	1	15	15	69,314	9.17	3.68	0.82	1.58
		2	6	6	69,314	3.71	1.76	0.69	0.98
		3	7	7	69,314	3.90	1.54	0.56	1.03
		4	10	10	69,314	4.51	2.10	0.62	1.30
		5	4	4	69,314	2.34	1.25	0.51	0.87
4	1	1	10	10	67,869	5.72	2.17	0.62	1.34
		2	8	8	67,869	3.89	2.27	0.73	1.17
		3	12	12	67,869	6.61	3.41	0.84	1.38
		4	8	8	67,869	3.64	2.03	0.67	1.17
		5	4	4	67,869	2.14	1.13	0.34	0.92
5	1	1	6	6	66,846	2.56	1.58	0.61	0.98
		2	8	8	66,846	4.71	1.96	0.66	1.15
		3	16	16	66,846	6.57	3.49	0.77	1.68
		4	7	7	66,846	2.65	1.70	0.54	1.15
		5	5	5	66,846	1.67	1.24	0.47	0.90
6	1	1	6	6	66,354	2.61	1.38	0.52	0.96
		2	13	13	66,354	7.04	2.99	0.77	1.44
		3	15	15	66,354	6.52	3.31	0.76	1.62
		4	6	6	66,354	2.37	1.49	0.61	0.93
		5	6	6	66,354	2.50	1.05	0.33	0.86
7	1	1	10	10	65,149	5.26	2.53	0.71	1.35
		2	8	8	65,149	2.56	1.89	0.63	1.15
		3	13	13	65,149	4.35	2.74	0.71	1.47
		4	7	7	65,149	2.77	1.68	0.55	1.12
		5	8	8	65,149	2.61	1.73	0.55	1.16
8	1	1	4	4	52,693	1.09	1.01	0.41	0.77
		2	15	15	52,693	5.28	2.90	0.68	1.65
		3	10	10	52,693	3.80	2.02	0.57	1.32
		4	11	11	52,693	3.33	1.89	0.45	1.41
		5	6	6	52,693	3.21	1.49	0.47	1.09

Table 9.13: Inter-Correlation of English Language Arts, Mathematics and Science Scale Scores

Grade	ELA /Mathematics	ELA/Science	Mathematics /Science
3	0.76		
4	0.73		
5	0.72	0.79	0.71
6	0.77		
7	0.73		
8	0.70	0.81	0.72

Figure 9.1: CSEM Curve with Cut Scores, ELA Grade 3

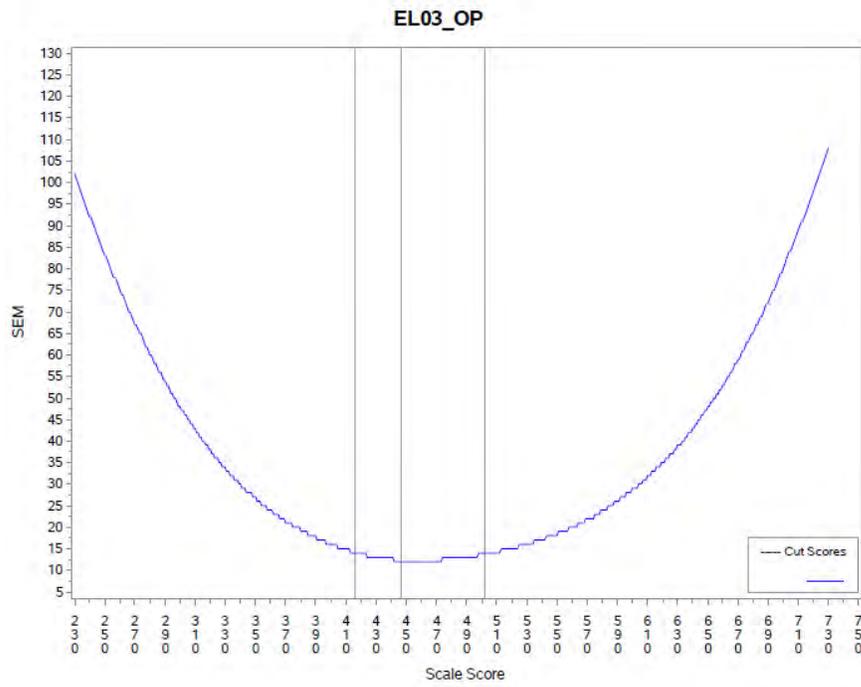


Figure 9.2: CSEM Curve with Cut Scores, ELA Grade 4

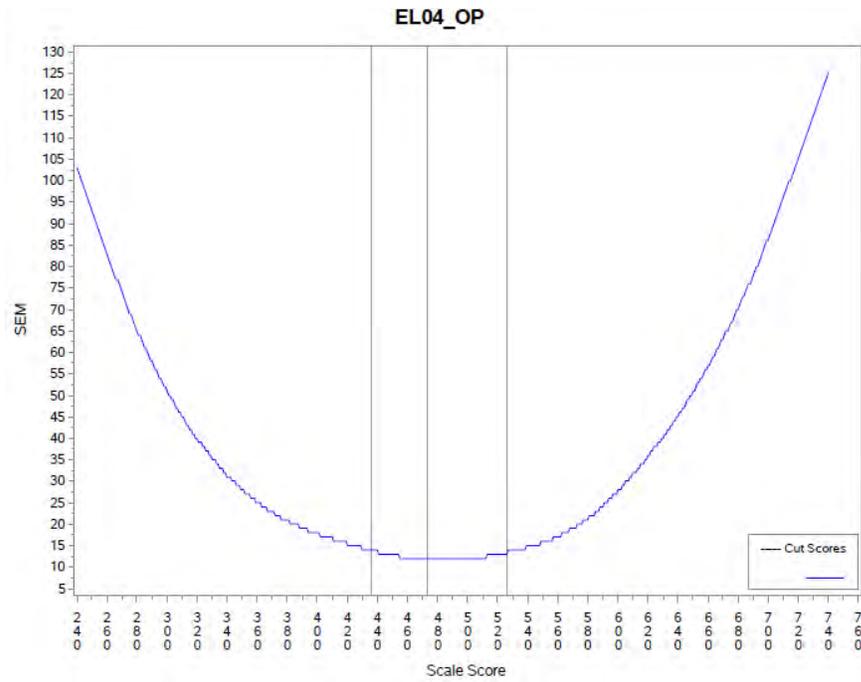


Figure 9.3: CSEM Curve with Cut Scores, ELA Grade 5

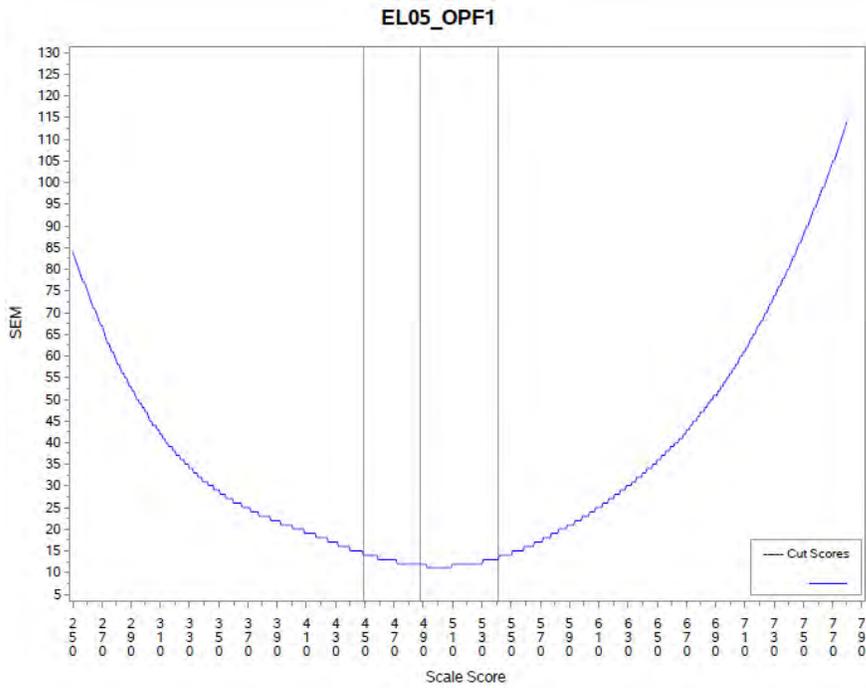


Figure 9.4: CSEM Curve with Cut Scores, ELA Grade 6

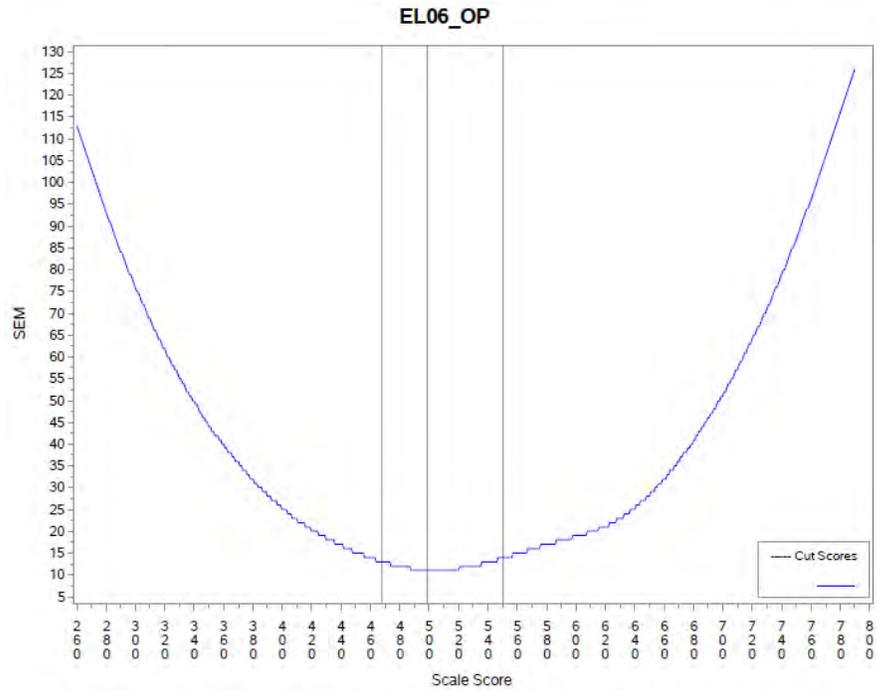


Figure 9.5: CSEM Curve with Cut Scores, ELA Grade 7

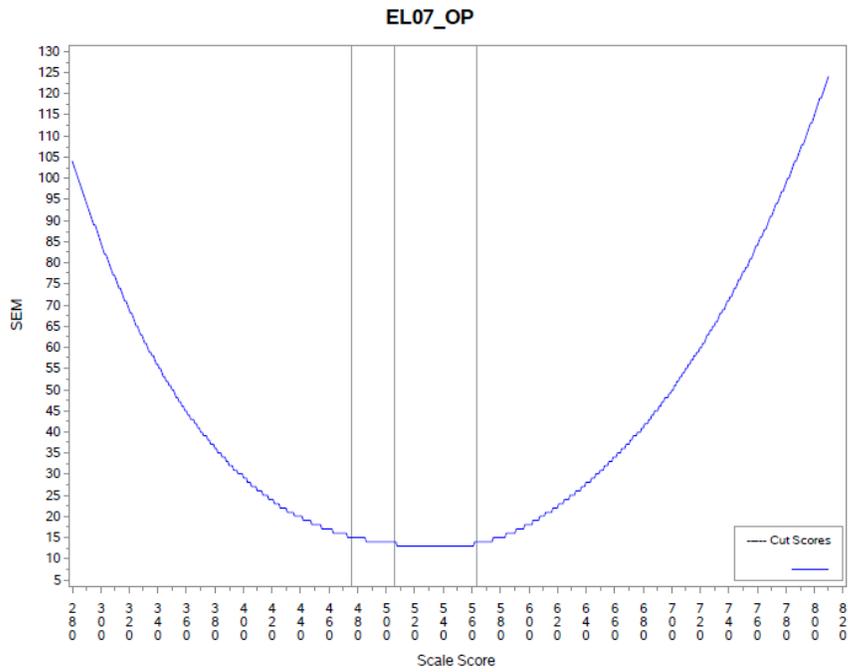


Figure 9.6: CSEM Curve with Cut Scores, ELA Grade 8

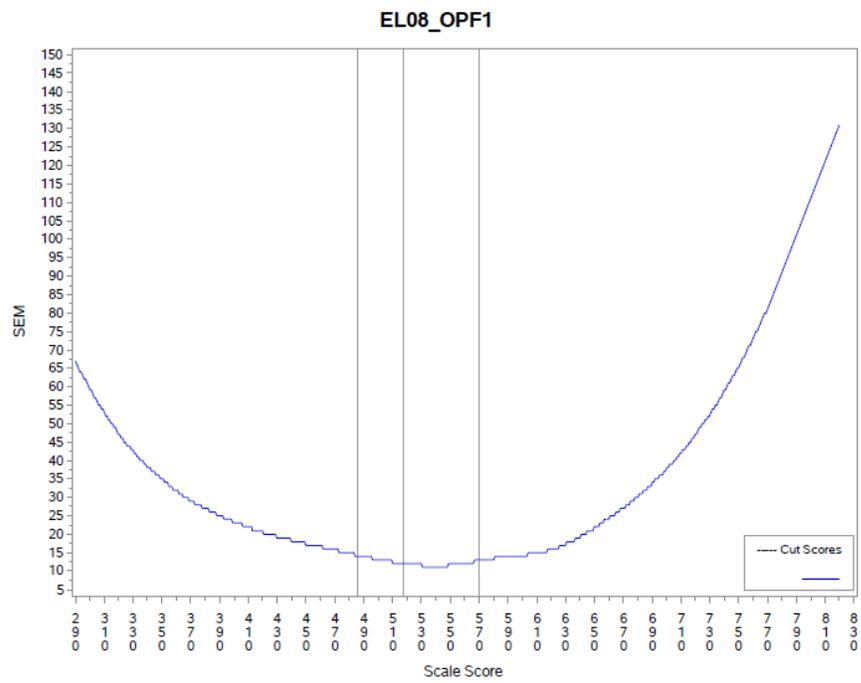


Figure 9.7: CSEM Curve with Cut Scores, Mathematics Grade 3

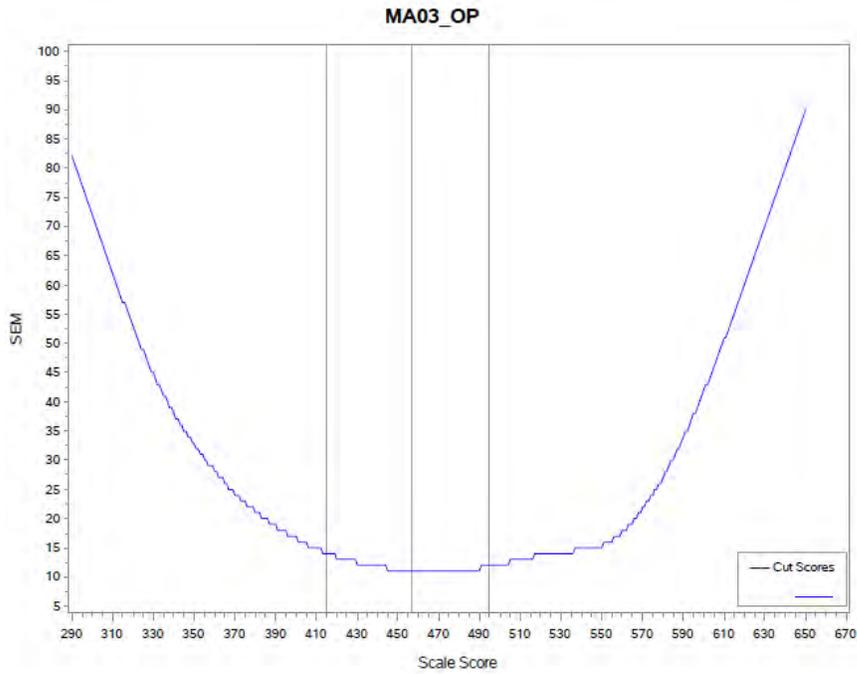


Figure 9.8: CSEM Curve with Cut Scores, Mathematics Grade 4

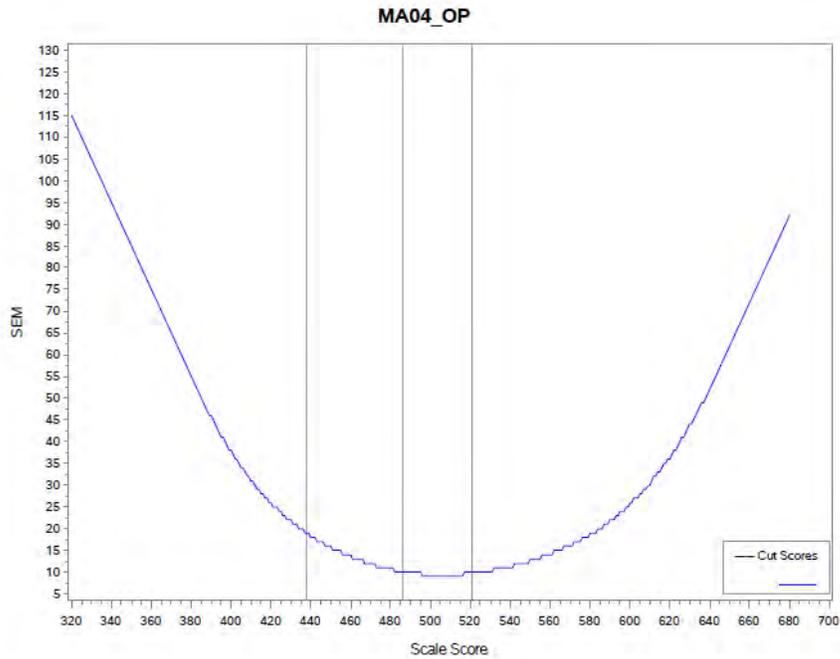


Figure 9.9: CSEM Curve with Cut Scores, Mathematics Grade 5

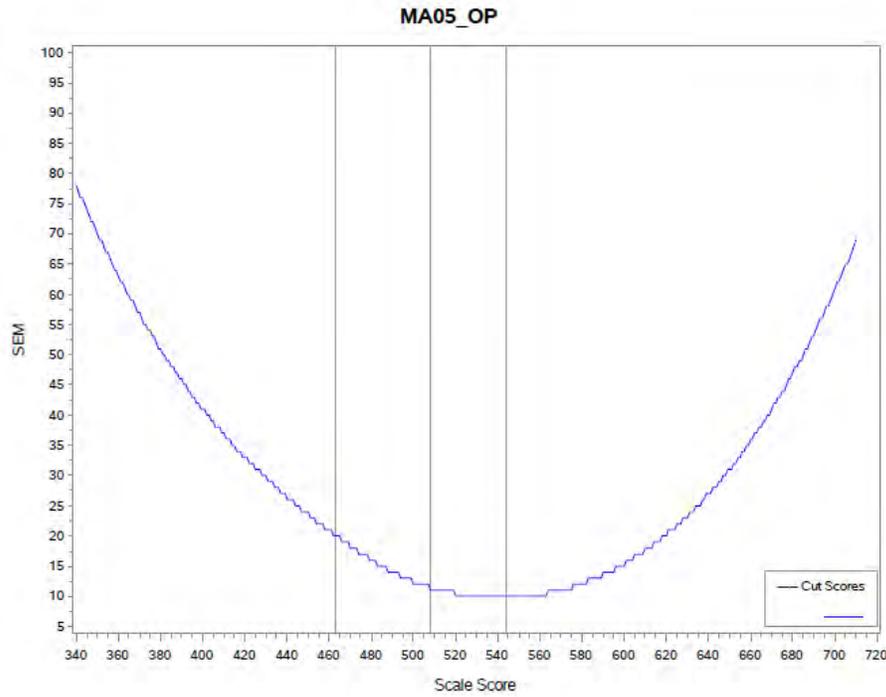


Figure 9.10: CSEM Curve with Cut Scores, Mathematics Grade 6

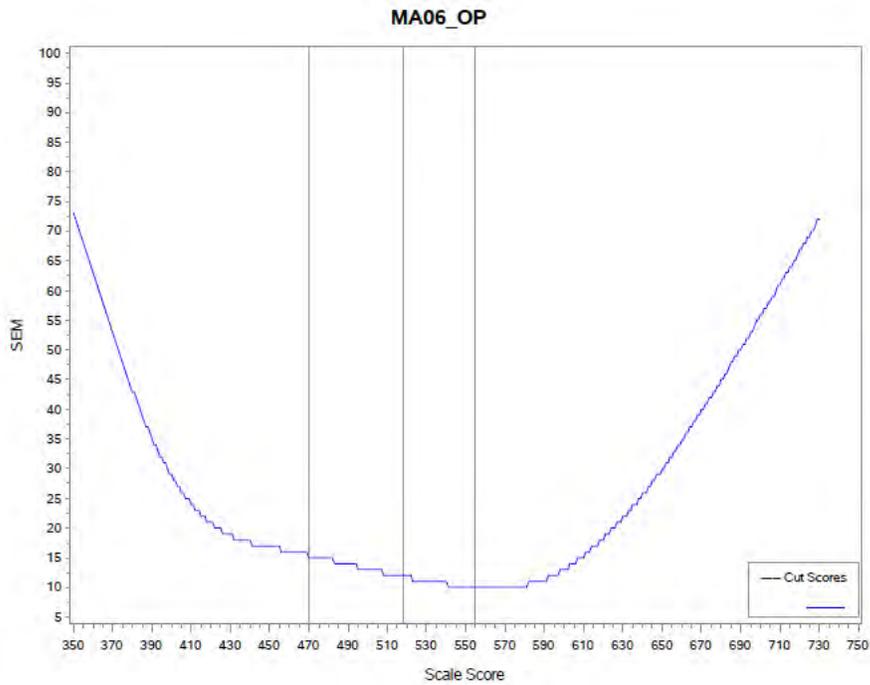


Figure 9.11: CSEM Curve with Cut Scores, Mathematics Grade 7

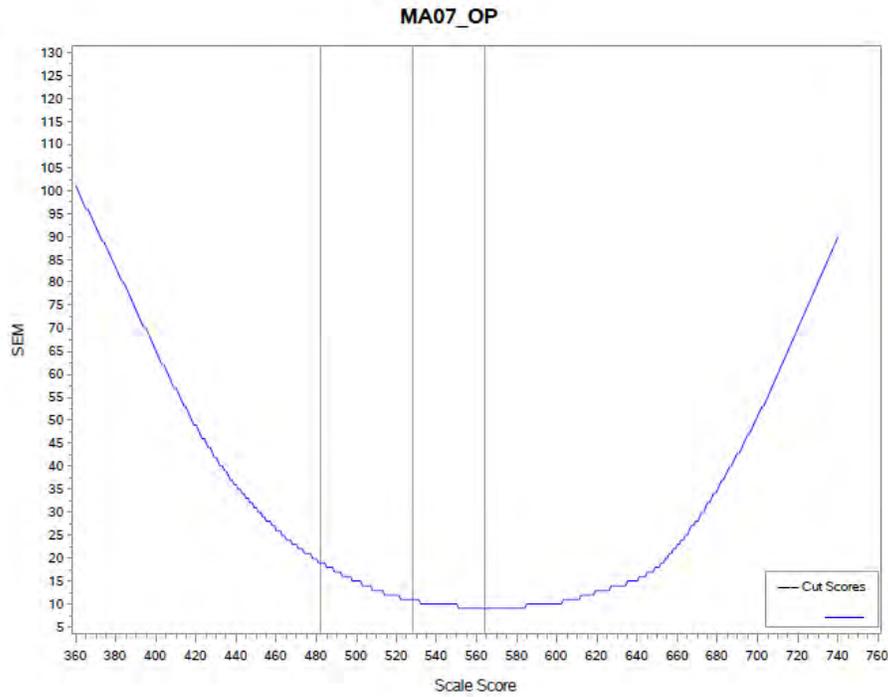
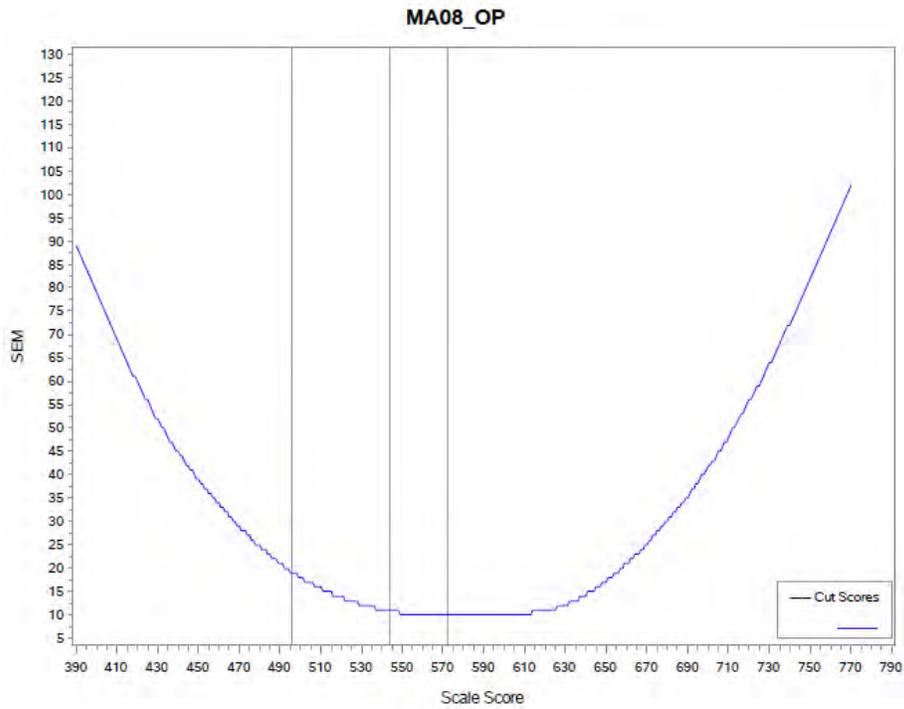


Figure 9.12: CSEM Curve with Cut Scores, Mathematics Grade 8



CHAPTER 10: FAIRNESS

As noted in the *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 2014), there are varying definitions of fairness. In this chapter, we examine fairness as it relates to minimizing bias on a test. We then look at test performance among varying subgroups assessed by MAP ELA and Mathematics. It should be noted that differences in test performance among subgroups do not mean that a test is unfair—it simply means that groups perform differently on the test. Even when a test is carefully and properly constructed, differences may exist among subgroups as a result of differences in curriculum or learning by students in the subgroup.

This chapter is particularly relevant to AERA, APA, & NCME (2014) Standards 3.1 through 3.6. These standards are from Chapter 3 of the AERA, APA, & NCME (2014) *Standards*, “Fairness in Testing.” Each of these standards will be presented as will the way the standard is addressed in this chapter. Standard 3.6 states the following:

Standard 3.6 Where credible evidence indicates that test scores may differ in meaning for relevant subgroups in the intended examinee population, test developers and/or users are responsible for examining the evidence for validity of score interpretations for intended uses for individuals from those subgroups. What constitutes a significant difference in subgroup scores and what actions are taken in response to such differences may be defined by applicable laws. (65)

There is no particular research on MAP showing that the test scores of examinee subgroups differ in meaning; however, this is an ongoing concern in any large-scale testing program. To lessen the possibility of differences in test score meaning, DRC has several steps that are followed in item development and selections as is explained in Section 10.1 of this chapter. In addition, DESE conducts content and bias reviews on items, as explained in Chapter 3. These practices adhere to Standard 3.3:

Standard 3.3 Those responsible for test development should include relevant subgroups in validity, reliability/precision, and other preliminary studies used when constructing the test. (64)

DRC conducts differential item functioning (DIF) studies following the operational administration of MAP. Typically, items are evaluated for possible DIF in the field test phase of the test development, and items flagged for DIF are typically further examined for possible bias. During the ELA and Mathematics test development, DRC content experts avoided including items that may potentially favor one demographic group over another. Also, Section 10.2 of this chapter explains the steps taken to evaluate MAP items through the use of DIF in order to adhere with this standard.

In addition, standardized test administration and training of test readers for MAP comply with Standards 3.4 and 3.5:

Standard 3.4 Test takers should receive comparable treatment during the test administration and scoring process. (65)

Standard 3.5 Test developers should specify and document provisions that have been made to test administration and scoring procedures to remove construct-irrelevant barriers for all relevant subgroups in the test-taker population. (65)

Section 10.1 of this chapter is also directly relevant to Standards 3.1 and 3.2:

Standard 3.1 Those responsible for test development, revision, and administration should design all steps of the testing process to promote valid score interpretations for intended score uses for the widest possible range of individuals and relevant subgroups in the intended population. (63)

Standard 3.2 Test developers are responsible for developing tests that measure the intended construct and for minimizing the potential for tests' being affected by construct-irrelevant characteristics, such as linguistic, communicative, cognitive, cultural, physical, or other characteristics. (64)

In this section, we explain the steps taken by DRC to minimize words, phrases, and content that may be regarded as offensive by members of particular demographic subgroups. Chapter 3 discusses item content considerations during item development and item reviews for items included in MAP. These reviews are also critical in fulfilling Standards 3.1 and 3.2.

10.1 Minimizing Bias through Careful Test Development

The development of a test that is fair for all examinees begins in the early stages of planning and development. The item and test development processes that were used to minimize bias are summarized below.

First, careful attention was paid to content-related validity during the item development and item selection processes. Bias can occur only if the test is measuring different things for different groups. By eliminating irrelevant skills or knowledge from the items, the possibility of bias is reduced.

Second, DRC item writers and test developers followed DRC's internal bias and sensitivity guidelines to help ensure that the items are fair for all groups of test takers, despite differences in characteristics including, but not limited to, disability status, ethnic group, gender, regional background, native language, race, religion, sexual orientation, and socioeconomic status. Test developers reviewed all items included in MAP assessments and other testing materials with these guidelines in mind.

Finally, careful attention is typically given to item statistics (if available) throughout the test development process. As part of the test assembly process, attempts are made to avoid using or reusing items with poor statistical fit or distractors with positive point

biserial correlations, since this may indicate that an item is tapping an ability that is irrelevant to the construct being measured. Additional steps to reduce bias, including the use of content and bias committees comprising of Missouri participants, are described in more detail in Chapter 3 of this report.

10.2 Evaluating Bias through Differential Item Functioning Statistics

After administering the test, an empirical approach known as DIF was used to examine the items. The DIF statistics indicate the degree to which members of a particular subgroup perform better or worse than expected on each item as compared to the members of reference group. The DIF procedures used and the results of these analyses are detailed in this section. It should be noted, though, that all items included on the MAP ELA and Mathematics assessments have been thoroughly reviewed for content and bias by Missouri educators and DRC content experts to ensure that they do not tap knowledge or specific abilities irrelevant to the construct the test intends to measure. Therefore, DIF flags do not necessarily indicate that an item is biased; rather, DIF flags indicate that the item functions differently for equally able members of different groups (Camilli & Shepard, 1994). Items are not necessarily suppressed from operational scoring if they are flagged for DIF.

The position of DRC concerning test bias is based on two general propositions. First, students may differ in their background knowledge, cognitive and academic skills, language, attitudes, and values. To the degree that these differences are large, no one curriculum and no one set of instructional materials will be equally suitable for all. Therefore, no one test will be equally appropriate for all. Furthermore, it is difficult to specify what amount of difference can be called large and to determine how these differences will affect the outcome of a particular test. Second, schools have been assigned the tasks of developing certain basic cognitive skills and supporting development of these skills equitably among all students. Therefore, there is a need for tests that measure the common skills and bodies of knowledge that are common to all learners. The test publisher's task is to develop assessments that measure these key cognitive skills without introducing extraneous or construct-irrelevant elements into the performances on which the measurement is based. If these tests require that students have culturally specific knowledge and skills not taught in school, differences in performance among students can occur because of differences in student background and out-of-school learning. Such tests are measuring different things for different groups and can be called biased (Camilli & Shepard, 1994; Green, 1975).

In order to lessen such biases, DRC strives to minimize the role of extraneous elements, thereby increasing the number of students for whom the test is appropriate. As discussed above and in Chapter 3 of this report, careful attention is given during the test development and test construction processes to lessen the influence of these elements for large numbers of students (including the use of content and bias review committees). Unfortunately, in some cases, these elements may continue to play a substantial role. To assess the extent to which items may be performing differently for various subgroups of interest, DIF analyses are conducted after each operational test administration.

DIF statistics are used to quantify differences in item performance between two groups after controlling for examinees' overall achievement level. Two DIF statistics that are commonly used for this purpose are the Mantel-Haenszel (MH) statistic (1959) and the standardized mean difference (SMD) between the reference and focal groups, proposed by Dorans and Schmitt (1991).

The MH statistic is computed as follows (Zwick, Donoghue, & Grima, 1993):

$$\text{Mantel } \chi^2 = \frac{\left(\sum_k F_k - \sum_k E(F_k) \right)^2}{\sum_k \text{Var}(F_k)},$$

where F_k is the sum of scores for the focal group at the k^{th} level of the matching variable. Note that the MH statistic is sensitive to N such that larger sample sizes increase the value of chi-square.

In addition to the MH chi-square statistic, the delta statistic (MH-D DIF) was computed for all items. Educational Testing Service first developed the MH-D DIF statistic. To compute delta, alpha (the odds ratio) is first computed:

$$\alpha_{MH} = \frac{\sum_{k=1}^K N_{r1k} N_{f0k} / N_k}{\sum_{k=1}^K N_{f1k} N_{r0k} / N_k},$$

where N_{r1k} is the number of correct responses in the reference group at ability level k , N_{f0k} is the number of incorrect responses in the focal group at ability level k , N_k is the total number of responses, N_{f1k} is the number of correct responses in the focal group at ability level k , and N_{r0k} is the number of incorrect responses in the reference group at ability level k . MH-D DIF is then computed:

$$\text{MH-D DIF} = -2.35 \ln(\alpha_{MH}).$$

For selected-response items, the MH (χ_{MH}^2) statistic was used to evaluate potential DIF items. In the MH procedure, subgroups are matched by their raw total test score, using a contingency table with K ability levels. When applying the MH procedure, the log-odds ratio α is assumed to be constant across the K matched levels. The χ_{MH}^2 , then, estimates a pooled common-odds ratio. Taking the natural logarithm of the common-odds ratio and its confidence limits and multiplying these by the constant -2.35 , allows the resulting values to then be placed on the MH delta metric (Δ_{MH}) for interpretive purposes. Items were flagged for DIF using the following criteria:

- Moderate DIF: significant MH chi-square statistic ($p < 0.05$) and $1.0 \leq |\text{MH D-DIF}| < 1.5$
- Large DIF: significant MH chi-square statistic ($p < 0.05$) and $|\text{MH D-DIF}| \geq 1.5$

For constructed-response items, an effect size (ES) statistic based on the MH chi-square will be used. The ES is obtained by dividing the SMD statistics by the standard deviation of the item. The SMD is an effect size index of DIF, which is relatively easy to interpret (Zwick et al., 1993). The SMD compares the mean of the reference and focal group, adjusting for the distribution of reference and focal group members on the conditioning variable (Zwick et al., 1993), which for these analyses is the MAP raw score. SMD is computed as follows (Zwick et al., 1993):

$$SMD = p_{Fk} \left(\sum_k m_{Fk} - \sum_k m_{Rk} \right),$$

where p_{Fk} is the proportion of the focal group members at the k th level of the matching variable, m_{Fk} is $1/N_{F1k}$, and m_{Rk} is $1/N_{R1k}$. Items are flagged using the same rules that are used in National Assessment of Educational Progress:

- Moderate DIF: If the MH statistic is significant ($p < .05$) and $|\text{ES}|$ is between 0.17 and 0.25.
- Large DIF: If the MH statistic is significant ($p < .05$) and $|\text{ES}| \geq 0.25$.

A positive DIF value indicates that the item favors the focal group, while a negative value indicates that the item disadvantages the focal group. Tables 10.1 and 10.2 show the DIF results for the following subgroups:

- **Gender:** The focal group is females; the reference group is males.
- **Race/Ethnicity:** The focal groups are students whose race/ethnicity is reported as Black, Hispanic, Asian/Pacific Islander, American Indian, or Other; the reference group is students whose race/ethnicity is reported as White.
- **Accommodations:** The focal group is students who had one or more testing accommodations; the reference group is all others.

A negative SMD value implies that the focal group has a lower mean item score than the reference group, whereas a positive value implies that the focal group has a higher mean item score than the reference group, conditioned on the matching test score.

The minimum case count for the focal group was set at 200 and the minimum case count for the reference group was set at 400. The DIF analyses are not performed for subgroups of fewer than 200 students. In these cases, the statistical procedures do not have sufficient power to detect differences, should they exist.

Tables 10.1 and 10.2 summarize the number of moderate and large DIF flags by grade and test form for each focal group that included at least 200 students for ELA and Mathematics, respectively. For example, consider Grade 3 ELA. In this form, no items were flagged for gender DIF. One item was flagged for DIF against the Asian/Pacific Islander subgroup and two items were flagged against the Hispanic subgroup—these items exhibited moderate negative DIF. No items were flagged for the Black subgroup. One item was flagged for the American Indian subgroup and displayed moderate positive DIF. A total of five items were flagged for the subgroup of students using accommodations: one item exhibited a moderate negative DIF, one item exhibited a large negative DIF, and three items displayed moderate positive DIF.

Again, any items included on the MAP (including those items flagged for DIF) have been thoroughly reviewed for content and bias by Missouri teachers, DESE staff, and DRC test development experts.

10.3 Impact Analysis

The impact of achievement testing on subgroups of students can be determined and reported in the form of average scores and also in terms of test score reliability.

10.3.1 Effect Size

One way to evaluate the magnitude of the differences is to calculate the effect size. Cohen's d was used to calculate the effect size. Cohen's d is given by the formula

$$d = \frac{\bar{x}_a - \bar{x}_b}{\sqrt{\frac{(n_a - 1)s_a^2 + (n_b - 1)s_b^2}{(n_a + n_b) - 2}}},$$

where \bar{x}_a is the mean score of group A, \bar{x}_b is the mean score of group B, s_a^2 is the variance of group A, s_b^2 is the variance of group B, n_a is the number of students in group A, and n_b is the number of students in group B.

Cohen's d , then, expresses the difference in group means in terms of the standard deviation. For example, if $d = .34$ for two groups, then it may be interpreted that the mean difference between the two groups is .34 of the pooled standard deviation. Cohen (1988) offered guidelines for interpreting the meaning of the d statistic: $d = .20$ is a small effect size, $d = .50$ is a medium effect size, and $d = .80$ is a large effect size.

Using Cohen's (1988) guidelines, certain trends become apparent in Tables 10.3 through 10.8.

In the English Language Arts, there are small differences between the mean test scores of female students and male students with female students outperforming male students in Grades 5 through 8 (no difference in Grades 3 and 4).

There is a medium difference in mean English Language Arts test scores of Black students compared to White students, with Black students underperforming White students in all grades. There is a small difference between the mean test scores of Hispanic and White students, with Hispanic students underperforming White students on English Language Arts in all grades. There is a small difference between the mean test scores of Native Americans and White students, with Native American students underperforming White students on English Language Arts in all grades. There is also a small difference between the mean English Language Arts test scores of Asian/Pacific Islander students and White students, with Asian/Pacific Islander students outperforming White students in all grades except for Grade 4 (no difference).

There is a large difference between the mean English Language Arts test scores of students using testing accommodations compared to students not using testing accommodations, with students not using testing accommodations outperforming their peers who use accommodations in all grade levels.

In Mathematics, there is a medium difference between the mean test scores of Black students compared to White students, with Black students underperforming White students in Grades 3, 5, 6, and 8. There is a large difference between the mean test scores of Black and White students, with Black students underperforming White students in grades 4 and 7. There is a small difference between the mean Mathematics test scores of Hispanic students compared to White students, with Hispanic students underperforming White students in all grades. There is a small difference between the mean test scores of Native American students compared to White students, with Native American students underperforming White students in all grades except for Grade 8 (no difference). Finally, there is a small difference between the mean Mathematics test scores of Asian/Pacific Islander students and White students, in all grades except Grade 5 where there is a medium difference between the mean test scores. Asian/Pacific Islander students outperform White students in all grades.

There is a large difference between the mean Mathematics test scores of students not using testing accommodations and students using testing accommodations, with students not using testing accommodations outperforming students using testing accommodations in all grades.

The mean scale score differences trend observed in the Spring 2016 data are similar to the trends observed in the Spring 2015 data.

10.3.2 Reliability

Tables 10.9 through 10.20 show the test form reliability coefficients and standard error of measurement by student ethnicity, student gender, and whether or not students used any testing accommodations.

The reliability coefficients for English Language Arts forms ranged from 0.85 to 0.94. For Mathematics the reliability coefficients ranged from 0.65 to 0.94. Lower reliability coefficients were generally observed for students using testing accommodations and for Grade 8 Mathematics subgroups compared to other Mathematics groups or grades. Overall, this analysis shows that the test reliability is of acceptable magnitude for all of the subgroups. Note that the reliability coefficients are not reported for subgroups smaller than 50 students.

10.4 Summary

In summary, the overall purpose of this chapter is to address fairness concerns that are relevant to the administration of MAP. The information in this chapter supports multiple best practices of the testing industry and, in particular is related to the following AERA, APA, & NCME (2014) standards:

- Standard 3.1—Those responsible for test development, revision, and administration should design all steps of the testing process to promote valid score interpretations for intended score uses for the widest possible range of individuals and relevant subgroups in the intended population.
- Standard 3.2—Test developers are responsible for developing tests that measure the intended construct and for minimizing the potential for tests being affected by construct-irrelevant characteristics, such as linguistic, communicative, cognitive, cultural, physical, or other characteristics.
- Standard 3.3—Those responsible for test development should include relevant subgroups in validity, reliability/precision, and other preliminary studies used when constructing the test.
- Standard 3.4—Test takers should receive comparable treatment during the test administration and scoring process.
- Standard 3.5—Test developers should specify and document provisions that have been made to test administration and scoring procedures to remove construct-irrelevant barriers for all relevant subgroups in the test-taker population.
- Standard 3.6—Where credible evidence indicates that test scores may differ in meaning for relevant subgroups in the intended examinee population, test developers and/or users are responsible for examining the evidence for validity of score interpretations for intended uses for individuals from those subgroups. What constitutes a significant difference in subgroup scores and what actions are taken in response to such differences may be defined by applicable laws.

Table 10.1: 2016 MAP DIF Statistics: Number of Flagged Items, English Language Arts

English Language Arts		Grade	3	4	5	6	7	8
		# of Items	52	52	69	52	52	60
Group	DIF Magnitude	DIF Direction	Number of Flagged Items					
Female	Moderate	Negative	0	0	0	3	1	2
		Positive	0	0	5	0	0	7
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	7	0	0	4
Asian/ Pacific Islander	Moderate	Negative	1	2	1	2	0	1
		Positive	0	0	3	0	0	1
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	1	0	0
Black	Moderate	Negative	0	0	2	1	1	2
		Positive	0	0	0	0	0	0
	Large	Negative	0	0	0	1	0	0
		Positive	0	0	0	0	0	0
Hispanic	Moderate	Negative	2	0	1	1	0	0
		Positive	0	0	0	0	0	0
	Large	Negative	0	1	0	0	0	0
		Positive	0	0	0	0	0	0
American Indian	Moderate	Negative	0	1	0	0	0	0
		Positive	1	0	0	0	0	0
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	1	0
Ethnicity: Other	Moderate	Negative	0	0	0	0	0	0
		Positive	0	0	2	0	0	0
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	0
Accommo- dations	Moderate	Negative	1	4	2	3	2	4
		Positive	3	2	2	4	1	3
	Large	Negative	1	2	2	0	0	2
		Positive	0	0	1	1	0	0

Note: For Grades 5 and 8, the three components of the writing prompts were analyzed as separate items.

Table 10.2: 2016 MAP DIF Statistics: Number of Flagged Items, Mathematics

Mathematics		Grade	3	4	5	6	7	8
		# of Items	42	42	42	46	46	46
Group	DIF Magnitude	DIF Direction	Number of Flagged Items					
Female	Moderate	Negative	1	1	0	1	1	1
		Positive	2	0	0	1	1	0
	Large	Negative	1	0	0	0	0	0
		Positive	0	0	0	0	0	0
Asian/ Pacific Islander	Moderate	Negative	0	1	0	2	2	0
		Positive	2	1	0	1	2	0
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	0
Black	Moderate	Negative	0	0	1	0	0	0
		Positive	0	0	0	1	0	0
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	0
Hispanic	Moderate	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	0
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	0
American Indian	Moderate	Negative	0	0	0	1	0	0
		Positive	0	0	0	0	0	0
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	0
Ethnicity: Other	Moderate	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	0
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	0
Accommo- dations	Moderate	Negative	1	1	2	0	2	1
		Positive	3	1	0	3	0	1
	Large	Negative	1	0	0	1	0	0
		Positive	3	0	2	0	2	1

Table 10.3: Impact Analysis, Grade 3

Content Area	Category	Group	N	Mean	Std. Dev.	Effect Size
English Language Arts	Race/Ethnicity	White (not Hispanic)	48,779	465.18	48.72	.
		Asian/Pacific Islander	1,427	477.06	53.33	-0.24
		Black (not Hispanic)	11,529	429.78	49.54	0.72
		Hispanic	4,430	446.72	48.01	0.38
		American Indian	273	453.25	45.95	0.24
		Other	2,922	458.80	47.75	0.13
	Gender	Male	35,310	453.77	51.68	.
		Female	34,050	462.48	49.30	-0.17
	Accommodations	No	69,111	458.26	50.47	.
Yes		249	398.47	76.97	1.18	
Mathematics	Race/Ethnicity	White (not Hispanic)	48,766	462.49	46.78	.
		Asian/Pacific Islander	1,490	478.38	51.90	-0.34
		Black (not Hispanic)	11,552	428.78	48.65	0.71
		Hispanic	4,474	445.13	47.61	0.37
		American Indian	274	446.74	47.89	0.34
		Other	2,922	453.97	47.28	0.18
	Gender	Male	35,367	456.39	51.25	.
		Female	34,111	454.96	46.70	0.03
	Accommodations	No	69,196	455.92	48.90	.
Yes		282	398.18	57.37	1.18	

Table 10.4: Impact Analysis, Grade 4

Content Area	Category	Group	N	Mean	Std. Dev.	Effect Size
English Language Arts	Race/Ethnicity	White (not Hispanic)	48,224	492.93	48.21	.
		Asian/Pacific Islander	1,448	501.42	55.43	-0.18
		Black (not Hispanic)	11,043	455.42	50.54	0.77
		Hispanic	4,353	473.20	48.21	0.41
		American Indian	241	480.70	54.03	0.25
		Other	2,511	485.95	48.92	0.14
	Gender	Male	34,753	481.40	52.22	.
		Female	33,067	489.68	48.97	-0.16
	Accommodations	No	67,540	485.79	50.28	.
Yes		280	400.39	93.25	1.69	
Mathematics	Race/Ethnicity	White (not Hispanic)	48,224	490.42	51.17	.
		Asian/Pacific Islander	1,498	509.29	58.55	-0.37
		Black (not Hispanic)	11,076	446.27	60.13	0.83
		Hispanic	4,399	468.30	56.13	0.43
		American Indian	241	474.77	57.78	0.31
		Other	2,509	482.07	55.20	0.16
	Gender	Male	34,822	482.75	58.17	.
		Female	33,125	480.89	53.66	0.03
	Accommodations	No	64,897	485.21	53.33	.
Yes		3,050	410.11	63.48	1.40	

Table 10.5: Impact Analysis, Grade 5

Content Area	Category	Group	N	Mean	Std. Dev.	Effect Size
English Language Arts	Race/Ethnicity	White (not Hispanic)	48,111	505.45	49.97	.
		Asian/Pacific Islander	1,454	521.55	54.70	-0.32
		Black (not Hispanic)	10,493	471.63	52.55	0.67
		Hispanic	4,202	487.98	49.67	0.35
		American Indian	272	490.28	51.15	0.30
		Other	2,277	499.69	50.65	0.12
	Gender	Male	34,126	492.88	53.55	.
		Female	32,683	505.66	49.75	-0.25
	Accommodations	No	66,526	499.53	51.47	.
Yes		283	404.18	98.01	1.84	
Mathematics	Race/Ethnicity	White (not Hispanic)	48,094	505.81	47.80	.
		Asian/Pacific Islander	1,502	531.69	54.61	-0.54
		Black (not Hispanic)	10,509	473.46	48.92	0.67
		Hispanic	4,249	489.52	47.81	0.34
		American Indian	272	489.97	50.22	0.33
		Other	2,277	497.66	49.40	0.17
	Gender	Male	34,181	498.99	52.04	.
		Female	32,722	500.92	47.51	-0.04
	Accommodations	No	63,166	502.74	48.70	.
Yes		3,737	452.56	45.72	1.03	

Table 10.6: Impact Analysis, Grade 6

Content Area	Category	Group	N	Mean	Std. Dev.	Effect Size
English Language Arts	Race/Ethnicity	White (not Hispanic)	48,170	512.68	43.54	.
		Asian/Pacific Islander	1,475	524.82	48.25	-0.28
		Black (not Hispanic)	10,567	481.18	43.48	0.72
		Hispanic	3,952	495.54	43.30	0.39
		American Indian	282	502.47	42.89	0.23
		Other	1,942	506.50	45.29	0.14
	Gender	Male	33,931	501.73	45.88	.
		Female	32,457	511.88	44.08	-0.23
	Accommodations	No	62,213	509.70	44.08	.
Yes		4,175	461.89	39.07	1.09	
Mathematics	Race/Ethnicity	White (not Hispanic)	48,148	513.70	45.59	.
		Asian/Pacific Islander	1,476	533.11	53.08	-0.42
		Black (not Hispanic)	10,594	477.97	47.05	0.78
		Hispanic	3,992	496.13	45.94	0.39
		American Indian	282	502.80	48.49	0.24
		Other	1,940	505.13	46.20	0.19
	Gender	Male	33,941	505.64	49.94	.
		Female	32,491	508.59	45.98	-0.06
	Accommodations	No	62,531	510.67	45.91	.
Yes		3,901	449.58	45.21	1.33	

Table 10.7: Impact Analysis, Grade 7

Content Area	Category	Group	N	Mean	Std. Dev.	Effect Size
English Language Arts	Race/Ethnicity	White (not Hispanic)	48,155	521.71	52.34	.
		Asian/Pacific Islander	1,466	542.13	57.57	-0.39
		Black (not Hispanic)	10,445	483.50	53.10	0.73
		Hispanic	3,841	503.92	51.30	0.34
		American Indian	260	508.33	53.85	0.26
		Other	1,827	513.49	56.01	0.16
	Gender	Male	33,723	509.20	56.24	.
		Female	32,271	520.65	52.26	-0.21
	Accommodations	No	62,057	518.27	53.19	.
Yes		3,937	460.14	47.37	1.10	
Mathematics	Race/Ethnicity	White (not Hispanic)	47,526	521.99	47.28	.
		Asian/Pacific Islander	1,367	542.96	54.79	-0.44
		Black (not Hispanic)	10,440	481.92	49.46	0.84
		Hispanic	3,864	504.06	47.58	0.38
		American Indian	260	506.12	52.06	0.34
		Other	1,793	510.31	50.85	0.25
	Gender	Male	33,314	514.26	52.99	.
		Female	31,936	514.90	47.40	-0.01
	Accommodations	No	61,211	517.88	48.93	.
Yes		4,039	464.54	44.46	1.10	

Table 10.8: Impact Analysis, Grade 8

Content Area	Category	Group	N	Mean	Std. Dev.	Effect Size
English Language Arts	Race/Ethnicity	White (not Hispanic)	47,902	534.28	49.97	.
		Asian/Pacific Islander	1,452	553.22	59.37	-0.38
		Black (not Hispanic)	10,448	498.12	51.72	0.72
		Hispanic	3,834	515.10	50.58	0.38
		American Indian	314	519.81	50.04	0.29
		Other	1,751	526.46	50.68	0.16
	Gender	Male	33,742	519.59	53.92	.
		Female	31,959	535.95	49.42	-0.32
	Accommodations	No	62,214	530.75	50.83	.
Yes		3,487	470.41	47.32	1.19	
Mathematics	Race/Ethnicity	White (not Hispanic)	37,802	521.50	46.05	.
		Asian/Pacific Islander	892	535.17	54.19	-0.30
		Black (not Hispanic)	9,194	489.88	51.87	0.67
		Hispanic	3,196	505.51	49.06	0.35
		American Indian	272	514.44	43.35	0.15
		Other	1,403	513.94	49.07	0.16
	Gender	Male	27,554	512.05	51.15	.
		Female	25,205	518.25	46.52	-0.13
	Accommodations	No	49,005	518.70	47.15	.
Yes		3,754	466.87	48.53	1.10	

Table 10.9: Grade 3 English Language Arts Reliability and SEM by Subgroup

Grade	Category	Group	N Count	Cronbach's Alpha	SEM
3	Race/Ethnicity	White (not Hispanic)	48,677	0.90	3.08
		Asian/Pacific Islander	1,418	0.91	3.01
		Black (not Hispanic)	11,481	0.89	3.10
		Hispanic	4,423	0.89	3.12
		American Indian	272	0.89	3.09
		Other	2,919	0.90	3.09
	Gender	Male	35,200	0.91	3.09
		Female	33,990	0.90	3.08
	Accommodations	No	68,965	0.90	3.09
		Yes	225	0.90	3.06

Table 10.10: Grade 4 English Language Arts Reliability and SEM by Subgroup

Grade	Category	Group	N Count	Cronbach's Alpha	SEM
4	Race/Ethnicity	White (not Hispanic)	48,153	0.91	2.98
		Asian/Pacific Islander	1,444	0.92	2.88
		Black (not Hispanic)	10,992	0.90	3.10
		Hispanic	4,340	0.90	3.09
		American Indian	239	0.92	3.01
		Other	2,505	0.91	3.01
	Gender	Male	34,663	0.92	3.03
		Female	33,010	0.91	2.98
	Accommodations	No	67,447	0.91	3.01
		Yes	226	0.92	3.09

Table 10.11: Grade 5 English Language Arts Reliability and SEM by Subgroup

Form	Category	Group	N Count	Cronbach's Alpha	SEM
F1	Race/Ethnicity	White (not Hispanic)	5,639	0.90	3.07
		Asian/Pacific Islander	181	0.89	2.90
		Black (not Hispanic)	989	0.91	3.24
		Hispanic	385	0.90	3.15
		American Indian	23	.	.
		Other	284	0.90	3.10
	Gender	Male	3,682	0.91	3.14
		Female	3,819	0.90	3.05
	Accommodations	No	7,500	0.91	3.10
Yes	1	.	.		
F2	Race/Ethnicity	White (not Hispanic)	5,670	0.90	3.06
		Asian/Pacific Islander	149	0.90	2.91
		Black (not Hispanic)	1,038	0.90	3.18
		Hispanic	390	0.89	3.12
		American Indian	25	.	.
		Other	234	0.89	3.09
	Gender	Male	3,735	0.91	3.10
		Female	3,771	0.90	3.05
	Accommodations	No	7,505	0.90	3.08
Yes	1	.	.		
F3	Race/Ethnicity	White (not Hispanic)	17,039	0.91	3.17
		Asian/Pacific Islander	544	0.93	3.10
		Black (not Hispanic)	4,957	0.89	3.24
		Hispanic	2,039	0.90	3.22
		American Indian	108	0.91	3.22
		Other	870	0.91	3.20
	Gender	Male	13,603	0.91	3.21
		Female	11,954	0.91	3.15
	Accommodations	No	25,352	0.91	3.19
Yes	205	0.91	3.24		
F4	Race/Ethnicity	White (not Hispanic)	5,644	0.90	3.07
		Asian/Pacific Islander	163	0.90	2.87
		Black (not Hispanic)	945	0.90	3.20
		Hispanic	383	0.90	3.13
		American Indian	27	.	.
		Other	268	0.91	3.10
	Gender	Male	3,740	0.91	3.13
		Female	3,690	0.90	3.05
	Accommodations	No	7,429	0.91	3.10
Yes	1	.	.		

Note: Reliability and SEM not computed for groups smaller than 50 students.

Table 10.11: Grade 5 English Language Arts Reliability and SEM by Subgroup (cont.)

Form	Category	Group	N Count	Cronbach's Alpha	SEM
F5	Race/Ethnicity	White (not Hispanic)	5,602	0.89	3.13
		Asian/Pacific Islander	194	0.89	3.00
		Black (not Hispanic)	999	0.89	3.25
		Hispanic	386	0.89	3.18
		American Indian	29	.	.
		Other	236	0.91	3.16
	Gender	Male	3,720	0.90	3.16
		Female	3,726	0.89	3.12
	Accommodations	No	7,443	0.90	3.15
	Yes	3	.	.	
F6	Race/Ethnicity	White (not Hispanic)	5,593	0.9	3.07
		Asian/Pacific Islander	149	0.92	2.91
		Black (not Hispanic)	1,012	0.91	3.19
		Hispanic	425	0.89	3.12
		American Indian	35	.	.
		Other	255	0.89	3.13
	Gender	Male	3,660	0.91	3.11
		Female	3,809	0.9	3.07
	Accommodations	No	7,465	0.91	3.09
	Yes	4	.	.	
F7	Race/Ethnicity	White (not Hispanic)	2,833	0.90	3.06
		Asian/Pacific Islander	72	0.87	2.76
		Black (not Hispanic)	491	0.91	3.22
		Hispanic	182	0.91	3.12
		American Indian	24	.	.
		Other	124	0.90	3.08
	Gender	Male	1,884	0.91	3.12
		Female	1,842	0.90	3.04
	Accommodations	No	3,723	0.91	3.08
	Yes	3	.	.	

Note: Reliability and SEM were not computed for groups smaller than 50 students.

Table 10.12: Grade 6 English Language Arts Reliability and SEM by Subgroup

Grade	Category	Group	N Count	Cronbach's Alpha	SEM
6	Race/Ethnicity	White (not Hispanic)	46,317	0.89	3.06
		Asian/Pacific Islander	1,457	0.91	2.96
		Black (not Hispanic)	10,206	0.88	3.16
		Hispanic	3,776	0.89	3.13
		American Indian	273	0.89	3.12
		Other	1,859	0.90	3.09
	Gender	Male	32,312	0.90	3.10
		Female	31,576	0.89	3.06
	Accommodations	No	62,157	0.90	3.08
Yes		1,731	0.85	3.15	

Table 10.13: Grade 7 English Language Arts Reliability and SEM by Subgroup

Grade	Category	Group	N Count	Cronbach's Alpha	SEM
7	Race/Ethnicity	White (not Hispanic)	46,357	0.90	3.16
		Asian/Pacific Islander	1,434	0.92	3.02
		Black (not Hispanic)	10,026	0.89	3.19
		Hispanic	3,675	0.90	3.21
		American Indian	239	0.91	3.17
		Other	1,739	0.91	3.15
	Gender	Male	32,059	0.91	3.16
		Female	31,411	0.90	3.16
	Accommodations	No	61,987	0.91	3.17
Yes		1,483	0.85	3.13	

Table 10.14: Grade 8 English Language Arts Reliability and SEM by Subgroup

Form	Category	Group	N Count	Cronbach's Alpha	SEM
F1	Race/Ethnicity	White (not Hispanic)	18,497	0.91	3.08
		Asian/Pacific Islander	574	0.94	3.02
		Black (not Hispanic)	4,636	0.89	3.15
		Hispanic	1,661	0.90	3.15
		American Indian	132	0.91	3.10
		Other	643	0.91	3.11
	Gender	Male	13,666	0.92	3.13
		Female	12,477	0.91	3.06
	Accommodations	No	24,793	0.92	3.09
Yes		1,350	0.86	3.21	
F2	Race/Ethnicity	White (not Hispanic)	11,106	0.90	3.06
		Asian/Pacific Islander	341	0.93	2.87
		Black (not Hispanic)	2,198	0.90	3.17
		Hispanic	803	0.91	3.14
		American Indian	66	0.90	3.14
		Other	423	0.91	3.08
	Gender	Male	7,446	0.91	3.11
		Female	7,491	0.91	3.03
	Accommodations	No	14,934	0.91	3.08
Yes		3	.	.	
F3	Race/Ethnicity	White (not Hispanic)	11,091	0.90	3.02
		Asian/Pacific Islander	367	0.92	2.88
		Black (not Hispanic)	2,154	0.90	3.14
		Hispanic	848	0.91	3.08
		American Indian	74	0.90	3.13
		Other	391	0.90	3.07
	Gender	Male	7,384	0.91	3.08
		Female	7,541	0.91	3.00
	Accommodations	No	14,924	0.91	3.05
Yes		1	.	.	
F4	Race/Ethnicity	White (not Hispanic)	5,575	0.91	3.06
		Asian/Pacific Islander	154	0.91	2.94
		Black (not Hispanic)	1,100	0.90	3.19
		Hispanic	385	0.89	3.15
		American Indian	28	.	.
		Other	222	0.90	3.08
	Gender	Male	3,763	0.91	3.12
		Female	3,701	0.90	3.04
	Accommodations	No	7,463	0.91	3.09
Yes		1	.	.	

Note: Reliability and SEM were not computed for groups smaller than 50 students.

Table 10.15: Grade 3 Mathematics Reliability and SEM by Subgroup

Grade	Category	Group	N Count	Cronbach's Alpha	SEM
3	Race/Ethnicity	White (not Hispanic)	48,667	0.90	2.63
		Asian/Pacific Islander	1,489	0.92	2.48
		Black (not Hispanic)	11,500	0.88	2.74
		Hispanic	4,467	0.90	2.71
		American Indian	274	0.89	2.74
		Other	2,917	0.90	2.67
	Gender	Male	35,263	0.91	2.65
		Female	34,051	0.90	2.66
	Accommodations	No	69,046	0.91	2.66
Yes		268	0.87	2.78	

Table 10.16: Grade 4 Mathematics Reliability and SEM by Subgroup

Grade	Category	Group	N Count	Cronbach's Alpha	SEM
4	Race/Ethnicity	White (not Hispanic)	48,176	0.91	2.72
		Asian/Pacific Islander	1,495	0.93	2.55
		Black (not Hispanic)	11,056	0.87	2.75
		Hispanic	4,396	0.90	2.76
		American Indian	240	0.91	2.76
		Other	2,506	0.91	2.73
	Gender	Male	34,773	0.92	2.72
		Female	33,096	0.91	2.74
	Accommodations	No	64,845	0.91	2.73
Yes		3,024	0.81	2.67	

Table 10.17: Grade 5 Mathematics Reliability and SEM by Subgroup

Grade	Category	Group	N Count	Cronbach's Alpha	SEM
5	Race/Ethnicity	White (not Hispanic)	48,058	0.89	2.72
		Asian/Pacific Islander	1,501	0.92	2.61
		Black (not Hispanic)	10,492	0.84	2.65
		Hispanic	4,249	0.86	2.71
		American Indian	272	0.88	2.71
		Other	2,274	0.89	2.70
	Gender	Male	34,139	0.90	2.70
		Female	32,707	0.88	2.72
	Accommodations	No	63,129	0.89	2.71
Yes		3,717	0.74	2.56	

Table 10.18: Grade 6 Mathematics Reliability and SEM by Subgroup

Grade	Category	Group	N Count	Cronbach's Alpha	SEM
6	Race/Ethnicity	White (not Hispanic)	48,106	0.90	2.71
		Asian/Pacific Islander	1,476	0.93	2.63
		Black (not Hispanic)	10,568	0.86	2.66
		Hispanic	3,988	0.88	2.69
		American Indian	278	0.90	2.74
		Other	1,938	0.90	2.70
	Gender	Male	33,896	0.91	2.71
		Female	32,458	0.90	2.69
	Accommodations	No	62,500	0.90	2.71
Yes		3,854	0.77	2.59	

Table 10.19: Grade 7 Mathematics Reliability and SEM by Subgroup

Grade	Category	Group	N Count	Cronbach's Alpha	SEM
7	Race/Ethnicity	White (not Hispanic)	47,454	0.90	2.85
		Asian/Pacific Islander	1,367	0.94	2.79
		Black (not Hispanic)	10,419	0.82	2.70
		Hispanic	3,860	0.87	2.80
		American Indian	260	0.87	2.82
		Other	1,789	0.89	2.82
	Gender	Male	33,257	0.90	2.82
		Female	31,892	0.89	2.82
	Accommodations	No	61,145	0.90	2.83
Yes		4,004	0.65	2.61	

Table 10.20: Grade 8 Mathematics Reliability and SEM by Subgroup

Grade	Category	Group	N Count	Cronbach's Alpha	SEM
8	Race/Ethnicity	White (not Hispanic)	37,756	0.84	2.90
		Asian/Pacific Islander	891	0.91	2.87
		Black (not Hispanic)	9,178	0.80	2.79
		Hispanic	3,194	0.81	2.86
		American Indian	272	0.81	2.88
		Other	1,402	0.84	2.88
	Gender	Male	27,510	0.85	2.86
		Female	25,183	0.83	2.90
	Accommodations	No	48,950	0.84	2.89
Yes		3,743	0.65	2.70	

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Appendix A: Test Coordinator's Manual

Missouri Assessment Program

Grade-Level Assessments Test Coordinator's Manual

*English Language Arts
Grades 3, 4, 5, 6, 7, 8*

*Mathematics
Grades 3, 4, 5, 6, 7, 8*

*Science
Grades 5, 8*



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This Test Coordinator's Manual is NOT a secure document. All administrators should read this manual before administering the test.

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February 8, 2016: (Version 2) Updates

Page 26: Updated the format of Math recommended total test ranges from minutes to hours and minutes.

Page 27: Updated English Language Arts recommended test times for Session 1 at grades 5–8 from 45–60 minutes to 45–80 minutes.

March 31, 2016: (Version 3) Updates

Page 15: Updated that an English dictionary and a thesaurus may be available for the ELA session 4 writing prompt. Updated that ELL students may use an English, a non-English, and a bilingual dictionary and thesaurus as needed during session 4.

1.0 OVERVIEW OF IMPORTANT INFORMATION FOR THE MAP GRADE-LEVEL ASSESSMENTS

1.1 This Test Coordinator's Manual

The purpose of this *Test Coordinator's Manual* is to provide detailed instructions for administering the Missouri Assessment Program Grade-Level Assessments. The manual includes instructions for test preparation and post-test administration procedures. District Test Coordinators (DTCs) and School Test Coordinators (STCs) should thoroughly read the manual and view training before administering the tests.

1.2 Glossary of Terms

Accommodations	Changes in procedures or materials that increase equitable access to the MAP Grade-Level Assessments. Assessment accommodations allow students to access assessment content to show what they know and can do. Accommodations are available for students with documented Individualized Education Programs (IEPs) or 504 Plans.
Break/Pause	Action taken by a student or Test Examiner (TE) to temporarily halt the test during any part of the test, as needed. The online assessment provides an opportunity to pause the test for up to 20 minutes.
eDIRECT	The administrative platform—the Missouri Assessment Program Portal—from which district personnel will manage the assessments.
INSIGHT	INSIGHT is the secure, browser-based test engine for the MAP Grade-Level Assessments.
Item	A test question or stimulus presented to a student to elicit a response.
Performance Event	A performance event comprises Session 3 of the MAP Grade-Level Science Assessment. It is designed to provide students with an opportunity to demonstrate their ability to apply their knowledge and higher-order thinking skills to explore and analyze a complex, real-world scenario.
Session	A specific part of a test assigned to a specific student, which is grouped by Test Examiner according to the precode file.

Stimulus/Stimuli	Material or materials used in the test context, which form the basis for assessing the knowledge and skills of students. Many items/tasks for the assessments include a stimulus along with a set of questions to which the student responds. Examples of stimuli include, but are not limited to, traditional reading passages/texts viewed on a computer screen, images with audio presentations, and simulated web pages.
Universal Tools	Universal tools are available to students based on student preference and selection. Some tools, such as a ruler and sticky notes, are embedded in the online system, while others, such as a physical thesaurus and scratch paper, are external to the system. The availability of particular universal tools varies by item.
Writing Prompt	A special type of performance event that appears in the Grades 5 and 8 English Language Arts (ELA) Assessments is an open-ended item that requires students to demonstrate their writing proficiency.

1.3 About the Tests

- The Missouri State Board of Education identified the following purposes for the MAP Grade-Level Assessments:
 - Measuring and reflecting student 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
 - Providing professional development for teachers
- The MAP Grade-Level Assessments are designed to adapt testing to the needs of Missouri districts, schools, teachers, and students, while meeting state and federal requirements.
- The MAP Grade-Level Assessments are based on the Missouri Learning Standards, which align to college-and-career readiness standards. All the 2016 assessments will include traditional selected-response items and innovative technology-enhanced items designed to elicit student knowledge and skills in new ways. English Language Arts/Literacy assessments will include a writing prompt, and the Science assessments will include a performance event and constructed-response items.

The Missouri Department of Elementary and Secondary Education (DESE) uses the information obtained through the MAP Grade-Level Assessments to monitor the progress of Missouri's students in meeting the Missouri Learning Standards, to inform the public and the state legislature about students' performance, and to help make informed decisions about educational issues.

- Data Recognition Corporation (DRC) and DESE are collaborating to deliver Missouri's²¹⁶ Spring 2016 Grade-Level Assessments. Missouri educators will use DRC's eDIRECT online platform for enrollment and test administrator processes and INSIGHT for test delivery. DRC will also provide handscoring and reporting services. These cooperative efforts and systems comprise a fully integrated assessment platform to meet the needs of school districts, educators, students, and other Missouri stakeholders.
- The Spring 2016 MAP Grade-Level Assessments include the following:
 - English Language Arts/Literacy Assessment for Grades 3–8
 - Mathematics Assessment for Grades 3–8
 - Science Assessment for Grades 5 and 8
- The English Language Arts Assessments consist of three sessions in grades 3, 4, 6, and 7. In grades 5 and 8, there will be four sessions. The first three sessions contain selected-response items and technology-enhanced items. The fourth session contains a writing prompt that is scored with a ten-point rubric.
- The Mathematics Assessments consist of two sessions. Both sessions contain selected-response items and technology-enhanced items.
- The Science Assessments consist of three sessions. The first session contains constructed-response items, the second session contains selected-response items, and the third session contains a performance event.
- All MAP Grade-Level Assessments are available only in INSIGHT, the secure online browser, unless a Large Print, Braille, or paper-and-pencil edition is required by the student as an accommodation. For students needing one of these versions, test examiners will be responsible for transcribing student responses into INSIGHT.

1.4 Schedule of Important Dates for Spring 2016

Precode File Due to DESE	Student Test Setup Available in eDIRECT	MAP Grade-Level Assessment Test Window
Window 1 - January 29, 2016 Window 2 - March 11, 2016 Window 3 - March 18, 2016	February 29, 2016	April 4, 2016—May 27, 2016

Event	Schedule
eDIRECT test administration portal opens.	January 11, 2016
District Test Coordinators provide Science assessment test windows,* purchase order numbers, and Large Print and Braille orders through eDIRECT Enrollments.	January 11, 2016—February 5, 2016. The deadline for ordering additional Large Print and Braille testing materials is May 16, 2016. Purchase Orders must be submitted to DRC at 1-888-282-0526 by February 5, 2016.
STCs and District Information Technology Coordinators (DITCs) coordinate the installation of INSIGHT on all student workstations and complete a site certification.	February 9, 2016—February 26, 2016 is the Statewide Readiness Test (SRT) window. For more information on the SRT please see the Technology Readiness Checklist. Site certification must be completed before the statewide administration window.
STCs verify that all student accommodations and status codes are recorded through eDIRECT Test Setup.	February 29, 2016 is when Test Setup can begin. All accommodations and universal tools must be marked prior to testing.
DTCs contact DRC to schedule pickup of Large Print, Braille, and paper-and-pencil test books.	May 31, 2016 is the deadline to schedule pickups. Materials must be picked up no later than June 3, 2016.
Test results and Individual Student Reports (ISR) are available online via eDIRECT.	ISRs for Science are available no later than the close of business on the 10th business day after each district content area testing window closes. ISRs for ELA and Mathematics are available September 1, 2016.

* English Language Arts and Mathematics testing windows automatically default to the entire test window.

1.5 Special Populations, Optional Populations, and Special Circumstances

Inclusion of Special Populations

All students, including, but not limited to, the following groups of students, must participate in the required MAP Grade-Level Assessments.

- **Missouri Virtual Instruction Program (MoVIP):** Missouri students enrolled in MoVIP are required to participate in the MAP Grade-Level Assessments. For further inquiries regarding MoVIP participation, contact the MoVIP Section at 573-751-2453.
- **Homebound Students:** Homebound students must be tested, either at home or at the school, at the discretion of the district. If the student can come to the school, the student may take the test online. If the student cannot come to the school, the student may take the test online using a district issued device that has a Testing Site Manager installed. If, for any reason, the student cannot take the test online, then the student may take a paper-and-pencil edition of the test. (See instructions in the Large Print, Braille, and Paper-and-Pencil Editions section of this manual.) Test Examiners of homebound students should receive training in the administration of the MAP Grade-Level Assessments. Test Examiners are responsible for ensuring the security of the tests and transcribing student responses into INSIGHT for paper-and-pencil tests.
- **IEP Students:** Students with disabilities, as classified under the Individuals with Disabilities Education Act (IDEA), have an Individualized Education Program (IEP). All decisions regarding a student's participation in the MAP Grade-Level Assessments are made by the student's IEP team and documented in the IEP. All students, including those students with an IEP, must take the MAP Grade-Level Assessments that are required for accountability purposes. The IEP team has the responsibility and authority to determine accommodations needed to ensure accessibility to the MAP Grade-Level Assessments.
- **IAP/504 Students:** Students with an Individual Accommodation Program (IAP) 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 MAP Grade-Level Assessments. However, professionals knowledgeable about IAP students' disabilities and their educational needs will make decisions about universal tools and accommodations for these students as they would with IEP students. All IAP/504 accommodations should be marked in the same manner as the IEP student accommodations.
- **English Language Learner (ELL) Students:** Students who have been in the United States 12 cumulative months or fewer at the time of the test administration may be exempt from the English Language Arts Assessment. ELL students must participate in all other required assessments regardless of the length of time they have been in the United States. To indicate the ELA exemption for the students, mark them "absent" for the ELA Assessment.

Further Information on Special Populations

For further questions regarding special populations, contact the DESE Assessment Section at 573-751-3545 or the Special Education Section at 573-751-5739. Accommodation definitions and codes can be found in the *Examiner's Manuals*.

Optional Populations

The following student groups MAY participate in MAP Grade-Level Assessments:

- **Foreign Exchange Students:** Foreign exchange students are allowed, but not required, to take the MAP Grade-Level Assessments at the discretion of the district.
- **Home Schooled Students:** Home schooled students may take part in the MAP Grade-Level Assessments at the discretion of the district. Home schooled students participating in the MAP Grade-Level Assessments will take the assessment(s) online at the local school with district-approved procedures in place during the school's testing window. When a home schooled student is entered into eDIRECT, the "Home School" box on the Testing Codes screen must be checked. The MOSIS ID field should be left blank. Individual Student Reports for home schooled students will be available. See page 18 for more information on these reports. District Test Coordinators must collect contact information from the parents of home schooled students so that DTCs can notify the parents when reports become available.
- **Private School Students:** Private school students may also participate in the MAP Grade-Level Assessments. A representative from the private school must contact the MAP Service Line at 1-800-544-9868. Private schools must uphold the same standardized administration procedures and security measures that Missouri public schools uphold.

Special Circumstances

Some students may require special arrangements for testing. Please refer to the following guidelines for students requiring a change in test setting, test format, or test administration.

- **Universal Tools and Accommodations:** Prior to testing, be sure to consider any additional planning that may be required to administer the test using students' universal tools and/or accommodations. Universal tools/accommodations that require particular attention include, but are not necessarily limited to:
 - **Use of a Translator:** District staff may read Mathematics and Science Assessments and English items to students in their native language. Read aloud of English reading passages in a student's native language is allowed only if specified in a student's IEP or 504 Plan. For all assessments, ELL students may give their responses orally or in writing in their native language. Their responses must be translated into English and transcribed into INSIGHT.
 - Refer to the *Examiner's Manuals* for the appropriate universal tools/accommodation codes to use when a test is being translated. The translation and transcription must be an accurate interpretation of the student's responses.

Translators must be trained in administering the Grade-Level Assessments. If needed, translators for students taking the assessments may have access to printed student test books in a secure environment to read and review before the test administration. Please see Section 4.0 for instructions regarding administering the Large Print, Braille, and paper-and-pencil editions of the tests.

The DTC must contact the off-site district/agency prior to the first day of the district of residence’s testing window to make arrangements:

- If the student is testing online at a school, arrange for the student’s Test Tickets to be available through eDIRECT.
- If the student is testing online at an off-site location, arrange for the student to take the test using a district device.
- If the student is taking a paper-and-pencil edition of the assessment, follow the administration instructions in Section 4.0 of the manual.

2.0 BEFORE ONLINE TESTING

2.1 Advance Announcements and Preparation

Parents and guardians should be informed of the district MAP Grade-Level Assessment schedule so they can help ensure their students are present on days testing (without scheduled appointments or vacation days during the testing window) and prepared with the proper materials that may not be provided by the district.

In addition to completing the applicable content for the grade level, students should have experience using the specific device on which they will be taking the assessments. Students taking the assessments on a desktop, Chromebook, or laptop computer should know how to use a mouse and keyboard. Instead of a mouse, students may use the embedded touchpad in the keyboard of a laptop. Students taking the assessments on iPads or Android devices should know how to use a touchscreen (and/or stylus, if applicable). It is strongly recommended, but not required, that students taking the assessments on tablet devices have access to (and know how to use) an external keyboard. Students should review the INSIGHT Online Tools Training (OTT) for the MAP Grade-Level Assessment they will be taking. OTTs are for Test Examiners and students to become familiar with the format and functionality of the online test. The OTTs provide a preview of the item types included in the MAP Grade-Level Assessments.

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DTCs print the MAP Grade-Level Assessments as appropriate beginning March 3rd. Print copies of the assessments will have a barcode. Barcoded printed assessments must be returned to DRC after the tests have been transcribed into the test delivery system (INSIGHT).

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MAP Grade-Level Assessments are available on the following devices:

- Desktop Computers
- Laptops
- Netbooks
- Chromebooks
- iPads
- Android devices

Students should be familiar with the device on which they will be taking the assessment prior to testing. Please see the INSIGHT User Guide for complete device specifications.

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2.2 User Roles

The DTC is responsible for training all STCs on testing procedures. If a district does not have STCs, the DTC performs the role of the STC. While the training of Test Examiners may be delegated to each building's STC, the DTC is responsible for ensuring that all Test Examiners are well-prepared and trained. Training includes special education teachers, proctors, translators, and Test Examiners who are administering the MAP Grade-Level Assessments to homebound or out-of-district students.

District Test Coordinator Responsibilities

All DTCs are responsible for the following:

- View all trainings provided by DESE and DRC.
- Stay abreast of all communication regarding the MAP Grade-Level Assessments.
- Ensure that all STCs, Test Examiners, and other responsible district and/or school staff have been trained.
- Maintain the district's testing schedule and be prepared to provide it to DESE upon request. If the district's Science assessment testing schedule changes in any way, the DTC is responsible for updating this information in eDIRECT until February 5, 2016, and by contacting the MAP Service Line after that time. Inform district staff of the testing schedule so that distractions such as PA announcements, lawn maintenance, or fire drills are avoided at the time of test administration.
- Update student demographic information to correct any errors and ensure these corrections are also made in the local student information systems and MOSIS. See Appendix A in this manual for instructions on how to handle student transfers.
- Communicate with DRC and DESE on behalf of the district. The STC should contact the DTC if help is needed. If the DTC is unable to answer a question, he or she will contact DRC's dedicated MAP Service Line.
- Ensure the DTC's email account allows receipt of all communication from DESE's, and DRC's email domains (@dese.mo.gov and @datarecognitioncorp.com).
- Verify with the STCs that INSIGHT has been installed and certified on all applicable workstations for the current statewide window.

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DTCs must ensure that all STCs, Test Examiners, and other responsible district and/or school staff have been trained.

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The DTC is responsible for updating the district's Science assessment testing schedule if it changes.

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DRC's dedicated MAP Service Line
1-800-544-9868
7:30 A.M. to 6:30 P.M. Central Time,
Monday–Friday

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Any Test Examiner who needs to set or check accommodations will need an eDIRECT account. Other Test Examiners do not need an eDIRECT account, as logging into eDIRECT is not required to start a test.

- After verifying each building’s security, ensure that STCs have access to eDIRECT and secure test administration materials.
- Enter Test Examiners into eDIRECT in order to generate their eDIRECT logins (for Test Examiners needing an eDIRECT login).
- Ensure test security is maintained by restricting Test Examiner access to the MAP Grade-Level Assessments and other secure testing materials before and after testing.
- Transcribe Large Print, Braille, and paper-and-pencil edition responses into INSIGHT (in districts where this role is not assigned to the Test Examiner).

School Test Coordinator Responsibilities

All STCs are responsible for the following:

STCs must ensure that all Test Examiners are trained on MAP Grade-Level Assessment procedures.

- View all trainings provided by the DTC, DESE, and DRC.
- Stay abreast of all communication from the DTC regarding the MAP Grade-Level Assessments.
- Ensure that all Test Examiners are trained on MAP Grade-Level Assessment procedures.
- Review the Tutorial and the Online Tools Training (OTT) prior to testing and ensure that Test Examiners and students have an opportunity to review both the Tutorial and OTT prior to testing.
- Work with the DITC (if applicable) to ensure INSIGHT has been installed and certified on all applicable workstations.
- Verify the accuracy of student and Test Examiner information in eDIRECT for the school and update as needed. Confirm that any appropriate student accommodation codes are marked in **Test Setup** in eDIRECT.
- Communicate with the DTC regarding the school’s testing schedule prior to testing. If the school’s testing schedule changes in any way, the STC is responsible for updating the DTC.
- Ensure that all Test Examiners are knowledgeable about permitted and prohibited materials (see Section 2.5 Assessment Materials for Students/ Administrators).

- Verify that Test Examiners have eDIRECT access and necessary permissions to allow adequate time for reviewing documents and training in preparation for administering the tests.
- On each testing day, ensure that each Test Examiner has the following:
 - Student Test Tickets for each test session
 - The appropriate quantity of Large Print and Braille test books or access to paper-and-pencil editions as required per content area
 - Any required ancillary testing materials
- Ensure test security is maintained by restricting Test Examiner access to the MAP Grade-Level Assessments and other secure testing materials before and after testing.
- Validate that testing procedures are followed as written in this *Test Coordinator's Manual*. Printed copies of the manual should be destroyed at the building level after the final district content testing window has closed.

2.3 Test Security

Test security and ethical testing practices continue to be of utmost importance. A test security policy must be in place for each district and charter school. The test security policy should be placed in the District's Assessment Plan, which is locally board approved annually. The accurate assessment of student achievement is a critical component of the educational process in Missouri. It is the responsibility of everyone involved in the assessment process to understand the security measures in place to avoid any intentional or unintentional unethical behavior by students or staff members. Administrators and Test Examiners are responsible for reporting any of these behaviors to district administration and/or to the DESE Assessment Section at 573-751-3545 or assessment@dese.mo.gov.



Administrators and Test Examiners are responsible for reporting any intentional or unintentional unethical behavior by students or staff members to district administration and/or to the DESE Assessment Section at 573-751-3545 or assessment@dese.mo.gov.



2.5 Assessment Materials for Students/Administrators

This section concerns all materials required, permitted but not provided, or prohibited while taking Grade-Level Online Assessments.

Required Materials

- A workstation with Internet access, a monitor, a mouse, and a keyboard **OR** a tablet device with Internet access. Devices must have INSIGHT properly loaded and certified.
- Student Test Tickets (This ticket provides the secure login credentials (i.e., username and password) required for a student to use the testing software).
- The resources in Table 7

Table 7: Additional Required Resources for ELA, Mathematics, and Science

Content Area	Session 1	Session 2	Session 3	Session 4 (Writing Prompt)
ELA	<ul style="list-style-type: none"> • Headphones are required for students using text-to-speech. • Scratch paper should be provided for note taking if necessary. 	<ul style="list-style-type: none"> • Headphones are required for students using text-to-speech. • Scratch paper should be provided for note taking if necessary. 	<ul style="list-style-type: none"> • Headphones are required for all students taking this session. • Scratch paper should be provided for note taking if necessary. 	<ul style="list-style-type: none"> • Headphones are required for students using text-to-speech. • Scratch paper should be provided for note taking if necessary.
Mathematics	<ul style="list-style-type: none"> • Headphones are required for students using text-to-speech. • Scratch paper is required for all grades. 	<ul style="list-style-type: none"> • Headphones are required for students using text-to-speech. • Scratch paper is required for all grades. 	N/A	N/A
Science	<ul style="list-style-type: none"> • Headphones are required for students using text-to-speech. • Graph paper is required. • Scratch paper is required. 	<ul style="list-style-type: none"> • Headphones are required for students using text-to-speech. • Scratch paper is required. 	<ul style="list-style-type: none"> • Headphones are required for students using text-to-speech. • Graph paper is required. • Scratch paper is required. 	N/A

Permitted Materials

- Scratch paper and grid/graph paper are allowable for all assessments even if not required.
- A physical calculator can be accessed for calculator-allowed items for the Mathematics assessments.
 - For grade 6 Mathematics assessments, a four-function calculator with square root and percentage functions is permitted.
 - For grades 7 and 8 Mathematics assessments, a scientific calculator with exponents, trigonometry, and logarithmic functionalities is permitted.
 - Test Examiners are responsible for ensuring and verifying that any calculator with the ability to store functions and equations, e.g., a scientific calculator, has the memory cleared before and after each Mathematics assessment.
 - Calculators cannot have Internet connectivity or be able to connect to anyone inside or outside the classroom during testing.
 - Students cannot 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 is required for a student and is specified on his or her IEP.
 - No calculators with QWERTY keyboards are allowed.
- An English dictionary and a thesaurus may be available for the ELA session 4 writing prompt. ELL students may use an English, a non-English, and a bilingual dictionary and thesaurus as needed during session 4.

Prohibited Materials

- Electronic devices, including any portable device that can connect to the Internet or to anyone inside or outside of the classroom, must not be accessible during the testing sessions. Such items include, but are not limited to:
 - cellular/mobile phones
 - electronic music players
 - digital cameras
 - handheld scanners
 - portable gaming devices
 - any device that can connect to the Internet
- If students are allowed to enter the testing room with cell phones, the phones **must** be collected prior to testing and returned at the end of the testing session. Students are not allowed to have cell phones in their pockets, purses, or backpacks during testing.

Assessment Materials and Training for Test Examiners

- *Test Examiner Manual*
- Grade-Level Assessment training provided online by DESE
- Student Test Tickets (obtained from the School Test Coordinator)

NOTE: All materials distributed to the students with usernames and passwords must be collected before the students leave the testing area.

- Extra pencils and a supply of scratch and grid/graph paper

NOTE: Physical scratch paper should be collected and destroyed immediately upon conclusion of a testing session.

Accessing and Printing Listening Script

The use of some tools/accommodations requires access to a printed copy of the listening script for ELA Session 3. The script will need to be downloaded and printed at the school level. The scripts are secure; do not allow unauthorized persons to access them. Maintaining the security of all test materials is crucial to obtaining valid and reliable test results. Therefore, test materials must be kept in locked storage, except during actual test administration. It is the responsibility of all individuals who administer the test to follow security procedures.

NOTE: The DTC must contact the MAP Service Line to request access to specific listening scripts.

3.0 AFTER ONLINE TESTING

3.1 Submitting All Tests/Close of Testing Window

After all testing for a grade level/content area is completed, the DTC/STC should review the Testing Status for each student in eDIRECT and communicate with Test Examiners to resolve any tests that appear as "In Progress." The DTC or DITC should also check the Testing Site Manager (if used) to ensure that there are no unsent responses. If all testing is completed for a grade level/content area prior to the end of the district's designated testing window for that grade level/content area, the DTC has the option to close that testing window early. To close a grade level/content window early, the DTC must contact DRC's MAP Service Line. Please note, only the DTC can request to close a district's testing window. It is very important that the DTC ensure that all testing for the grade level/content area is completed prior to closing a testing window. Once a testing window has been closed, scoring for that grade level/content area begins and the window cannot be re-opened for any reason. If the DTC does not request to close a testing window early, the window will close automatically at 8 P.M. on the end date that the DTC entered into eDIRECT when the testing window was set.

3.2 Reporting Test Invalidations

Neither a student's behavior during testing nor the judgment of a student's effort during testing can invalidate a student's test.

A MAP Grade-Level Assessment should be invalidated if a student is discovered cheating. To do so, select the "Teacher Invalidation" bubble for the affected content area in eDIRECT. (See the eDIRECT User Guide for instructions.) Cheating is the only time the "Teacher Invalidation" code is used. This code invalidates all sessions of the content area.

If the “Teacher Invalidation” bubble is used due to cheating, adhere to the following process:

1. The STC and the Test Examiner agree that a particular student’s test should be invalidated.
2. A district invalidation letter on district letterhead and signed by the superintendent is faxed to DESE’s Director of Assessment at 573-526-0812.
3. The district invalidation fax should include the following information:
 - a. Student Name
 - b. MOSIS ID
 - c. Date of Birth
 - d. Grade
 - e. School Name
 - f. County District Code
 - g. District Name
 - h. School Code
 - i. Content Area
 - j. The reason the testing session is being invalidated/description of the incident
4. The district files a copy of the fax for its records and future reference.

3.3 How to Handle Student Absences

If a student is absent for any or all of the MAP Grade-Level Assessments and unable to test in district determined make-up sessions, then mark the student as absent in eDIRECT. Additionally, mark absent students who have been in the United States 12 cumulative months or fewer that are being exempted from the ELA Assessment.

3.4 Securely Destroy Materials

Federal law—the Family Educational Rights and Privacy Act (FERPA)—prohibits the release of any student’s personally identifiable information. Any printed materials must be securely stored and then shredded.

The STC or DTC should destroy the following materials at the building level:

- Printed copies of the *Test Coordinator’s Manual* should be destroyed after the final district content testing window has closed.
- All manuals for Large Print, Braille, and paper-and-pencil administrations should be destroyed after the final district content testing window has closed. Electronic files must be deleted.

Scratch paper and grid/graph paper must be kept in a securely locked room or locked cabinet that can be opened only with a key or keycard by staff responsible for test administration. All test materials must remain secure at all times. Scratch paper and grid/graph paper must be collected and inventoried at the end of each test session and then given to the School Test Coordinator to securely destroy.

3.5 Individual Student Reports

Individual Student Reports (ISRs) are available in PRISM. A link to PRISM is in eDIRECT in the left-hand navigation pane. ISRs for Science are available no later than the close of business on the tenth business day after the science testing window closes. ISRs for ELA and Mathematics are available September 1, 2016.

4.0 LARGE PRINT, BRAILLE, AND PAPER-AND-PENCIL EDITIONS

Large Print, Braille, and paper-and-pencil editions of the MAP Grade-Level Assessments will be available for students with designated IEPs or special circumstances for spring 2016 testing. Large Print and Braille forms may be ordered online via eDIRECT during the enrollment period January 11, 2016 to February 5, 2016. Paper-and-pencil editions can be generated from eDIRECT (after students are assigned such an accommodation). Unique identification numbers will be used to produce barcodes that will be printed onto the paper-and-pencil editions. After testing, student responses for Large Print, Braille, and paper-and-pencil editions must be entered into the INSIGHT system and all test materials must be collected for return to DRC for processing and storage.

4.1 Before Testing

Paper-and-Pencil Materials

For special circumstances that require students to test on paper, a paper-and-pencil edition is a part of the test delivery system. To activate the paper-and-pencil edition print function, Test Examiners will access the Test Setup feature in eDIRECT to mark the applicable accommodation and code for students who require the paper version of the test. Using the information collected during the precode and enrollment processes, the administration component of the online testing system will generate a unique barcode number for a paper-and-pencil edition prior to local printing. Depending on the printed accommodation needed for a particular student, the unique barcode number will then become embedded into the electronic version on each page of the paper-and-pencil form. During local printing, the embedded barcode number will print along with each page of the paper-and-pencil edition. Each barcode number will be unique to a student for the purposes of linking the printed form to the student's record in the master database. Barcode numbers will be recorded and associated with each student's record.

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 For additional information regarding Large Print and Braille forms, refer to the Large Print and Braille Kit and follow the instructions in the Braille Omit Return Instruction Sheet.

For specific instructions regarding how to generate a paper-and-pencil edition, see the *eDIRECT User Guide – Test Setup*, available on the **Documents** page of eDIRECT, <https://mo.drctdirect.com>.

Once the PDF downloads, it is available for printing on the local network printer.

The Test Examiner should become familiar with the directions for administering a paper-and-pencil edition. The paper-and-pencil edition of the test is secure and should be treated as such.

Reasons for using Paper/Pencil Assessment

Reason	Instructions
Student has IEP/504 Plan that allows use of Paper/Pencil Assessment	Mark code A102 for Paper/ Based Assessment
ELL student is using the Translation tool (S109) or Read Aloud – Native Language (S111) and the translator needs access to the assessment prior to administration to conduct translation services.	Mark code S112. If using this for a group, choose this tool for just ONE student in the group. That student should still take the assessment online. NOTE: There is a \$15 charge to the district for each printed Paper/Pencil assessment not required by an IEP.
Student is in an off-site non-district building (e.g. hospital, juvenile facility, etc.) and cannot take the assessment online	Mark code S112. NOTE: There is a \$15 charge to the district for each printed Paper/Pencil assessment not required by an IEP.
Student has Read Aloud – Human Reader and the examiner would like to read from a Paper copy of the assessment	Mark code S112. If using this for a group, choose this tool for just ONE student in the group. That student should still take the assessment online. NOTE: There is a \$15 charge to the district for each printed Paper/Pencil assessment not required by an IEP.



Unless a student's IEP requires a paper-based accommodation, districts will be charged a processing fee of \$15 for each paper-and-pencil PDF form of the test that is printed per content area.



Large Print and Braille Materials

Large Print and Braille forms can be ordered online via eDIRECT. Material orders must be placed between January 11, 2016 and February 5, 2016. DTCs should order all Large Print and Braille materials through the Enrollments tab in eDIRECT. See the *eDIRECT User Guide – User Administration* for enrollment instructions.

Test Examiners or Test Coordinators must transcribe students' responses into INSIGHT.

Large Print and Braille testing materials are packaged by building and shipped to the district's office address.

District Test Coordinator

For every building administering a Large Print, Braille, or paper-and-pencil assessment, the DTC needs to complete the Accountability Form located under the Materials section of eDIRECT. Reference the *eDIRECT User Guide – User Administration* for specific instructions. Complete the following steps for each building before distributing materials to the STC:

1. Confirm the box count of the Large Print and Braille testing materials shipment from DRC (e.g., Box 1 of 5 through Box 5 of 5).
2. Verify the security barcode numbers of the test books against the packing list.
3. Record the number of test books listed on the packing list and the number of paper-and-pencil tests that were downloaded on the Accountability Form.
4. Report any discrepancies to DRC's dedicated MAP Service Line at 1-800-544-9868 between the hours of 7:30 A.M. and 6:30 P.M. Central Time, Monday–Friday.

School Test Coordinator

After receiving the testing materials from the DTC, complete the following steps:

1. Verify that security barcode numbers printed on the Large Print and Braille test books match the numbers listed on the packing list (located in Box 1 of the building's shipment).
2. Confirm that the proper accommodation code is marked in eDIRECT.
3. Complete the Accountability Form, following the directions in the *eDIRECT User Guide – User Administration*.
4. Document any Large Print and Braille security barcode discrepancies.
5. Notify the DTC of any discrepancies immediately.
6. If any student is taking a MAP Grade-Level Assessment out of district/building, or if the student is homebound, note the barcode number of the test book before delivering it to the testing site to ensure proper accounting of all test books when they are returned to the district.
7. Ensure all test books have been accounted for before they are shipped to DRC.
8. Follow the procedures in the Contaminated Test Materials section of this manual for any contaminated test materials.
9. Maintain the Accountability Form during the test administration.

Test Examiner

Count the number of Large Print and Braille books received and assign each test book to a student. Write the student's name and MOSIS ID on the front of each test book.

Document this information in preparation for returning the test books to the STC.

Contaminated Test Materials

Test materials are considered *contaminated* due to: a) a student health issue that affects the test book itself (blood, fluids, etc.) or b) contact with any potentially hazardous material. If test materials are contaminated, the Test Examiner should notify the School Test Coordinator for instructions for handling the contaminated materials since **all** printed testing material must be accounted for. The DTC, or STC, or TE is responsible for transcribing the answers into the online system, and then the contaminated test materials must be securely destroyed at the test site by the DTC or STC. The DTC or STC should fill out the Missing Materials section of the Accountability Form to account for the contaminated test materials located under the Materials section of eDIRECT.

4.2 After Testing

Assemble Materials for Return and for Entry into INSIGHT

After testing has been completed, prepare materials to be returned to the School Test Coordinator. Check test books to make sure there are no sticky notes, staples, pins, paper clips, or tape of any kind on any pages. Check to make sure that no scratch or graph paper was left inside test books. Remove any extraneous material.

Transcription of Large Print, Braille, and Paper-and-Pencil Editions

After testing, student responses for Large Print, Braille, and paper-and-pencil editions **must** be transcribed into the INSIGHT testing software before the district's test window closes. It is recommended that transcription occur as soon after testing as possible. To transcribe responses requires the Test Examiner or other designated and authorized district or school personnel to log in to INSIGHT using the student's Test Ticket. Follow these steps to transcribe student answers:

1. In eDIRECT Test Setup, ensure that the student has been assigned the appropriate accommodation:
 - a. Paper-Based Assessment
 - b. Paper-Based Braille
 - c. Paper-Based Large Print
2. In eDIRECT Test Setup, assign the student to a test session and print his or her Test Ticket. Retain the Test Ticket rather than distributing it to the student.
3. After the student has completed the test on paper, use a device that has the INSIGHT client software installed and use the student's Test Ticket to log in to the student's test.
4. Begin transcribing student responses. Once you have finished, select End Test and Submit. The Test Examiner should then return all printed test materials to the STC.

Transcribe the student’s responses as faithfully and as completely as possible using the following guidelines:

- Do not transcribe erased or crossed out words or marks.
- If a student’s response consists of incomprehensible squiggles, marks, etc., which clearly are not words or word fragments, then leave the item blank.
- If a student’s response is wholly or partly illegible, enter “ILLEGIBLE” for the entire response or for the part where applicable.
- If 50% or more of a student’s response is written in any language other than English, then note “WRITTEN IN ANOTHER LANGUAGE” where applicable.
- If part of a student’s response cannot be entered into INSIGHT, then leave that part blank.
- If no part of a student’s response can be entered, then leave the entire item blank.
- Additional clarifying notes may be entered as needed if the item type allows text entry.

Arrange for the Return Shipment of Large Print, Braille, and Paper-and-Pencil Test Books to DRC

DTCs MUST use DRC boxes to return Large Print, Braille, and Paper-and-Pencil test books via UPS. Braille and Large Print Assessments are shipped to the district in a kit that includes boxes and labels necessary for returning testing materials. Paper-and-pencil test books may be returned in the same shipping boxes with Braille and Large Print test books.

If the district downloaded paper-and-pencil test books, but did not order any Braille or Large Print test books, the DTC must order DRC boxes and return shipping labels via Additional Materials in eDIRECT. DRC is responsible for all return shipping costs for the Large Print, Braille, and paper-and-pencil test books; however, the DTC must make shipping arrangements at least 24 hours in advance of package pickup. Detailed information about the Additional Materials process can be found in the *eDIRECT User Guide – User Administration*.

Organize Materials for the District Test Coordinator

Instructions for the School Test Coordinator

Make sure that all Large Print, Braille, and paper-and-pencil testing materials are received from each Test Examiner in the school. Contact any Test Examiner who delays returning student testing materials.

Follow these guidelines for packaging testing materials for the DTC:

1. Obtain Boxes

Test materials must be returned in the DRC boxes. Reuse the boxes in which the Large Print and Braille testing materials arrived. If the DTC does not have DRC boxes or needs additional boxes, the DTC can order these via Additional Materials in eDIRECT.

Prior to packing test materials, securely tape the bottom of each box to prevent breakage. Use three pieces of packing tape and overlap the tape. Make sure it wraps around the sides at least 2 inches.

2. Package Materials

Place the following materials in boxes in the order specified below, with the first items listed on the top in Box 1.

- Paper-and-pencil test books
- Braille test books
- Large Print test books

3. Affix Shipping Labels

- Affix the green shipping labels to the boxes. Green labels should be placed on the top of the box on one of the flaps.
- Affix the UPS label to the boxes. UPS labels should be placed on the top of the box on the other flap.

Return shipping labels are scannable and cannot be photocopied. If more return shipping labels are needed, the DTC can order these via Additional Materials in eDIRECT.

4. Send Materials to the District Test Coordinator

- Do not seal the boxes of test books.
- The DTC will review the contents of each box.

Package and Ship Testing Materials

Instructions for the District Test Coordinator

Make sure that all testing materials are received from each school in the district. Contact any STC who delays returning school testing materials. Verify that the STC followed the instructions in this *Test Coordinator's Manual*.

If a box from an STC is received without a return shipping label on it, affix one of the blank District return shipping labels that were provided in the DTC's Package. Fill out the School information on the label to ensure correct processing.

Do **not** return the following to DRC:

- *Test Coordinator's Manuals*
- test administration scripts for the Large Print, Braille, or paper-and-pencil editions (must be **securely** destroyed by district)
- scratch and/or grid paper used for the English Language Arts, Mathematics, and Science Assessments (must be **securely** destroyed by district)
- contaminated test materials (must be **securely** destroyed by district; see page 21 in this manual)
- unused return shipping labels

Check all materials from the STCs to ensure they have correctly followed the procedure²³⁷ described in this manual.

1. Add Packing Material

To avoid damage caused when materials shift during transit, add sufficient packing material to fill all voids and hold documents firmly in place. We strongly recommend using crumpled, recycled paper for this purpose. Do **not** use foam packing “peanuts” or “popcorn.”

2. Seal Boxes

Seal each box securely by overlapping three pieces of packing tape over the top and making sure it wraps around the sides at least 2 inches. This will prevent damage to the boxes and subsequent loss of test materials.

3. Schedule Testing Material Pickup

The DTC will return MAP Grade-Level Assessment testing materials via UPS. Contact UPS no later than May 31, 2016, to schedule your pickup date. Please allow 1–3 days for pickup of your test materials. All materials must be picked up no later than June 3, 2016.

Test materials must be returned via UPS in order to ensure secure tracking of materials.

Materials must be returned in a single shipment unless prior arrangements are made with DRC.

Instructions for scheduling the pickup of MAP Grade-Level Assessment testing materials:

- a. Ensure that each box has a green return shipping label and a UPS-RS label affixed.
- b. Keep all boxes for a school together and store the materials in a secure place until UPS arrives.
- c. If you do not have a daily scheduled pickup call UPS at 1-866-857-1501. Tell UPS that you would like to schedule a pickup and that you have return service labels. Give the service representative the tracking number on one UPS return service label. This will let UPS know that DRC will be paying all return charges. Also, tell the service representative what day and time your packages will be ready.

NOTE: There is a tear-off portion of the UPS-RS label. You can retain the bottom portion of the label for your records as it will contain the tracking number for the package.

d. Questions

For answers to any questions regarding the return procedures described in this manual, call the DRC dedicated MAP Service Line at 1-800-544-9868.

APPENDIX A: HANDLING STUDENT TRANSFERS AND CHANGES IN TESTING STATUS

Students Who Move Before or During the MAP Grade-Level Assessment Administration

<i>If . . .</i>	<i>then . . .</i>
a new student moves into the district:	Add the new student in eDIRECT. Then assign the student to the appropriate test session(s).* NOTE: If the DTC is unable to add the new student, the DTC must contact the MAP Service Line.
a student moves out of the district prior to or during the district test administration window:	Remove the student from any test session in eDIRECT. Do not log into the test and do not mark any status code(s) for the student.*
a student moves from one building to another building within the same district prior to testing:	The DTC should edit the student's information in eDIRECT before the student begins testing so that the student's scores report to the correct building. The DTC must move the student to a different test session in eDIRECT.*
a student moves from one building to another building within the same district after the student has begun testing:	The DTC should edit the student's information in eDIRECT to update the student's school and put the student in the new test session for the content areas they will test at their new school. NOTE: It is recommended that students complete all sessions for a content area at the same school.

*See the *eDIRECT User Guide – Test Setup*, available on the **Documents** page of eDIRECT, <https://mo.drctdirect.com>.

Please contact the DRC dedicated MAP Service Line at 1-800-544-9868 if there are any questions regarding moving a student within a school or district.

APPENDIX B: TEST TIMING GUIDELINES

Math Timing Estimates		
Grade/Session	Recommended Range (minutes)	Recommended Range (Total Test)
Grades 3–5 Session 1	35–50	1 hr 10 min–1 hr 40 min
Grades 3–5 Session 2	35–50	
Grade 6 Science 1	35–45	1 hr 20 min–1 hr 45 min
Grade 6 Session 2	45–60	
Grade 7 Session 1	20–25	1 hr 20 min–1 hr 45 min
Grade 7 Session 2	60–80	
Grade 8 Session 1	15–20	1 hr 20 min–1 hr 45 min
Grade 8 Session 2	65–85	

APPENDIX B: TEST TIMING GUIDELINES (CONTINUED)

English Language Arts Timing Estimates		
Grade/Session	Recommended Range (minutes)	Recommended Range (Total Test)
Grades 3–4 Session 1	45–80	1 hr 30 min–2 hr 35 min
Grades 3–4 Session 2	30–50	
Grades 3–4 Session 3	15–25	
Grade 5 Session 1	45–80	2 hr 25 min–4 hr
Grade 5 Session 2	25–45	
Grade 5 Session 3	15–25	
Grade 5 Session 4	60–90	
Grades 6–7 Session 1	45–80	1 hr 30 min–2 hr 35 min
Grades 6–7 Session 2	30–50	
Grades 6–7 Session 3	15–25	
Grade 8 Session 1	45–80	2 hr 25 min–4 hr
Grade 8 Session 2	25–45	
Grade 8 Session 3	15–25	
Grade 8 Session 4	60–90	

APPENDIX B: TEST TIMING GUIDELINES (CONTINUED)

Science Timing Estimates		
Grade/Session	Recommended Range (minutes)	Recommended Range (Total Test)
Grade 5 Session 1	45–55	1 hr 50 min–2 hr 25 min
Grade 5 Session 2	20–25	
Grade 5 Session 3	45–65	
Grade 8 Session 1	45–55	1 hr 50 min–2 hr 25 min
Grade 8 Session 2	20–25	
Grade 8 Session 3	45–65	



***Grade-Level Assessments
Test Coordinator's Manual***



Appendix B: Examiner's Manual



Examiner's Manual

Grade 5

***English Language Arts, Mathematics,
and Science Assessments***

Spring 2016

NOTICE OF NON-DISCRIMINATION

It is the policy of the Missouri Department of Elementary and Secondary Education not to discriminate on the basis of race, color, religion, gender, national origin, age, or disability in its programs or employment practices as required by Title VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, the Age Discrimination Act of 1975 and Title II of the Americans with Disabilities Act of 1990.

Inquiries related to Department employment practices may be directed to the Jefferson State Office Building, Human Resources Director, 8th Floor, 205 Jefferson Street, P.O. Box 480, Jefferson City, MO 65102-0480; telephone number (573) 751-9619 or TTY (800) 735-2966. Inquiries related to Department programs and to the location of services, activities, and facilities that are accessible by persons with disabilities may be directed to the Jefferson State Office Building, Office of the General Counsel, Coordinator–Civil Rights Compliance (Title VI/Title IX/504/ADA/Age Act), 6th Floor, 205 Jefferson Street, P.O. Box 480, Jefferson City, MO 65102-0480; telephone number (573) 526-4757 or TTY (800) 735-2966, email civilrights@dese.mo.gov.

Anyone attending a meeting of the State Board of Education who requires auxiliary aids or services should request such services by contacting the Executive Assistant to the State Board of Education, Jefferson State Office Building, 205 Jefferson Street, Jefferson City, MO 65102-0480; telephone number (573) 751-4446 or TTY (800) 735-2966.

Inquiries or concerns regarding civil rights compliance by school districts or charter schools should be directed to the local school district or charter school Title IX/non-discrimination coordinator. Inquiries and complaints may also be directed to the Office for Civil Rights, Kansas City Office, U.S. Department of Education, 8930 Ward Parkway, Suite 2037, Kansas City, MO 64114; telephone number (816) 268-0550; FAX: (816) 823-1404; TDD: (877) 521-2172.

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1.0 OVERVIEW OF IMPORTANT INFORMATION FOR THE MAP GRADE-LEVEL ASSESSMENTS

1.1 This Examiner's Manual

The purpose of this *Examiner's Manual* is to provide detailed instructions for administering the Missouri Assessment Program (MAP) Grade-Level Assessments. The manual includes instructions for test preparation, scripts for administering the tests, and post test administration procedures. Test Examiners (TEs) should thoroughly read this manual and view training before administering the tests.

1.2 Glossary of Terms

Accommodations	Changes in procedures or materials that increase equitable access to the MAP Grade-Level Assessments. Assessment accommodations allow students to access assessment content to show what they know and can do. Accommodations are available for students with documented Individualized Education Programs (IEPs) or 504 Plans.
Break/Pause	Action taken by a student or Test Examiner (TE) to temporarily halt the test during any part of the test, as needed. The online assessment provides an opportunity to pause the test for up to 20 minutes.
eDIRECT	The administrative platform—the Missouri Assessment Program Portal—from which district personnel will manage the assessments.
INSIGHT	INSIGHT is the secure, browser-based test engine for the MAP Grade-Level Assessments.
Item	A test question or stimulus presented to a student to elicit a response.
Performance Event	A performance event comprises Session 3 of the MAP Grade-Level Science Assessment. It is designed to provide students with an opportunity to demonstrate their ability to apply their knowledge and higher-order thinking skills to explore and analyze a complex, real-world scenario.
Session	A specific part of a test assigned to a specific student, which is grouped by Test Examiner according to the precode file.

Stimulus/Stimuli	Material or materials used in the test context, which form the basis for assessing the knowledge and skills of students. Many items/tasks for the assessments include a stimulus along with a set of questions to which the student responds. Examples of stimuli include, but are not limited to, traditional reading passages/texts viewed on a computer screen, images with audio presentations, and simulated web pages.
Universal Tools	Universal tools are available to students based on student preference and selection. Some tools, such as a ruler and sticky notes, are embedded in the online system, while others, such as a physical thesaurus and scratch paper, are external to the system. The availability of particular universal tools varies by item.
Writing Prompt	A special type of performance event that appears in the Grades 5 and 8 English Language Arts (ELA) Assessments is an open-ended item that requires students to demonstrate their writing proficiency.

1.3 About the Tests

- The Missouri State Board of Education identified the following purposes for the MAP Grade-Level Assessments:
 - Measuring and reflecting student 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
 - Providing professional development for teachers
- The MAP Grade-Level Assessments are designed to adapt testing to the needs of Missouri districts, schools, teachers, and students, while meeting state and federal requirements.
- The MAP Grade-Level Assessments are based on the Missouri Learning Standards, which align to college- and career-readiness standards. All 2016 assessments will include traditional multiple-choice items and innovative technology-enhanced items designed to elicit student knowledge and skills in new ways. English Language Arts/Literacy assessments will include a writing prompt, and the Science assessments will include a performance event and constructed-response items. See Appendix A: Item Types.

The Missouri Department of Elementary and Secondary Education (DESE) uses the information obtained through the MAP Grade-Level Assessments to monitor the progress of Missouri's students in meeting the Missouri Learning Standards, to inform the public and the state legislature about students' performance, and to help make informed decisions about educational issues.

- Data Recognition Corporation (DRC) and DESE are collaborating to deliver Missouri's²⁴⁹ Spring 2016 Grade-Level Assessments. Missouri educators will use DRC's eDIRECT online platform for enrollment and test administrator processes and INSIGHT (DRC's online delivery system) for test delivery. DRC will also provide handscoring and reporting services. These cooperative efforts and systems comprise a fully integrated assessment platform to meet the needs of school districts, educators, students, and other Missouri stakeholders.
- The Spring 2016 MAP Grade-Level Assessments include the following:
 - English Language Arts/Literacy Assessment for Grades 3–8
 - Mathematics Assessment for Grades 3–8
 - Science Assessment for Grades 5 and 8
- The English Language Arts Assessments consist of three sessions in grades 3, 4, 6, and 7. In grades 5 and 8, there will be four sessions. The first three sessions contain selected-response items and technology-enhanced items. The fourth session administered in grades 5 and 8 contains a writing prompt that is scored with a ten-point rubric.
- The Mathematics Assessments consist of two sessions. Both sessions contain selected-response items and technology-enhanced items.
- The Science Assessments consist of three sessions. The first session contains constructed-response items, the second session contains selected-response items, and the third session contains a performance event. See Appendix A: Item Types.
- All MAP Grade-Level Assessments are available only in INSIGHT, the secure online browser, unless a Large Print, Braille, or paper/pencil edition is required by the student as an accommodation. For students needing one of these versions, test examiners will be responsible for transcribing student responses into INSIGHT.

1.4 Test Administration Policies

General Rules of Online Testing

Students in grade 5 will take online tests for English Language Arts and Mathematics consisting of selected-response (SR) and technology-enhanced (TE) items. Students in grade 5 will also take ELA writing prompts (WP) and online science tests consisting of selected- and constructed-response items (CR) and a performance event (PE). The SR, CR, and TE items component and the PE component will be presented as one test with separate sessions. Students may not return to a test once it has been completed and submitted.

Basic online testing parameters:

- Within each test there will be sessions. A student may not return to a session once it has been completed and submitted.
- Some items include multiple parts over more than one page. Students may need to use the vertical scroll bar to view an entire item on a page.
- Students may mark items for review and return to those items within a session.

Pause Rules

The INSIGHT system includes a “Pause” feature that allows a student to pause a test, either to take a short break of up to 20 minutes or to continue testing at a later time as indicated by the district’s testing schedule. While the test is paused, a large count-down timer displays in the INSIGHT system on the student’s computer. This allows the Test Examiner to easily monitor which students have activated the feature and how much time remains in their break. If a student does not resume testing before 20 minutes elapses, then the student is logged out of the test and is required to log back in to the test using the login and password from his or her Test Ticket. Students may also choose to exit the test from the Pause screen.



The “Pause” feature allows a student to pause a test, either to take a short break of up to 20 minutes or to continue testing at a later time.



1.5 Scheduling the Tests

The following table lists general estimates of the time it will take most students to complete each component of the online MAP Grade-Level Assessments. These times do not include time needed to start computers, load secure browsers, and log in students. Nor do they include time needed for students to complete the INSIGHT Tutorials.

Duration and Timing Information

The scheduling/rules for each assessment are included in tables 1, 2, and 3. Note that the duration, timing, and session recommendations vary for each content area.

Table 1: Assessment Sequence—English Language Arts

ELA	Session 1	Session 2	Session 3	Session 4 (writing prompt)
Content and Duration of Sessions	This session assesses the Reading Strand. It contains passage-based selected-response and technology-enhanced items. Recommendation: <ul style="list-style-type: none"> Session duration ranges from 45–80 minutes. 	This session assesses the Research and Writing Strands. It contains selected-response and technology-enhanced items. Recommendation: <ul style="list-style-type: none"> Session duration ranges from 25–45 minutes. 	This session assesses the Listening Strand. It contains passage-based selected-response and technology-enhanced items. Recommendation: <ul style="list-style-type: none"> Session duration ranges from 15–25 minutes. 	The writing prompt is presented in one session. Recommendation: <ul style="list-style-type: none"> Session duration ranges from 60–90 minutes.
Total Duration	Recommendation: <ul style="list-style-type: none"> Student completes this component within three days of starting. 	Recommendation: <ul style="list-style-type: none"> Student completes this component within three days of starting. 	Recommendation: <ul style="list-style-type: none"> Student completes this component within three days of starting. 	Recommendation: <ul style="list-style-type: none"> Student completes in one test session.

Table 2: Assessment Sequence—Mathematics

Mathematics	Session 1	Session 2
Number and Duration of Sessions	This session assesses the Mathematics Strands. It contains selected-response and technology-enhanced items. Recommendation: <ul style="list-style-type: none"> Session duration ranges from 35–50 minutes. 	This session assesses the Mathematics Strands. It contains selected-response and technology-enhanced items. Recommendation: <ul style="list-style-type: none"> Session duration ranges from 35–50 minutes.
Total Duration	Recommendation: <ul style="list-style-type: none"> Student completes this component within two days of starting. 	Recommendation: <ul style="list-style-type: none"> Student completes this component within two days of starting.

Table 3: Assessment Sequence—Science

Science	Session 1	Session 2	Session 3 (Performance Event)
Number and Duration of Sessions	<ul style="list-style-type: none"> Administer in one session. Session duration ranges from 45–55 minutes. 	<ul style="list-style-type: none"> Administer in one session. Session duration ranges from 20–25 minutes. 	<ul style="list-style-type: none"> Administer in one session. Session duration ranges from 45–65 minutes.
Total Duration	<p>Recommendation:</p> <ul style="list-style-type: none"> Student completes Session 1 in a single session. 	<p>Recommendation:</p> <ul style="list-style-type: none"> Student completes Session 2 in a single session. 	<p>Recommendation:</p> <ul style="list-style-type: none"> Student completes Session 3 in a single session.

Additional Administration Recommendations:

- For the performance events, students may be best served by sequential, uninterrupted time that may exceed the time allotted in a student’s schedule.
- When responding to the writing prompt, students may wish to write their rough draft on scratch paper. To do this, the student must first log in to the test using his or her Test Ticket, in order to view the writing prompt. After reading the prompt, the student must press “Pause” to pause the test. Once the student has finished the rough draft and is ready to input the final response into the online test, the student should press “Resume Test.” (If the 20-minute countdown has expired, the student will need to log back into the test, using the original test ticket.) Students must complete both the rough draft on paper and the final draft in the online test during the same testing session.
- Minimize the amount of time between beginning and completing each test within a content area.

Important reminders:

- The test can be spread out over multiple days as needed.
- Breaks can be provided during the test session using the software’s “Pause” feature. If the test is paused for more than 20 minutes, the student will be able to go back to items on the previous screens in that session.
- Review the test directions in this *Examiner’s Manual* in advance. Examiner’s Manuals are not secure and can be viewed in advance.

1.6 Accommodations and Special Populations

Updated Accommodations Procedures/Codes

The accommodations for the MAP Grade-Level Assessments have changed starting with the Spring 2016 Grade-Level administration. What was previously referred to as accommodations has now been split into two areas: Universal Tools and Accommodations.

- Universal Tools are available to all students taking a Grade-Level Assessment, unless otherwise noted.
- Accommodations must appear in a student's IEP/504 Plan.

For Special Education students, the IEP team should choose **all** of the accommodations that a student will receive.

Some tools and accommodations are only for ELL students with an IEP/504 Plan.

Prior to testing, Test Examiners should log in to eDIRECT to check and set tools and accommodations for students from the Edit Student window. See the eDIRECT User Guide for detailed instructions.

Table 4: Universal Tools

<u>UNIVERSAL TOOLS</u>		
<p>These tools for use on the Grade-Level Assessment are available to ALL STUDENTS unless otherwise noted.</p> <p>Please note:</p> <ul style="list-style-type: none"> • Some tools need to be marked in eDIRECT prior to the assessment. Please read the description to determine if the tool must be marked in eDIRECT, under student accommodations. • Some tools are only for use by English Language Learner (ELL) students (ELL students are those marked LEP-RCV or LEP-NRC in MOSIS). 		
Tool	Description	Code
Bilingual Dictionary	<p>ELL students may have access to a physical bilingual dictionary for use ONLY on the writing prompt in grades 5 and 8. If the bilingual dictionary is electronic, it may not connect to the Internet.</p> <p>This tool must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	S431
Break (Pause)	<p>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.</p> <p>The INSIGHT platform allows all students to pause the online assessment for up to 20 minutes. If the test is paused for more than 20 minutes, the student will have to log back in.</p> <p>If the need arises to move a student from one computer to another, pause the test and choose the Exit button. The test will remain incomplete until the student logs back in and completes the test.</p>	N/A
Calculator (For Calculator-Allowed Items Only)	<p>All students may have access to a physical calculator, on items where calculator use is allowed (Session 2, Grades 6–8). The memory of the physical calculator must be cleared before and after testing by the test examiner.</p> <p><i>Please Note: Use of a calculator is only for the Mathematics assessment.</i></p>	N/A
Grades 6–8	<p>The INSIGHT platform features an embedded calculator for all students to use on items where calculator use is allowed (Session 2, Grades 6–8).</p>	

Table 4: Universal Tools, continued

<u>UNIVERSAL TOOLS</u>		
<p>These tools for use on the Grade-Level Assessment are available to ALL STUDENTS unless otherwise noted.</p> <p>Please note:</p> <ul style="list-style-type: none"> Some tools need to be marked in eDIRECT prior to the assessment. Please read the description to determine if the tool must be marked in eDIRECT, under student accommodations. Some tools are only for use by English Language Learner (ELL) students (ELL students are those marked LEP-RCV or LEP-NRC in MOSIS). 		
Tool	Description	Code
Color Contrast—Online	The INSIGHT platform allows all students to adjust background or font color based on student needs or preferences.	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 eDIRECT system under student accommodations prior to testing.	S102
Color Overlay	All students taking the paper/pencil assessment may have a color transparency placed over the test presented to them based on student needs or preferences. This tool must be chosen in the eDIRECT system under student accommodations prior to testing.	S103
English Dictionary	All students may have access to a physical English Dictionary for use ONLY on the writing prompt in grades 5 and 8. If the English Dictionary is electronic, it may not connect to the Internet. The INSIGHT platform features an embedded English Dictionary for use ONLY on the writing prompt in grades 5 and 8.	N/A
Grammar Handbook	All students may have access to a physical Grammar Handbook for use ONLY on the writing prompt in grades 5 and 8. If the Grammar Handbook is electronic, it may not connect to the Internet. The Grammar Handbook must be one that is published. It cannot be a district-, school-, or classroom-made handbook.	N/A
Graphing Tool	The INSIGHT platform allows all students to use an embedded tool to graph functions.	N/A
Highlighter	The INSIGHT platform allows all students access to a highlighter for marking desired text. All students may have access to a physical highlighter.	N/A
Keyboard Navigation	The INSIGHT platform allows all students to navigate through the text by using the keyboard.	N/A
Line Guide	The INSIGHT platform allows all students to use an embedded horizontal line that brings focus to a single line of text.	N/A
Magnifier (Zoom)	The INSIGHT platform allows all students to magnify the screen by 1.5 or 2 times the original size. All students taking the paper/pencil or Large Print assessments may have access to a magnifying device.	N/A

<u>UNIVERSAL TOOLS</u>		
<p>These tools for use on the Grade-Level Assessment are available to ALL STUDENTS unless otherwise noted.</p> <p>Please note:</p> <ul style="list-style-type: none"> Some tools need to be marked in eDIRECT prior to the assessment. Please read the description to determine if the tool must be marked in eDIRECT, under student accommodations. Some tools are only for use by English Language Learner (ELL) students (ELL students are those marked LEP-RCV or LEP-NRC in MOSIS). 		
Tool	Description	Code
Magnification—Assistive Technology	<p>Students with visual impairments may use assistive technology software that magnifies the screen beyond the built-in capabilities of the magnifier (zoom) tool. The software can be used in conjunction with the INSIGHT platform. The software must be provided by the district.</p> <p><i>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.</i></p> <p><i>Please Note: While the use of assistive technology software is not directly supported by DRC, the help desk will work with districts needing to use the software.</i></p> <p>This tool must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	S105
Mark for Review	The INSIGHT platform allows all students to mark an item for review.	N/A
Masking—Online	The INSIGHT platform allows all students to block off content that is not of immediate need or that may be distracting by using an embedded masking tool.	N/A
Masking—Paper	<p>All students taking the paper/pencil or Large Print assessments may use a masking tool to block off content that is not of immediate need or that may be distracting.</p> <p>This tool must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	S107

Table 4: Universal Tools, continued

<u>UNIVERSAL TOOLS</u>		
<p>These tools for use on the Grade-Level Assessment are available to ALL STUDENTS unless otherwise noted.</p> <p>Please note:</p> <ul style="list-style-type: none"> • Some tools need to be marked in eDIRECT prior to the assessment. Please read the description to determine if the tool must be marked in eDIRECT, under student accommodations. • Some tools are only for use by English Language Learner (ELL) students (ELL students are those marked LEP-RCV or LEP-NRC in MOSIS). 		
Tool	Description	Code
Non-Accommodation Paper Based Assessment	<p>This tool is available for the following scenarios:</p> <p>For students that need to test off-site in a non-district building (e.g. hospital, juvenile facility, etc.), the student may use the Paper Based Assessment.</p> <p>For ELL students who are using the Translation tool (S109) or Read Aloud – Native Language (S111), where the translator needs access to the assessment prior to administration to conduct translation services, choose this tool for just ONE student in the group. That student should still take the assessment online.</p> <p>For students using Read Aloud – Human Reader (S043) where the examiner needs a paper copy to read from, choose this tool for just ONE student in the group. That student should still take the assessment online.</p> <p><i>Please Note: There is a \$15 charge to the district for each printed paper/pencil assessment not required by an IEP. If the off-site student does have an IEP that requires using a paper/pencil assessment, use accommodation A102 instead.</i></p> <p><i>Please Note: Answers from students who access the assessment using the paper/pencil format must be entered into eDIRECT prior to shipping the paper assessment back. Please follow the return instructions found in the Test Coordinator’s Manual.</i></p> <p><i>Please Note: All the answers given in the online system must be in English.</i></p> <p>This tool must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	S112
Protractor	<p>The INSIGHT platform allows all students to use an embedded protractor on specific items where appropriate.</p> <p>All students taking the paper/pencil, Large Print or Braille assessments may have access to a physical protractor for use on specific items where appropriate.</p>	N/A

UNIVERSAL TOOLS

These tools for use on the Grade-Level Assessment are available to **ALL STUDENTS** unless otherwise noted.

Please note:

- Some tools need to be marked in eDIRECT prior to the assessment. Please read the description to determine if the tool must be marked in eDIRECT, under student accommodations.
- Some tools are only for use by English Language Learner (ELL) students (ELL students are those marked LEP-RCV or LEP-NRC in MOSIS).

Tool	Description	Code
<p>Read Aloud (Not Including ELA Reading Passages)—Text-To-Speech</p>	<p>The INSIGHT platform allows all students to have the test directions and items in English Language Arts, Mathematics and Science read aloud via embedded text-to-speech technology. The student can control the speed and volume of the voice. The system also includes a follow-along feature, where the word being read is highlighted for the student.</p> <p><i>Please Note: This tool DOES NOT read ELA reading passages to the student. In order to have ELA reading passages Read Aloud, a student MUST have that accommodation in their IEP/504 plan.</i></p> <p><i>Please Note: 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.</i></p> <p>This tool must be turned on in the eDIRECT system under student accommodations prior to testing.</p>	<p>S041</p>
<p>Read Aloud (Not Including ELA Reading Passages)—Human Reader</p>	<p>Any student taking the online, paper/pencil, Large Print or Braille assessments may have the test directions and items in English Language Arts, Mathematics and Science read aloud by a human reader.</p> <p><i>Please Note: Read Aloud of ELA Listening items will require the download of a script.</i></p> <p><i>Please Note: Use of this tool DOES NOT allow the reading of ELA passages to the student. In order to have ELA reading passages Read Aloud, a student MUST have that accommodation in their IEP/504 plan.</i></p> <p><i>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.</i></p> <p><i>Please Note: 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.</i></p> <p>This tool must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	<p>S043</p>

<u>UNIVERSAL TOOLS</u>		
<p>These tools for use on the Grade-Level Assessment are available to ALL STUDENTS unless otherwise noted.</p> <p>Please note:</p> <ul style="list-style-type: none"> Some tools need to be marked in eDIRECT prior to the assessment. Please read the description to determine if the tool must be marked in eDIRECT, under student accommodations. Some tools are only for use by English Language Learner (ELL) students (ELL students are those marked LEP-RCV or LEP-NRC in MOSIS). 		
Tool	Description	Code
<p>Read Aloud (Not Including ELA Reading Passages)—Assistive Technology</p>	<p>Students with Disabilities that use specific text-to-speech assistive technology software in the everyday classroom may use that technology in conjunction with the INSIGHT testing platform. The software must be provided by the district.</p> <p><i>Please Note: Use of this tool DOES NOT allow the reading of ELA passages to the student. In order to have reading passages Read Aloud, a student MUST have that accommodation in their IEP/504 plan.</i></p> <p><i>Please Note: 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.</i></p> <p><i>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.</i></p> <p><i>Please Note: While the use of assistive technology software is not directly supported by DRC, the help desk will work with districts needing to use the software.</i></p> <p>This tool must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	<p>S042</p>
<p>Read Aloud (Not Including ELA Reading Passages)—Native Language</p>	<p>ELL students taking either the online, paper/pencil, Large Print or Braille assessments may have the test directions and items in English Language Arts, Mathematics and Science read aloud in the students' native language by a human reader.</p> <p><i>Please Note: Use of this tool DOES NOT allow the reading of ELA passages in the students' native language to the student. In order to have ELA reading passages Read Aloud, a student MUST have that accommodation in their IEP/504 plan.</i></p> <p><i>Please Note: If the translator needs access to the assessment prior to administration to conduct translation services, the student must use the paper/pencil assessment (Code S114). There is a \$15 charge to the district for each printed paper/pencil assessment not required by an IEP.</i></p> <p><i>Please Note: All the answers given in the online system must be in English.</i></p> <p>This tool must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	<p>S111</p>
<p>Ruler</p>	<p>The INSIGHT platform allows all students to use an embedded ruler on specific items where appropriate.</p> <p>All students taking the paper/pencil, Large Print or Braille assessments may have access to a physical ruler for use on specific items where appropriate.</p>	<p>N/A</p>

<u>UNIVERSAL TOOLS</u>		
<p>These tools for use on the Grade-Level Assessment are available to ALL STUDENTS unless otherwise noted.</p> <p>Please note:</p> <ul style="list-style-type: none"> Some tools need to be marked in eDIRECT prior to the assessment. Please read the description to determine if the tool must be marked in eDIRECT, under student accommodations. Some tools are only for use by English Language Learner (ELL) students (ELL students are those marked LEP-RCV or LEP-NRC in MOSIS). 		
Tool	Description	Code
Scratch Paper (Sticky Notes)	<p>The INSIGHT platform allows all students to use an embedded notepad (called Sticky Notes) to make notes about an item. Electronic notes DO NOT carry over from previous sessions. If a student logs off prior to finishing a session, any electronic notes WILL NOT carry over when the student logs back in. As long as you do not log out or finish the session, they remain.</p> <p>All students taking the online, paper/pencil, Large Print or Braille assessments may have access to physical scratch paper to make notes about an item. Scratch paper can be blank, ruled, graph or grid paper. Physical scratch paper should be collected and destroyed IMMEDIATELY upon the conclusion of a testing session.</p>	N/A
Scribe	<p>Students may dictate their responses to a scribe, who must follow the scribing guidelines (http://dese.mo.gov/sites/default/files/asmt-scribing-guidelines.pdf).</p> <p><i>Please Note: DESE does not recommend the use of Scribe for students who do not use it as part of their everyday learning in the classroom. The use of Scribe for some students can prove distracting and become a hindrance to student performance.</i></p> <p><i>Please Note: The Scribe should be familiar to the student and have scribing experience with the student in some capacity prior to the state assessment.</i></p> <p><i>Please Note: Students who obtain a physical injury prior to testing that prevents them from responding may also dictate their responses to a scribe.</i></p> <p>This tool must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	S351
Separate Setting	<p>Students may be allowed to test in a separate setting from other students. This includes testing individually or testing as part of a smaller group.</p> <p>This tool must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	S501
Strikethrough (Cross Off)	<p>The INSIGHT platform allows all students to cross out answer options.</p>	N/A
Thesaurus	<p>All students may have access to a physical Thesaurus for use ONLY on the ELA writing prompt in grades 5 and 8. If the Thesaurus is electronic, it may not connect to the Internet.</p>	N/A

Table 4: Universal Tools, continued

<u>UNIVERSAL TOOLS</u>		
<p>These tools for use on the Grade-Level Assessment are available to ALL STUDENTS unless otherwise noted.</p> <p>Please note:</p> <ul style="list-style-type: none"> Some tools need to be marked in eDIRECT prior to the assessment. Please read the description to determine if the tool must be marked in eDIRECT, under student accommodations. Some tools are only for use by English Language Learner (ELL) students (ELL students are those marked LEP-RCV or LEP-NRC in MOSIS). 		
Tool	Description	Code
Translation	<p>ELL students may respond to any assessment in their native language. The responses must be translated and transcribed.</p> <p><i>Please Note: If the translator needs access to the assessment prior to administration to conduct translation services (Code S112), there is a \$15 charge to the district for each printed paper/pencil assessment not required by an IEP.</i></p> <p><i>Please Note: All the answers given in the online system must be in English.</i></p> <p>This tool must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	S109
Writing Tools	<p>The INSIGHT platform allows all students to use writing tools on specific items where appropriate. The tools include the ability to bold, italicize and underline text, create bullet points, undo/redo typing, and copy/paste text the student has typed.</p>	N/A

Table 5: Accommodations

<u>ACCOMMODATIONS</u>		
<p>These accommodations for use on the Grade-Level Assessment are available only to students with the accommodation in their IEP/504 plan.</p> <p>Please note:</p> <ul style="list-style-type: none"> All accommodations need to be marked in eDIRECT 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 Core Data). 		
Accommodation	Description	Code
Abacus	<p>Students with this accommodation in their IEP/504 plan may have access to an abacus.</p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	A391
Alternate Response Options	<p>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.</p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	A441

Table 5: Accommodations, continued

<u>ACCOMMODATIONS</u>		
<p>These accommodations for use on the Grade-Level Assessment are available only to students with the accommodation in their IEP/504 plan.</p> <p>Please note:</p> <ul style="list-style-type: none"> • All accommodations need to be marked in eDIRECT 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 Core Data). 		
Accommodation	Description	Code
Braille	<p>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.</p> <p><i>Please Note: Answers from students who access the assessment using the Braille format must be entered into eDIRECT prior to shipping the Braille assessment back. Please follow the instructions found in the virtual Braille kit (available from eDIRECT).</i></p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	A012
<p>*INVALIDATION*</p> <p>Calculator (For Non-Calculator-Allowed Items Only)</p> <p>GRADE 3 ONLY</p> <p>*INVALIDATION*</p>	<p>Students in 3rd grade with this accommodation in their IEP/504 plan may have access to a physical calculator on items where calculator use is not allowed. The memory of the physical calculator must be cleared before and after testing by the test examiner.</p> <p><i>Please Note: Use of this accommodation will cause an invalidation for the Mathematics Assessment and the student will receive the Lowest Obtainable Scale Score (LOSS).</i></p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	A392
<p>Calculator (For Non-Calculator-Allowed Items Only)</p> <p>GRADES 4–8</p>	<p>Students in grades 4–8 with this accommodation in their IEP/504 plan may have access to a physical calculator on items where calculator use is not allowed. The memory of the physical calculator must be cleared before and after testing by the test examiner.</p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	A393
Large Print	<p>Students with visual impairments with this accommodation in their IEP/504 plan may access the assessment via a Large Print version.</p> <p><i>Please Note: Answers from students who access the assessment using the Large Print format must be entered into eDIRECT prior to shipping the Large Print assessment back. Please follow the instructions found in the virtual Large Print kit (available from eDIRECT).</i></p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	A021

Table 5: Accommodations, continued

<u>ACCOMMODATIONS</u>		
<p>These accommodations for use on the Grade-Level Assessment are available only to students with the accommodation in their IEP/504 plan.</p> <p>Please note:</p> <ul style="list-style-type: none"> All accommodations need to be marked in eDIRECT 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 Core Data). 		
Accommodation	Description	Code
<p>*INVALIDATION*</p> <p>Multiplication Table</p> <p>GRADE 3 ONLY</p> <p>*INVALIDATION*</p>	<p>Students in 3rd grade with this accommodation in their IEP/504 plan may have access to a single-digit multiplication table.</p> <p><i>Please Note: Use of this accommodation will cause an invalidation for the Mathematics Assessment and the student will receive the Lowest Obtainable Scale Score (LOSS).</i></p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	A394
<p>Multiplication Table</p> <p>GRADES 4–8</p>	<p>Students in grades 4–8 with this accommodation in their IEP/504 plan may have access to a single-digit multiplication table.</p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	A395
<p>Paper Based Assessment</p>	<p>Students with this accommodation in their IEP/504 plan may take the assessment using the paper/pencil format.</p> <p><i>Please Note: Answers from students who access the assessment using the paper/pencil format must be entered into eDIRECT prior to shipping the Paper Based Assessment back. Please follow the return instructions found in the Test Coordinator’s Manual.</i></p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	A102
<p>*INVALIDATION*</p> <p>Read Aloud (ELA Reading Passages)—Text-To-Speech</p> <p>GRADES 3–5</p> <p>*INVALIDATION*</p>	<p>Students in grades 3–5 with this accommodation in their IEP/504 plan can have the INSIGHT platform read the ELA Reading Passages via embedded text-to-speech technology. The student can control the speed and volume of the voice. The system also includes a follow-along feature, where the word being read is highlighted for the student.</p> <p><i>Please Note: Use of this accommodation will cause an invalidation for the English Language Arts Assessment and the student will receive the Lowest Obtainable Scale Score (LOSS).</i></p> <p><i>Please Note: 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.</i></p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	A040

Table 5: Accommodations, continued

<u>ACCOMMODATIONS</u>		
<p>These accommodations for use on the Grade-Level Assessment are available only to students with the accommodation in their IEP/504 plan.</p> <p>Please note:</p> <ul style="list-style-type: none"> • All accommodations need to be marked in eDIRECT 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 Core Data). 		
Accommodation	Description	Code
<p>*INVALIDATION*</p> <p>Read Aloud (ELA Reading Passages)—Human Reader</p> <p>GRADES 3–5</p>	<p>Students in grades 3–5 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.</p> <p><i>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.</i></p> <p><i>Please Note: Use of this accommodation will cause an invalidation for the English Language Arts Assessment and the student will receive the Lowest Obtainable Scale Score (LOSS).</i></p> <p><i>Please Note: 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.</i></p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	<p>A041</p>
<p>*INVALIDATION*</p> <p>Read Aloud (ELA Reading Passages)—Assistive Technology</p> <p>GRADES 3–5</p>	<p>Students in grades 3–5 with this accommodation in their IEP/504 plan that use specific text-to-speech assistive technology software in the everyday classroom may use that technology in conjunction with the INSIGHT testing platform to have the ELA Reading Passages read aloud by the software. The software must be provided by the district.</p> <p><i>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.</i></p> <p><i>Please Note: Use of this accommodation will cause an invalidation for the English Language Arts Assessment and the student will receive the Lowest Obtainable Scale Score (LOSS).</i></p> <p><i>Please Note: 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.</i></p> <p><i>Please Note: While the use of assistive technology software is not directly supported by DRC, the help desk will work with districts needing to use the software.</i></p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	<p>A042</p>
<p>*INVALIDATION*</p>	<p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	

Table 5: Accommodations, continued

<u>ACCOMMODATIONS</u>		
<p>These accommodations for use on the Grade-Level Assessment are available only to students with the accommodation in their IEP/504 plan.</p> <p>Please note:</p> <ul style="list-style-type: none"> All accommodations need to be marked in eDIRECT 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 Core Data). 		
Accommodation	Description	Code
<p>*INVALIDATION*</p> <p>Read Aloud (ELA Reading Passages)—Native Language</p> <p>GRADES 3–5</p> <p>*INVALIDATION*</p>	<p>ELL students in grades 3–5 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.</p> <p><i>Please Note: Use of this accommodation will cause an invalidation for the English Language Arts Assessment and the student will receive the Lowest Obtainable Scale Score (LOSS).</i></p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	A111
<p>Read Aloud (ELA Reading Passages)—Text-To-Speech</p> <p>GRADES 6–8</p>	<p>Students in grades 6–8 with this accommodation in their IEP/504 plan can have the INSIGHT platform read the ELA Reading Passages via embedded text-to-speech technology. The student can control the speed and volume of the voice. The system also includes a follow-along feature, where the word being read is highlighted for the student.</p> <p><i>Please Note: 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.</i></p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	A043
<p>Read Aloud (ELA Reading Passages)—Human Reader</p> <p>GRADES 6–8</p>	<p>Students in grades 6–8 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.</p> <p><i>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.</i></p> <p><i>Please Note: 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.</i></p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	A045

Table 5: Accommodations, continued

<u>ACCOMMODATIONS</u>		
<p>These accommodations for use on the Grade-Level Assessment are available only to students with the accommodation in their IEP/504 plan.</p> <p>Please note:</p> <ul style="list-style-type: none"> • All accommodations need to be marked in eDIRECT 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 Core Data). 		
Accommodation	Description	Code
<p>Read Aloud (ELA Reading Passages)—Assistive Technology GRADES 6–8</p>	<p>Students in grades 6–8 with this accommodation in their IEP/504 plan that use specific text-to-speech assistive technology software in the everyday classroom may use that technology in conjunction with the INSIGHT testing platform to have the ELA Reading Passages read aloud by the software. The software must be provided by the district.</p> <p><i>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.</i></p> <p><i>Please Note: While the use of assistive technology software is not directly supported by DRC, the help desk will work with districts needing to use the software.</i></p> <p><i>Please Note: 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.</i></p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	<p>A044</p>
<p>Read Aloud (ELA Reading Passages)—Native Language GRADES 6–8</p>	<p>ELL students in grades 6–8 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.</p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	<p>A112</p>
<p>Read-Aloud (ELA reading passages)—Blind Students</p>	<p>Blind students at any grade level 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.</p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	<p>A046</p>
<p>Sign Language</p>	<p>Hearing Impaired students with this accommodation in their IEP/504 plan may have ELA listening items translated into American Sign Language (ASL), Signing Exact English (SEE) or any other form of sign language.</p> <p><i>Please Note: Signing of ELA Listening items will require the download of a script.</i></p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	<p>A052</p>

Table 5: Accommodations, continued

<u>ACCOMMODATIONS</u>		
<p>These accommodations for use on the Grade-Level Assessment are available only to students with the accommodation in their IEP/504 plan.</p> <p>Please note:</p> <ul style="list-style-type: none"> • All accommodations need to be marked in eDIRECT 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 Core Data). 		
Accommodation	Description	Code
Specialized Calculator (For Calculator-Allowed Items Only)	<p>Students with this accommodation in their IEP/504 plan may have access to a specialized calculator on items where calculator use is allowed (Session 2). 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.</p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	A396
Speech-to-Text—Assistive Technology	<p>Students with this accommodation in their IEP/504 plan that use specific speech-to-text assistive technology software in the everyday classroom may use that technology in conjunction with the INSIGHT testing platform. The software must be provided by the district.</p> <p><i>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.</i></p> <p><i>Please Note: While the use of assistive technology software is not directly supported by DRC, the help desk will work with districts needing to use the software.</i></p> <p>This accommodation must be chosen in the eDIRECT system under student accommodations prior to testing.</p>	A352

Table 6: Tools/Accommodations on Test Tickets

<u>TOOLS/ACCOMMODATIONS ON TEST TICKETS</u>		
The following are the only tools and accommodations that will appear on a student Test Ticket. For descriptions of these Tools/Accommodations, please see the appropriate table in this section.		
Tool/Accommodation	Code	Ticket Abbreviation
Braille	A012	Braille
Large Print	A021	LargePrint
Non-Accommodation Paper Based Assessment	S112	SCPaper
Paper Based Assessment	A102	PaperBased
Sign Language	A052	A052
Translation	S109	S109
Read Aloud (Not Including ELA Reading Passages)— Text-To-Speech	S041	TTS
Read Aloud (GRADES 3–5 OR GRADES 6–8) (ELA Reading Passages)—Text-To-Speech	S041/A040 OR S041/A043	TTSPASSAGE
Read Aloud (Not Including ELA Reading Passages)— Human Reader	S043	S043
Read Aloud (GRADES 3–5) (ELA Reading Passages)— Human Reader	A041	A041
Read Aloud (GRADES 6–8) (ELA Reading Passages)— Human Reader	A045	A045
Read Aloud (Not Including ELA Reading Passages)— Assistive Technology	S042	S042
Read Aloud (GRADES 3–5) (ELA Reading Passages)— Assistive Technology	A042	A042
Read Aloud (GRADES 6–8) (ELA Reading Passages)— Assistive Technology	A044	A044
Read Aloud (Not Including ELA Reading Passages)— Native Language	S111	S111
Read Aloud (GRADES 3–5) (ELA Reading Passages)— Native Language	A111	A111
Read Aloud (GRADES 6–8) (ELA Reading Passages)— Native Language	A112	A112
Read Aloud (ELA Reading Passages)—Blind Students	A046	A046

1.7 Online Tools Training and Tutorials

Online Tools Training

In preparation for the test and to expose students to the various item-response types in each content area (see Appendix A for item types), it is highly recommended that all students access the Online Tools Training (OTT) for each content area. Each OTT is designed to provide students and educators with an opportunity to quickly familiarize themselves with the software and navigational tools that they will use on the MAP Grade-Level Assessments. The OTT for each content area includes a variety of item response types. Even though a student's test form may not include every item type, the OTT provides an opportunity to practice all item types. The OTTs also include a comprehensive reflection of embedded universal tools and accommodations. The OTTs should also be provided to students with any non-embedded universal tools and accommodations as allowed on the operational assessments.

The OTTs can be accessed via the INSIGHT desktop icon once the testing software has been installed. Non-accommodated versions of the OTTs can be publicly accessed using the Google Chrome browser at <https://wbte.drctdirect.com/MO/portals/mo>. Students should choose Online Tools Training on the right-hand side of the page.

Tutorials

The Tutorials provide step-by-step video instructions on how to navigate the online system and give detailed explanations about the key features of the software. **The Tutorials should be reviewed at least once by Test Examiners who will supervise any of the MAP Grade-Level Assessments and by students in advance of their first test day. Allow students to repeat the Tutorials as often as desired and needed.**

Students should review the Tutorials before completing the Online Tools Training (OTT). It has been proven beneficial for schools to schedule a Tutorial session for students immediately before at least one OTT session.

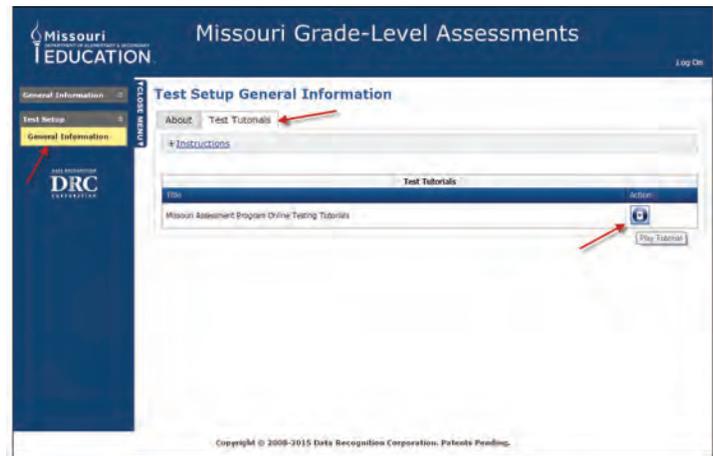
If computer lab availability is limited, the Tutorials may be presented to school personnel and students in a classroom using an LCD projector and a single Internet connection.

The Tutorials can be accessed via the Online Tutorials desktop icon once the testing software has been installed. The Tutorials may also be accessed through eDIRECT.



Instructions for Accessing the Tutorials through eDIRECT

1. Navigate to eDIRECT, <https://mo.drcedirect.com>. (Login is not required.)
2. Under **Test Setup** select **General Information**.
3. Select the **Test Tutorials** tab.
4. Select the **Play Tutorial** action button.
5. Select **Play All** or choose from different sections within the tutorial.



The Tutorials walk students through the software and tools that are available. In the Tutorial, the student can move forward as directed or jump around if desired. A menu at the left of the page allows the student to select specific sections for review.

List of INSIGHT Keyboard Shortcuts and Icons

During online testing, all students may have access to a printed list of the keyboard shortcuts and icons available in INSIGHT. The list may be printed from Appendix B or may be accessed on the **Documents** page of eDIRECT, <https://mo.drcedirect.com>.

Science Practice Items

Additional practice items for Science include constructed-response items and a performance event for grades 5 and 8. They allow students to practice with the item types and the functionality of the testing environment that they will experience during summative testing. The Science practice items can be accessed via the INSIGHT desktop icon once the testing software has been installed. Science practice items can also be publicly accessed using the Google Chrome browser at <https://wbte.drcedirect.com/MO/portals/mo>. Scoring materials for the practice items are available on the **Documents** page of eDIRECT (login required). After a practice test is closed, student responses are no longer available in the online system.

•••••

Both written and/or verbal discussion of specific MAP Grade-Level Assessment items breach the security and integrity of the test and may result in an invalidation or loss of scores for accountability purposes.

•••••

District and School Test Coordinators, Test Examiners, translators, proctors, and any other district and/or staff who have testing responsibilities must follow test security procedures. The tests must not be read, scored, reviewed, photocopied, duplicated, scanned, transported by students, or made accessible to personnel not responsible for testing. **Both written and/or verbal discussion of specific MAP Grade-Level Assessment items breach the security and integrity of the test and may result in an invalidation or loss of scores for accountability purposes.**

Translators and transcribers who read student test items and answers must maintain test security at all times. Test items or answers must not be discussed with anyone at any time. When hard-copy editions of the test are not in use, they must be stored in a secure, locked location outside of the classroom. Large Print, Braille, and paper/pencil editions of the tests must be transcribed into INSIGHT and shipped back to DRC following the procedures in Section 5.3 in this manual once testing is complete.

•••••

This *Test Examiner Manual* may be reviewed before testing, NOT the secure tests. Only translators may review secure test material prior to test administration.

•••••

Test security and ethics also include standardized training for all District and School Test Coordinators, Test Examiners, translators, proctors, and any district and/or school staff who have responsibilities in testing. Training webinars from DESE and manuals (including this manual) are provided for training purposes at <http://dese.mo.gov/college-career-readiness/assessment/grade-level>. This *Test Examiner Manual* is also available on the **Documents** page of eDIRECT.

2.4 Assessment Materials for Students/Administrators

This section concerns all materials required, permitted but not provided, or prohibited while taking Grade-Level Online Assessments.

Required Materials

- A workstation with Internet access, a monitor, a mouse, and a keyboard for each student, **OR** a tablet device with Internet access if a student will be testing on a tablet. Devices must have INSIGHT properly loaded and certified.
- Test Tickets (This ticket provides the secure login credentials (i.e., username and password) required for a student to use the testing software.)
- The resources in Table 7.

Table 7: Additional Required Resources for ELA, Mathematics, and Science

Content Area	Session 1	Session 2	Session 3	Session 4 (writing prompt)
ELA	<ul style="list-style-type: none"> • Headphones are required for students using text-to-speech. • Scratch paper should be provided for note taking if necessary. 	<ul style="list-style-type: none"> • Headphones are required for students using text-to-speech. • Scratch paper should be provided for note taking if necessary. 	<ul style="list-style-type: none"> • Headphones are required for all students taking this session. • Scratch paper should be provided for note taking if necessary. 	<ul style="list-style-type: none"> • Headphones are required for students using text-to-speech. • Scratch paper should be provided for note taking if necessary.
Mathematics	<ul style="list-style-type: none"> • Headphones are required for students using text-to-speech. • Scratch paper is required for all grades. 	<ul style="list-style-type: none"> • Headphones are required for students using text-to-speech. • Scratch paper is required for all grades. 	N/A	N/A
Science	<ul style="list-style-type: none"> • Headphones are required for students using text-to-speech. • Graph paper is required. • Scratch paper is required. 	<ul style="list-style-type: none"> • Headphones are required for students using text-to-speech. • Scratch paper is required. 	<ul style="list-style-type: none"> • Headphones are required for students using text-to-speech. • Graph paper is required. • Scratch paper is required. 	N/A

Permitted Materials

- Scratch paper and grid/graph paper are allowable for all assessments even if not required.
- An English dictionary and a thesaurus may be available for the ELA session 4 writing prompt. ELL students may use an English, a non-English, and a bilingual dictionary and thesaurus as needed during session 4.

Prohibited Materials

- Electronic devices, including any portable device that can connect to the Internet or to anyone inside or outside of the classroom, must not be accessible during the testing sessions. Such items include, but are not limited to:
 - cellular/mobile phones
 - electronic music players
 - digital cameras
 - handheld scanners
 - portable gaming devices
 - any device that can connect to the Internet
- If students are allowed to enter the testing room with cell phones, the phones **must** be collected prior to testing and returned at the end of the testing session. Students are not allowed to have cell phones in their pockets, purses, or backpacks during testing.

Assessment Materials and Training for Test Examiners

- *Test Examiner Manual*
- Grade-Level Assessment training provided online by DESE
- Student Test Tickets (obtained from the School Test Coordinator)

NOTE: All materials distributed to the students with usernames and passwords must be collected before the students leave the testing area.

- Extra pencils and a supply of scratch and grid/graph paper

NOTE: Physical scratch paper should be collected and destroyed immediately upon conclusion of a testing session.

3.0 DURING ONLINE TESTING

Use the following information and script to assist students with the login procedures.

The Test Examiner (TE) should verify the security of the testing environment prior to beginning a test session. TEs must ensure that students do not have access to prohibited devices and materials during testing.

To ensure that all students are tested under the same conditions, the TE should adhere strictly to the script for administering the test. These instructions can be found after the word "SAY" on the following pages. When asked, the TE should answer questions raised by students but should never help the class or individual students with specific test items. Except for single words, no test items can be read to any student for any content area, unless specified as an accommodation.

Please remember that the script must be followed exactly and used each time a test is administered. If the class is resuming a test and the TE is sure that all students are able to log in without hearing the login directions again, the TE may skip the italicized portions of the directions for the login section.

All directions that a TE needs to read to students are indicated by the word "SAY" so they stand out from the regular text. They should be read exactly as they are written, using a natural tone and manner. If the TE makes a mistake in reading a direction, the TE should stop and say, "I made a mistake. Listen again." Then the direction should be reread.

The TE should try to maintain a natural classroom atmosphere during the test administration. Before each test begins, he or she should encourage students to do their best.

Any time a student logs in to the testing system, the TE should follow this script. This includes logging in to complete any session of the Assessment.

.....

The TE should adhere strictly to the script for administering the test.

.....

.....

Test Examiners may read/pronounce one word per sentence to any student.

.....

3.1 Specific Administration Information

1. The TE distributes the Test Tickets.

You should have received Test Tickets for this testing session from your DTC or STC. Before beginning, ensure that you have all of the correct test tickets for the students who will be testing. Note the Test Name and read it aloud where the script states [Test Name].

If students are starting a new session:

SAY You are about to take (the) [Test Name].

If students are resuming a session:

SAY You are about to continue (the) [Test Name].

I will now hand out a Test Ticket to each of you. When you receive your Test Ticket, check that your name appears on the ticket. If your name does not appear, raise your hand.

Distribute test tickets to each student, ensuring that each student is given the correct ticket with his or her name printed on it. Contact your STC or DTC if a ticket is missing or incorrect.

2. The TE directs students to the test sign-in page.

SAY Now select the “DRC INSIGHT Online Assessments” icon that appears on your screen.

Students using a laptop or desktop workstation should double click on the icon. Students using a Chromebook, iPad, or Android device should tap on the icon. Help students if they have trouble activating the icon. Some devices are configured for multiple assessments. If that is the case, read number 3 below to the students. If not, go to number 4.



3. The TE instructs students to select testing program.

SAY On your screen, you will be asked to select your testing program. Select “Missouri.”

4. The TE instructs students to log in.

SAY

At the top of your screen you should see “Missouri Department of Elementary & Secondary Education.” On the right-hand side, you will see links for the Online Tools Training and Test Sign in for the MAP Grade-Level Assessments Summative test. Please select “Test Sign In.”



SAY

This is the Login screen. Type your username and password from your Test Ticket into the correct boxes on the screen. Then select “Sign In.”



Test Ticket information is unique to each student and each session but is not case sensitive. Assist students as needed; TEs may have to help students type in this information. After the login, make sure all students are on the correct screen. Wait for all students to reach this page.

SAY

This is the Welcome screen. Please check that your name appears at the top of the screen. Check that the test name is [Test Name]. Then check that your school, MOSIS ID, and other information are correct. If everything is correct, select "Continue." If your information is not correct, please raise your hand.

If a student's information is incorrect, the TE should contact the STC and/or the DTC.

Welcome **Training Student!**

Thank you for participating in the Missouri Assessment Program Grade-Level Assessments.

Before you begin testing, please confirm your profile information is correct:

Test Name: [G5 Math](#)
 Test Session: [Student's Session](#)
 School Name: [DRC Use Only - Sample School](#)

Your MOSIS ID is: 1234567890

If the above information is correct, please select **Continue**.

If any of the above information is not correct, please raise your hand and notify your Test Administrator.

[Continue](#) [Exit](#)

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SAY

You are now on the screen that shows the name of the test you are scheduled to take. If you do not see this, please raise your hand. Please select the test link that is shown.

The following tests have been scheduled for **Training Student!**

Once instructed, click on the test link below to start the test.
 If no additional tests are available, please select **Exit** to close the application.

- [G5 MA - Session 1](#)
- [G5 MA - Session 2](#)

[Exit](#)

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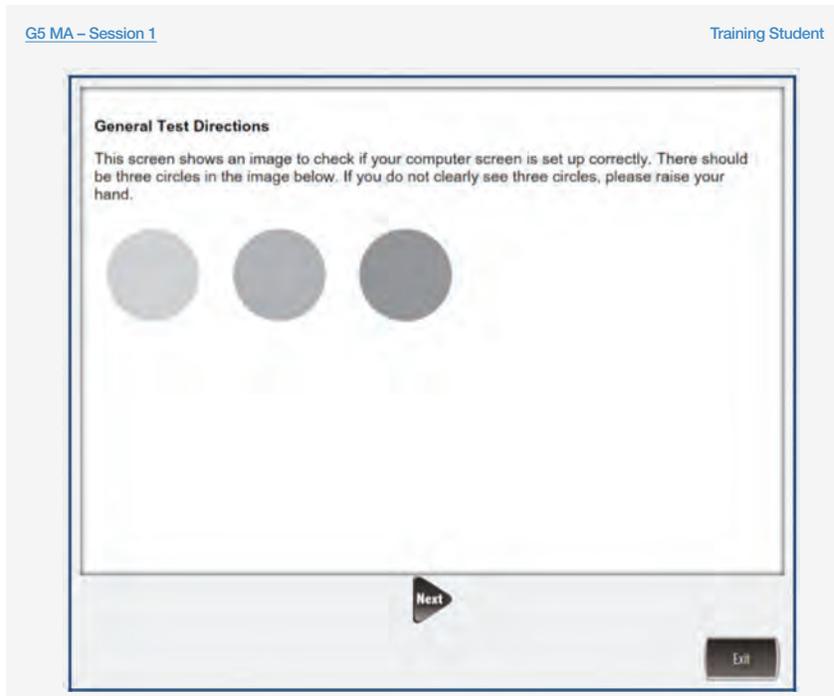
SAY

You are now on a screen that is used to make sure your computer screen is set up correctly. If you do not see three circles, please raise your hand.

Once you have confirmed that all students have three circles,

SAY

Select the NEXT arrow to continue.

**SAY**

The following screens contain the test directions for the test you are taking today. Please read the directions carefully. If you have any questions about the directions, raise your hand. You can find the directions during your test by clicking the HELP button in the top right corner.

During the test, you may see a page with no test questions. Follow the directions on the page to continue taking the test.

If you are unsure of an answer, provide what you think is the best answer; there is no penalty for guessing. If you would like to review that answer at a later time, mark the item for review by clicking the FLAG at the bottom of the screen before going on to the next question. Flagging the item will remind you to go back and decide whether or not you want to change the answer.

SAY

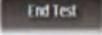
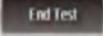
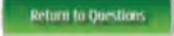
You may PAUSE at any point in the test by clicking PAUSE after answering an item. The PAUSE button is used to stop the test. Please raise your hand if you need a break and ask me before you click PAUSE. After pausing, a timer will appear on your screen. After your break, click on the RESUME button to continue. If you pause for more than 20 minutes, you will need to log back in.

Your answers need to be your own work. Please keep your eyes on your own test and remember that there should be no talking.

When you are ready to begin your test, click BEGIN THE TEST.

Students may PAUSE at any point in the test by clicking PAUSE after answering an item. The PAUSE button is used to stop the test. Students must raise their hands if they need a break and ask the TE before clicking PAUSE. After pausing, students must click on the RESUME button to continue. If students pause for more than 20 minutes, they will need to log back in.

Navigation

- Only one question at a time will appear on the screen.
- After you have answered a question, click on the  **Next** arrow at the bottom of the screen to go to the next question.
- To move quickly to any question on the test, click on the  **Down** arrow next to the question number and select the question you'd like to see.
- When you are ready to finish your test, click on the  **Review/End Test** button in the lower left-hand corner.
- If you have left a question unanswered or if you have  **flagged** a question as a reminder to return to a test question, you can return to that question.
- When you are ready to finish the test, click on the  **End Test** button.
- Confirm you would like to  **End Test** or  **Return to Questions**.

Helpful Testing Hints

- There is no time limit to finish the test.
- Only one question at a time will appear on the screen.
- If you need to go away from your computer, click on the **Pause** button. Click on the **Resume** button to continue. If you are away from your computer for more than 20 minutes, you will need to log back in.
- To see your progress on the test, click on the **Review/End Test** button. You may go to any question by selecting it from the list that appears on the screen.
- Click on the **Help** button to find more information.

Buttons: **Pause**, **Resume**, **Review/End Test**, **Help**, **Back**, **Next**, **Exit**

Click on the **Flag** button if you are not sure of the answer to a question. It will mark the question so you know to go back and answer the question later.

To look at these directions again, click on the **Help** button and choose the **Test Directions** tab.

Buttons: **Flag**, **Help**, **Test Directions**, **Back**, **Begin the Test**, **Exit**

5. The TE monitors student progress.

Monitoring Test Progress

Once students have started their tests, the TE should circulate through the room to ensure that all conditions of test security are maintained. If the TE witnesses or suspects the possibility of a test security incident, the STC and DTC should be contacted immediately in accordance with the security guidance provided in this manual.

If the TE notices that a student is off task, the TE may say the following statement to the student, verbatim, to keep him or her focused.

SAY

It is important that you do your best. Do you need to pause the test and take a break? Be sure to press the Pause button. Do not end the test.

If a student asks for assistance either in answering an item or manipulating an item type, the TE should let the student know that he or she should try his or her best, but that the TE cannot help answer an item.

SAY

I can't help you with your test. Check the HELP button to read the directions.

The TE may remind the student to reread the instructions for that item.

6. The TE ends the test session.

When there are approximately ten minutes left in the test session, the TE should give students a brief warning.

If students will continue this portion of the test at a later time, read aloud the following two scripts:

SAY

We are nearing the end of this test session. Please review any completed or marked items now. You will be able to finish the test at another time.

At the end of the session:

SAY

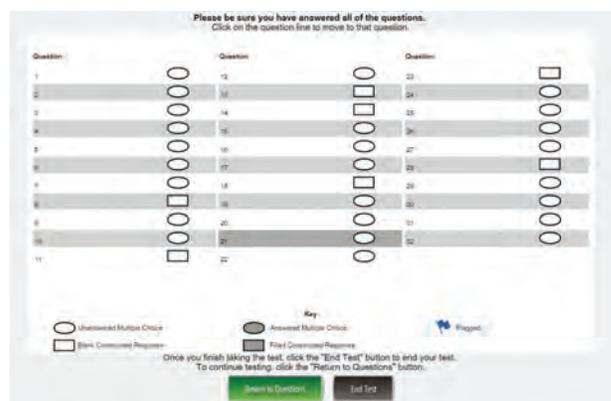
This test session is now over. Click PAUSE, then click EXIT, and then click YES, EXIT. You will be able to finish at another time. I will now collect any scratch paper or other material.

If students are completing this portion of the test, read aloud the following two "SAY" scripts:

SAY

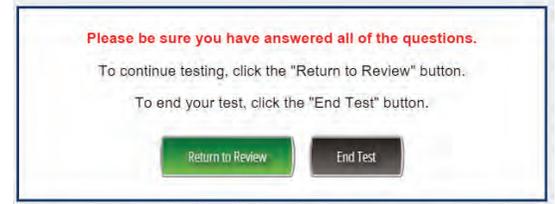
We are nearing the end of this test session. Please review any completed or marked items now. Do not submit your test unless you have answered all of the questions.

After answering the last item in each session, the student will press the Review/End Test button at the bottom left-hand corner of the screen. The student is then presented with a screen prompting him or her to review answers (marked and unmarked) for all items prior to submitting the test. At that point, the student can either click the Return to Questions button to answer previously unanswered questions or press End Test to submit the test. Once the student has pressed on the End Test button, the student must provide a confirmation that he or she is done. If a student needs additional testing time, direct him or her to pause the test and then exit so testing can continue at another time.



SAY

This test session is now over. When you have finished, click the “End Test” button. Then click on End Test again, confirming that you are done. Then click on the last screen to close the test. I will now collect any scratch paper or other material.



TEs should collect any scratch paper.

Testing Over Multiple Sessions or Days

For some tests, students may be best served by sequential, uninterrupted time that may exceed the time in the regular class schedule.

If the TE intends to administer a session over the course of multiple days for a student or group of students, TEs may ask students to pause and exit after they reach a designated point. For most tests, there is nothing built into the system to prevent students from progressing from one section of the test to another. In those cases, the TE should give the students clear directions on when to pause. For example, TEs may designate a certain amount of time for testing. This guidance may be written on a dry-erase board, chalkboard, or another place that students can easily see.

3.2 Moving a Student During an Assessment

Occasionally a student must be moved to a new location to continue testing. In order for the student to continue his or her test, complete the following steps:

1. Pause and end the student’s online assessment. To do so, select the “Pause” button, then select the “Exit” button, and then select the “Yes, Exit” button. (Once the student exits the test, the workstation becomes immediately available for other use.)
2. Escort the student to the new location.
3. Using the login and password from the student’s Test Ticket, log the student in to his or her assessment at the new workstation to complete the assessment.

4.0 AFTER ONLINE TESTING

4.1 Reporting Test Invalidations

Neither a student's behavior during testing nor the judgment of a student's effort during testing can invalidate a student's test.

A MAP Grade-Level Assessment should be invalidated if a student is discovered cheating. To do so, select the "Teacher Invalidation" bubble for the affected content area in eDIRECT. (See the eDIRECT User Guide for instructions.) Cheating is the only time the "Teacher Invalidation" code is used. This code invalidates all sessions of the content area.

If the "Teacher Invalidation" bubble is used due to cheating, adhere to the following process:

1. The STC and the Test Examiner agree that a particular student's test should be invalidated.
2. A district invalidation letter on district letterhead and signed by the superintendent is faxed to DESE's Director of Assessment at 573-526-0812.
3. The district invalidation fax should include the following information:
 - a. Student Name
 - b. MOSIS ID
 - c. Date of Birth
 - d. Grade
 - e. School Name
 - f. County District Code
 - g. District Name
 - h. School Code
 - i. Content Area
 - j. The reason the testing session is being invalidated/description of the incident
4. The district files a copy of the fax for its records and future reference.

4.2 How to Handle Student Absences

If a student is absent for any or all of the MAP Grade-Level Assessments and unable to test in district determined make-up sessions, then mark the student as absent in eDIRECT. (ELLs in-country less than one year and being exempted from the ELA assessments are also treated as absences in eDIRECT.)

5.0 LARGE PRINT, BRAILLE, AND PAPER/PENCIL EDITIONS

Large Print, Braille, and paper/pencil editions of the MAP Grade-Level Assessments will be available for students with designated IEPs or special circumstances for spring 2016 testing. Paper/pencil editions can be generated from eDIRECT (after students are assigned an accommodation). Unique identification numbers will be used to produce barcodes that will be printed onto the paper/pencil editions. After testing, student responses for Large Print, Braille, and paper/pencil editions must be entered into the INSIGHT system, and all test materials must be collected for return to DRC for processing and storage.

5.1 Before Testing

Paper/Pencil Materials

For special circumstances that require students to test on paper, a paper/pencil edition is a part of the test delivery system. To activate the paper/pencil edition print function, Test Examiners will access the Test Setup feature in eDIRECT to mark the applicable accommodation and code for students who require the paper version of the test. Using the information collected during the precode and enrollment processes, the administration component of the online testing system will generate a unique barcode number for a paper/pencil edition prior to local printing. Depending on the printed accommodation needed for a particular student, the unique barcode number will then become embedded into the electronic version on each page of the paper/pencil form. During local printing, the embedded barcode number will print along with each page of the paper/pencil edition. Each barcode number will be unique to a student for the purposes of linking the printed form to the student's record in the master database. Barcode numbers will be recorded and associated with each student's record.

For specific instructions regarding how to generate a paper/pencil edition, see the *eDIRECT User Guide—Test Setup*, available on the **Documents** page of eDIRECT, <https://mo.drccedirect.com>.

Once the PDF downloads, it is available for printing on the local network printer.



For additional information regarding Large Print and Braille forms, refer to the Large Print and Braille Kit and follow the instructions in the Braille Omit Return Instruction Sheet.



The Test Examiner should become familiar with the directions for administering a paper/²⁸⁸pencil edition. The paper/pencil edition of the test is secure and should be treated as such.

Large Print and Braille Materials

Test Examiners or Test Coordinators must transcribe students' responses into INSIGHT.

Large Print and Braille testing materials are packaged by building and shipped to the district's office address (or the shipping address indicated by the district during the registration process). The materials shipped to the district are based on the content-specific test window entered during registration.

Test Examiners must also count the number of books received and assign each test book to a student. Write the student's name and MOSIS ID on the front of each test book.

Document this information in preparation for returning the test books to the STC.

Contaminated Test Materials

Test materials are considered **contaminated** due to: a) a student health issue that affects the test book itself (blood, fluids, etc.) or b) contact with any potentially hazardous material. If test materials are contaminated, the Test Examiner should notify the School Test Coordinator for instructions for handling the contaminated materials since **all** printed testing material must be accounted for. The DTC, or STC, or TE is responsible for transcribing the answers into the online system, and then the contaminated test materials must be securely destroyed at the test site by the DTC or STC. The DTC or STC should fill out the Missing Materials section of the Accountability Form to account for the contaminated test materials located under the Materials section of eDIRECT.

Duration and Timing Information

The scheduling/rules for each component of the Large Print, Braille, and paper/pencil assessments are included in tables 8, 9, and 10. Note that the duration, timing, break/pause rules, and session recommendations vary for each content area and component. This information is for scheduling purposes only, as the assessments are untimed.

Table 8: Assessment Sequence for Large Print, Braille*, and Paper/Pencil—English Language Arts

ELA	Session 1	Session 2	Session 3	Session 4 (writing prompt)
Content and Duration of Sessions	This session assesses the Reading Strand. It contains passage-based selected-response and enhanced items. Recommendation: <ul style="list-style-type: none"> Session duration ranges from 45–80 minutes. 	This session assesses the Research and Writing Strands. It contains selected-response and enhanced items. Recommendation: <ul style="list-style-type: none"> Session duration ranges from 25–45 minutes. 	This session assesses the Listening Strand. It contains passage-based selected-response and enhanced items. Recommendation: <ul style="list-style-type: none"> Session duration ranges from 15–25 minutes. 	The writing prompt is presented in one session. Recommendation: <ul style="list-style-type: none"> Session duration ranges from 60–90 minutes.
Total Duration	Recommendation: <ul style="list-style-type: none"> Student completes this component within three days of starting. 	Recommendation: <ul style="list-style-type: none"> Student completes this component within three days of starting. 	Recommendation: <ul style="list-style-type: none"> Student completes this component within three days of starting. 	Recommendation: <ul style="list-style-type: none"> Student completes in one test session.

*Braille administration times will likely be longer than the times indicated here.

Table 9: Assessment Sequence for Large Print, Braille*, and Paper/Pencil—Mathematics

Mathematics	Session 1	Session 2
Number and Duration of Sessions	This session assesses the Mathematics Strands. It contains selected-response and enhanced items. Recommendation: <ul style="list-style-type: none"> Session duration ranges from 35–50 minutes. 	This session assesses the Mathematics Strands. It contains selected-response and enhanced items Recommendation: <ul style="list-style-type: none"> Session duration ranges from 35–50 minutes.
Total Duration	Recommendation: <ul style="list-style-type: none"> Student completes this component within two days of starting. 	Recommendation: <ul style="list-style-type: none"> Student completes this component within two days of starting.

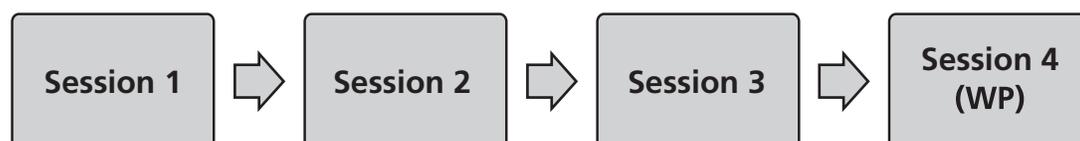
*Braille administration times will likely be longer than the times indicated here.

Table 10: Assessment Sequence for Large Print, Braille*, and Paper/Pencil—Science

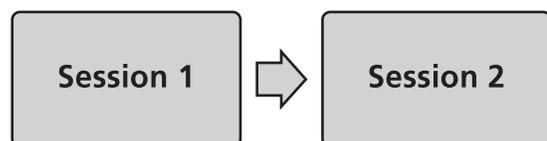
Science	Session 1	Session 2	Session 3 (Performance Event)
Number and Duration of Sessions	<ul style="list-style-type: none"> Administer in one session. Session duration ranges from 45–55 minutes. 	<ul style="list-style-type: none"> Administer in one session. Session duration ranges from 20–25 minutes. 	<ul style="list-style-type: none"> Administer in one session. Session duration ranges from 45–65 minutes.
Total Duration	<p>Recommendation:</p> <ul style="list-style-type: none"> Student completes Session 1 in a single session. 	<p>Recommendation:</p> <ul style="list-style-type: none"> Student completes Session 2 in a single session. 	<p>Recommendation:</p> <ul style="list-style-type: none"> Student completes Session 3 in a single session.

*Braille administration times will likely be longer than the times indicated here.

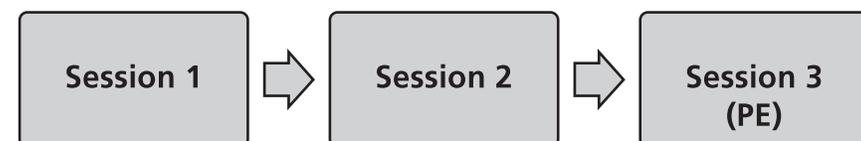
Recommended Order of Test Administration for ELA



Recommended Order of Test Administration for Mathematics



Recommended Order of Test Administration for Science



Students may take sessions on separate days. Districts/schools may opt to administer in a different order, if needed.

5.2 During Testing

This section provides an overview of preparing the testing environment, guidelines for test administration, and directions for accessing specific scripts for administering the Large Print, Braille, and paper/pencil editions. Test Examiners should become familiar with this section well in advance of the start of testing.

The scripts are secure; do not print or allow unauthorized persons to access them. Maintaining the security of all test materials is crucial to obtaining valid and reliable test results. Therefore, test materials must be kept in locked storage, except during actual test administration. It is the responsibility of all individuals who administer the test to follow security procedures.

Before administering the assessment, make sure that you have the following materials available for students:

- A test book for each student
- At least two sharpened No. 2 pencils
- Blank scratch paper for each student
- An English dictionary and a thesaurus for the writing prompt
- A four-function calculator with square root and percentage functions is permitted for students in grades 3–5 as an accommodation only, as the assessments include no calculator-allowed items. (Calculators must meet the guidelines below.)
 - DESE does not provide, endorse, or recommend a list of calculator brands or types that students are permitted to use. Test Examiners should follow their own district's general education policy for the types of calculators permitted during district-administered quizzes, benchmark tests, common assessments, chapter/unit tests, and final exams.
 - Calculators cannot contain stored equations or functions at the time of the MAP Grade-Level Mathematics Assessments. Test Examiners are responsible for ensuring and verifying that calculators that have the ability to store functions and equations, e.g., a scientific calculator, have the memory cleared before and after each Mathematics Assessment.
 - Calculators cannot have Internet connectivity or be able to connect to anyone inside or outside the classroom during testing. Students cannot 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 is required for a student and is specified on his or her IEP.
 - No calculators with QWERTY keyboards are allowed.

Specific Directions for Administering the Braille Form

The directions in this manual also apply to the administration of the Braille version of the English Language Arts Summative Assessment. Additional Braille instructions are as follows:

- The student’s name, Test Examiner’s name, district, and school must be printed on the front cover of each Braille test book.
- Because extra time may be needed for administering the Braille version, it is recommended that students be tested individually or in a small-group setting.
- When a Braille student responds by pointing to the answers or giving a verbal response in English only, the Test Examiner is permitted during the course of test administration to fill in student responses in the student test book. When a Braille student responds by using a Braillewriter or marking answers in the test book, the procedures for transcribing student responses detailed in the 5.3 “After Testing” section of this manual should be followed. In each instance, the Test Examiner must provide written affirmation to the School Test Coordinator that student responses have been completed in the student test book with accuracy. Under no circumstances should a student’s answer be altered or edited—to do so is a direct violation of test security.

Scripts for Administering the Large Print, Braille, and Paper/Pencil Editions

The specific scripts for administering the Large Print, Braille, and paper/pencil editions of each assessment are located on the **Documents** page of eDIRECT, <https://mo.drctdirect.com>.

1. From the eDIRECT homepage, log in using your eDIRECT credentials.
2. In the left navigation pane, under **General Information**, select **Documents**.
3. In the main page on the **Documents** tab,
 - a. Choose “Summative Grade-Level Assessments Spring 2016” from the Administration drop-down.
 - b. Choose “Scripts” from the Document Type drop-down.
 - c. Click “Show Documents.” A list of all available scripts will appear in the grid.

5.3 After Testing

Assemble Materials for Return and for Entry into INSIGHT

After testing has been completed, prepare materials to be returned to the School Test Coordinator. Check test books to make sure there are no sticky notes, staples, pins, paper clips, or tape of any kind on any pages. Check to make sure that no scratch or graph paper was left inside test books. Remove any extraneous material.

Transcription of Large Print, Braille, and Paper/Pencil Editions

After testing, student responses for Large Print, Braille, and paper/pencil editions **must** be transcribed into the INSIGHT testing software before the district's test window closes. It is recommended that transcription occur as soon after testing as possible. To transcribe responses requires the Test Examiner or other designated and authorized district or school personnel to log in to INSIGHT using the student's Test Ticket. Follow these steps to transcribe student answers:

1. In eDIRECT Test Setup, ensure that the student has been assigned the appropriate accommodation:
 - a. Paper-Based Assessment
 - b. Paper-Based Braille
 - c. Paper-Based Large Print
2. In eDIRECT Test Setup, assign the student to a test session and print his or her Test Ticket. Retain the Test Ticket rather than distributing it to the student.
3. After the student has completed the test on paper, use a device that has the INSIGHT client software installed and use the student's Test Ticket to log in to the student's test.
4. Begin transcribing student responses. Once you have finished, select End Test and Submit. The Test Examiner should then return all printed test materials to the STC.

Transcribe the student's responses as faithfully and as completely as possible using the following guidelines:

- Do not transcribe erased or crossed out words or marks.
- If a student's response consists of incomprehensible squiggles, marks, etc., which clearly are not words or word fragments, then leave the item blank.
- If a student's response is wholly or partly illegible, enter "ILLEGIBLE" for the entire response or for the part where applicable.
- If 50% or more of a student's response is written in any language other than English, then note "WRITTEN IN ANOTHER LANGUAGE" where applicable.
- If part of a student's response cannot be entered into INSIGHT, then leave that part blank.
- If no part of a student's response can be entered, then leave the entire item blank.
- Additional clarifying notes may be entered as needed if the item type allows text entry.

APPENDIX A: ITEM TYPES

As students engage with the MAP Grade-Level Assessments, they will be asked test questions that require them to use technology to respond in several ways, some of which may be new to students. The following table lists the different item types and briefly describes each one.

Content Area	Type of Item	Brief Description of How to Respond
ELA, Mathematics, and Science	Selected Response (also known as Multiple Choice, single correct response)	Select the radio button corresponding to one of four options. To deselect an option, select a different radio button. Select only one option.
	Short Text (also known as Constructed Response)	Respond via keyboard entry into text box (no text formatting). This item type offers the ability to edit previously entered text.
ELA and Mathematics	Multiple Choice, multiple correct responses	Mark a checkbox corresponding to an option. To deselect an option, click on the checkbox that is already marked. Mark one or more options.
	Matching/ Matching (with connecting lines)	Select an option from the first column and then select the corresponding option from the second column to create a line between them. You can match more than one corresponding option in the second column. To deselect an option, use the undo or redo buttons.
	Matching Tables (with a variation True/False or Yes/ No)	Select a checkbox corresponding to an option in a table cell. To deselect an option, select a checkbox that is already marked.
Mathematics and Science	Drag-and-Drop	Click and drag an object to the appropriate location in the response area.
	Table Fill In	Respond via keyboard entry into table cells or drag and drop objects into table cells.

Content Area	Type of Item	Brief Description of How to Respond
ELA Only	Two-part Multiple Choice, with Evidence-Based Selected-Response (EBSR)	This item type has two parts. Each part may consist of one of three item types: Multiple Choice, single correct response; Multiple Choice, multiple correct responses; and Hot Text, Select Text. See those item types for descriptions of how to respond.
	Hot Text, Select Text	Highlight an option by selecting it. To deselect an option, click on it to remove the highlighting. Select one or more options.
	Hot Text, Reorder Text	Select text and then click and drag text to a new area.
	Writing Prompt	Respond via keyboard entry using text formatting buttons. This item type offers the ability to edit previously entered text.
Mathematics Only	Hot Spot	Select targeted areas in the response area.
	Equation/Numeric	Select buttons representing numbers and mathematic symbols to create a numeric response or equation.
	Graphing	Plot points and/or draw lines in the response area.
Science Only	Bar Graphing	Click targeted areas in the response area and respond via keyboard entry into response fields.
	Line Graphing	Plot points and/or draw lines in the response area. Respond via keyboard entry into response fields.
	Build a Table	Respond via keyboard to make entries into table fields.

APPENDIX B: INSIGHT KEYBOARD SHORTCUTS AND ICONS

The following list contains the keyboard shortcuts and icons available in INSIGHT. All students may have access to a printed copy of this list during online testing.

INSIGHT Function	Keyboard Shortcuts		
	Desktop	Chromebook	iPad
Transfers the focus from one button to the next (from left to right). The focus is indicated by a red box that appears around the selected tool or function button when the Tab key is pressed.	Tab	Tab	N/A
Transfers the focus from one button to the next (from right to left). The focus is indicated by a red box that appears around the selected tool or function button when the Shift key and Tab key are pressed.	Shift + Tab	Shift + Tab	N/A
Activates the tool or function highlighted by the red box. Pressing the Enter key or Space Bar a second time deactivates the tool or function (with the exception of tools that keep the focus, such as Sticky Notes).	Enter/Space Bar	Enter/Space Bar	N/A
<p>Selects the highlighted test question from the Review/End Test page</p> <p>Selects the Sign In button after a Username and Password are entered</p> <p>Selects Continue from the Student Verification Page</p> <p>Selects the Go To Page number within the quick navigation drop-down menu</p>	Enter	N/A	N/A

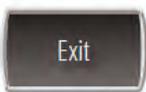
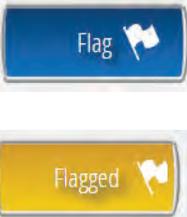
INSIGHT Function	Keyboard Shortcut		
	Desktop	Chromebook	iPad
Closes the Magnifier and “?” [Help] button when activated. If the red box is activated and the Esc key is pressed while on the tool bar without having any tools activated, the red box will move to the Pointer button.	Esc	Esc	N/A
Selects an answer option (i.e., ABCD) on a multiple-choice question when only one set of “ABCD bubbles” exists. Entering one of the letters fills or unfills the letter bubble before the answer option. Both uppercase and lowercase letters can be used.	ABCD, abcd	ABCD, abcd	N/A
Exits the online testing system from each page that has an Exit button	Alt + X	Alt + X	N/A
Moves any pop-up tool, such as the “?” [Help] button around the screen. (Does not work with Sticky Notes.)	CTRL + Right Arrow CTRL + Left Arrow CTRL + Up Arrow CTRL + Down Arrow	CTRL + Right Arrow CTRL + Left Arrow CTRL + Up Arrow CTRL + Down Arrow	N/A
Rotates the active tool +/- 1 degree	CTRL + plus [+] CTRL + minus [-]	CTRL + plus [+] CTRL + minus [-]	N/A
Moves the cursor up and down through a list of choices (such as questions on the Review/End Test screen)	Up/Down Arrows	Up/Down Arrows	N/A
Switches between multiple active pop-up tools on the screen	CTRL + Tab	CTRL + Tab	N/A
Activates the Review/End Test button and moves the user to the Review page of the test	Alt + R	Alt + R	Option + R
Activates the Pause button and pauses the test	Alt + P	Alt + P	Option + P

INSIGHT Function	Keyboard Shortcuts		
	Desktop	Chromebook	iPad
Activates the Flagged button and marks an item as flagged, or removes flag from an item	Alt + F	Alt + F	Option + F
Activates the Back button and moves the student back a question	Alt + B	Alt + B	N/A
Activates the Next button and moves the student forward a question	Alt + N	Alt + N	
INSIGHT Calculator Function			
Clears the calculator screen	Alt + Delete	Alt + Delete	N/A
Works as a shortcut key for subtracting on all calculators	-	-	
Works as a shortcut key for factorial on the Scientific Calculator/Graphing Tool	!	!	
Works as a shortcut key for using open parenthesis on the Scientific Calculator/Graphing Tool	((
Works as a shortcut key for using closed parenthesis on the Scientific Calculator/Graphing Tool))	
Works as a shortcut key for multiplying on all calculators	*	*	
Works as a shortcut key for dividing on all calculators	/	/	
Works as a shortcut key for squaring on the Scientific Calculator/Graphing Tool	@	@	
Works as a shortcut key for adding on all calculators	+	+	
Work as shortcut keys for numeric entry on all calculators	0-9	0-9	
Works as a backspace on all calculators	Backspace	Backspace	

INSIGHT Calculator Function	Keyboard Shortcut		
	Desktop	Chromebook	iPad
Works as a delete function on all calculators	Delete	N/A	N/A
Works as a shortcut to take a number to a specific power on the Scientific Calculator/ Graphing Tool	^	^	N/A
Works as the negate key on the Basic Calculator	,	,	N/A
INSIGHT Audio (TTS) Function			
Activates the Options button and opens or closes the Audio settings selection pop-up window	Alt + A	Alt + A	Option + A
Activates the Options button and opens or closes the Color Chooser selection pop-up window	Alt + O	Alt + O	Option + O
Activates the Play/Pause button when Audio is active	F8 (Mac — use FUNC F8)	N/A	N/A
INSIGHT Writing Tools Function			
Undo	CTRL + Z	N/A	CMD + Z
Redo	CTRL + Y	N/A	CMD + Shift + Z
Highlight text to the left	Shift + left arrow	Shift + left arrow	N/A
Highlight text to the right	Shift + right arrow	Shift + right arrow	N/A
Highlight all text	CTRL + A	CTRL + A	CMD + A
Cut highlighted text	CTRL + X	CTRL + X	CMD + X
Copy text from clipboard	CTRL + C	CTRL + C	CMD + C
Paste text from clipboard	CTRL + V	CTRL + V	CMD + V
Move to start of next word	CTRL + right arrow	CTRL + right arrow	Option + right arrow
Move to start of previous word	CTRL + left arrow	CTRL + left arrow	Option + left arrow

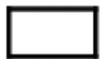
INSIGHT Writing Tools Function	Keyboard Shortcut		
	Desktop	Chromebook	iPad
Move cursor forward one character	Right Arrow	Right Arrow	Right Arrow
Move cursor backward one character	Left Arrow	Left Arrow	Left Arrow
Delete text (from cursor position) to the end of the line	N/A	N/A	Control + K
Delete text (from cursor position) to the beginning of the line	N/A	N/A	CMD + Delete
Delete the word before the cursor	N/A	N/A	Option + Delete
Jump cursor location to end of text entered	N/A	N/A	CMD + Left Arrow
Jump cursor location to the beginning of text entered	N/A	N/A	CMD + Right Arrow
Jump cursor location to previous start of line	N/A	N/A	Option + Up Arrow
Jump cursor location to next end of line	N/A	N/A	Option + Down Arrow
Apply bold formatting / repeat to turn off	N/A	N/A	CMD + B
Apply italic formatting / repeat to turn off	N/A	N/A	CMD + I
Apply underline formatting / repeat to turn off	N/A	N/A	CMD + U

Tool Icon	Tool Name	Tool Definition
	<p>Pointer</p>	<p>The Pointer tool is the default tool that is active when you begin. It is used to select answers as well as other tools and features within the online assessment.</p> <p>The Pointer will change to a pencil head when moved over a multiple-choice answer bubble. Use it to select your answer.</p> <p>If another tool has been selected, you can return to the Pointer tool mode by clicking on the Pointer tool button. This button is at the far left of the tools row.</p>
	<p>Cross-Off</p>	<p>The Cross-Off tool is used to narrow down the possible answer choices by allowing you to mark answer choices you believe to be incorrect. This tool is only available for multiple-choice items.</p>
	<p>Highlighter</p>	<p>The Highlighter tool is used to highlight important information.</p>
	<p>Sticky Note</p>	<p>The Sticky Note allows you to place a short note almost anywhere within the window that contains a question, passage, or scenario. Use a note to mark a special part or to leave a reminder of some important information in that question, passage, or scenario.</p>
	<p>Magnifier</p>	<p>The Magnifier allows you to enlarge the entire screen. Other tools, including the Line Guide, Cross-Off, Highlighter, and Calculator, can be used when the Magnifier is turned on.</p>
	<p>Line Guide</p>	<p>The Line Guide tool provides a horizontal line that brings the focus to a single line of text. The Line Guide can be used to track a passage or an individual question.</p>
	<p>Measurement Tools</p>	<p>The Measurement Tools button allows you to access the ruler, which can be used to measure an object. The ruler can be moved around the screen and can also be rotated.</p>

Tool Icon	Tool Name	Tool Definition
	Calculator	The Calculator tool may be used to assist with calculations necessary to answer questions on the exam. You will be given a Basic or Scientific calculator.
	Graphing Tool	The Graphing Tool is designed to graph functions when solved for the "Y" variable and has the ability to give the corresponding "Y" values for given "X" values.
	Next Button Back Button	<p>The Next and Back buttons are used to navigate between questions on the test. They are also used to move between pages on multi-page questions.</p> <p>Click on the Next button to move forward to the next question or page.</p> <p>Click on the Back button to move backward to the previous question or page.</p>
	Pause and Resume	When the Pause button is clicked, the test will be temporarily stopped. The test cannot be paused for more than 20 minutes. A countdown timer will be displayed showing how much longer the test will be paused. At any time during the countdown, the test can be resumed by clicking on the Resume button.
	Exit	<p>The Exit button appears on the Pause Page. Click on Exit to close the test.</p> <p>WARNING: If a student exits a test using this button, the test remains incomplete. The student must log in again to complete the test.</p>
	Flag	<p>Click on the Flag button to mark a test question for review at a later time. When you click on the Flag button, the color of the button will change to yellow to indicate the question is flagged.</p> <p>To unflag a test question, use the Pointer tool to click the button again.</p>
	Review/End Test	The Review/End Test button allows you to see all of the test questions you have flagged for review. The Review Page also shows which questions have been answered and which have not.

Tool Icon	Tool Name	Tool Definition
	Return to Questions	The Return to Questions button appears on the Review Page. Clicking Return to Questions will take the student back to the most recently visited question. The student can then review any questions, and proceed by clicking Review/End Test again.
	End Test	The End Test button appears on the Review Page. Clicking this button will provide a prompt for the student to confirm whether they would like to Return to Review or End Test . Clicking on the End Test button will end the exam.
	Go to Question	To quickly navigate to any question, passage, or scenario on the test, click on the down arrow next to the question number in the upper-left corner of the screen. A list of all available test questions and scenarios will appear. Click on the number of the test question, passage, or scenario you want to go to, and that question will appear on the screen. Click on the passage or scenario and you will be taken to the first question that appears with the passage or scenario.

Review Page Key

Key Icon	Key Description
	Unanswered multiple-choice item
	Answered multiple-choice item
	Blank constructed-response item
	Filled constructed-response item (text has been entered into the response box)
	Flagged item
S	Scenario indicator for Science; example: (S1)
P	Passage indicator for ELA; example: (P1)



Examiner's Manual

Grade 5 English Language Arts, Mathematics, and Science Assessments

Appendix C: MAP Vertical Scaling Study: ELA and Mathematics

Appendix C: MAP Vertical Scaling Study: ELA and Mathematics

The methodology and results of vertical linking using alternative approaches are presented in this section of the document. In addition to linking assessments using items from below- and above-grade level, the Missouri TAC recommended conducting a study in which the assessments are linked using only below-grade-level items and only above-grade-level items.

C.1 Separate Calibrations and Chain Linking

This study was conducted using separate calibration and chain-linking method. Similar to the concurrent calibration, described in the main body of this document, two item response theory (IRT) models were used to calibrate the operational and vertical linking test items. The three-parameter logistic (3PL) model was used to estimate parameters for the multiple-choice items. The two-parameter partial credit (2PPC) model was used to estimate parameters for the constructed-response items. The Pardux (Burket, 2002) program was used for all calibrations and equating (linking) in the study. The Stocking and Lord (1983) Test Characteristic Curve (TCC) method was used for equating.

The separate calibration and chain-linking method was accomplished in two steps. The first step was separate calibration of each grade level's data. The second step was grade-by-grade chain linking using common items. The separate calibrations resulted in the establishment of a unique theta metric scale for each grade. Next, the common items used for linking adjacent grades allowed for the development of a common scale. The item parameter estimates for common items were used to estimate scale transformation constants that would allow placement of item parameters from each adjacent grade onto the base-grade scale using the Stocking and Lord equating technique. This step was then repeated for each adjacent grade until all grades were placed on the common scale.

The separate calibration and chain linking for each content area was performed first with linking items from below-grade level and then again with linking items from above-grade level.

In each case, for both of the content areas, Grade 5 was identified as the base grade. The test data for Grade 5 (operational and vertical linking items administered in this grade) were calibrated first, and item parameters in the theta metric were estimated.

Next, item parameters for items administered in Grade 5 were used as anchors to equate Grade 4 test data to the base-grade scale. The Grade 4 assessment was equated to the Grade 5 scale in a separate equating run. A set of K1 and K2 equating constants was obtained for Grade 4 item parameters during the Stocking and Lord transformation.

In the next step, item parameters for items administered in Grade 4 (already on the same scale as the base Grade 5) were used to link the Grade 4 assessment to the base-grade scale. This equation was also conducted in a separate equating run, and another set of K1 and K2 equating constants was obtained for Grade 3 item parameters. Grade 3 items were placed on the common scale.

Equating of grades 6, 7, and 8 to the base grade was conducted in the same manner. After linking, obtained item parameter estimates for all grades were on the same scale and were expressed in a theta scale metric.

In addition, during the calibration of Grade 5 data, the sample mean ability estimates were obtained for the base Grade 5. These estimates were used to identify transformation constants (M1 and M2) that would permit transformation of item parameter estimates from the theta metric into the scale score metric and, thus, produce a scale with a desired mean and standard deviation for the base grade. As in the case of concurrent calibration, the mean in the scale score metric for the base grade was set to be 500 and the standard deviation was set to be 50 for both ELA and Math.

The formulae used to compute transformation constants for the transformation of the item parameter estimates from the theta metric to the scale score metric are provided in Chapter 6 of this report.

Vertical scales established using only below- or only above-grade-level items were evaluated using the same criteria as for the scale established using concurrent calibrations with all linking items as described in Chapter 6 of this report. The scale evaluation included examination of the pattern of grade-to-grade growth (means), grade-to-grade variability (standard deviations), and separation of scale score distributions across grades), as well as the test characteristic curves (TCCs) and standard error (SE) curves. Only on-grade-level operational test items were used in computation of statistics used in scale evaluation.

C.2 ELA Scale Developed Using Below-Grade-Level Linking Items

Item Calibration: The following item sets were calibrated separately on grade level: base Grade 5 data with linking items from Grade 4; Grade 4 data with linking items from Grade 3; Grade 3 data (no linking items); Grade 6 data with linking items from Grade 5; Grade 7 data with linking items from Grade 6; and Grade 8 data with linking items from Grade 7. All items converged in the calibration.

Item fit was evaluated using the criteria described in Section 6.3.3 of this report. There were nine items flagged for poor fit across all grades. Table C.1 shows the statistics for each flagged item in separate calibrations with below-grade-level linking items.

Adjacent-Grade Linking: The Stocking and Lord (1983) Test Characteristic Curve (TCC) method was used for linking consecutive grades starting from the base Grade 5. First, Grade 4 was linked to Grade 5 using the common items (from Grade 4) between Grades 4 and 5. This linking placed Grade 4 assessment onto the base-grade scale. Next, Grade 3 was linked to Grade 4 using the common items (from Grade 3) between Grades 3 and 4. This linking placed Grade 3 assessment onto the common scale. Grade 6 was then linked to the common scale using items from Grade 5 administered to Grade 6 students. Grade 7 was linked to Grade 6 using common items between these two grades (Grade 6 items administered to Grade 7 students). And last, but not least, Grade 8 assessment was linked to the common scale using a common set of Grade 7

items administered to Grade 8 students. There were 10 or 11 linking items between each pair of adjacent grades.

The linking results were evaluated and are presented in Table C.2. The information in the table includes K1 and K2 linking constants determined by minimizing the quadratic loss function (F), number of iterations, a value of the F function, correlations between anchor item input and estimate *a*-parameter, *b*-parameter, and *c*-parameter, as well as the number of outlier anchor items identified by plotting the input and estimated item parameters along with the line of best fit. Items with an absolute difference of parameters greater than two times the root mean squared difference were considered to be outliers. Overall, the linking results were acceptable and no anchor items were excluded from linking.

Scale Evaluation: The ELA scale developed using only below-grade-level linking items as anchors was evaluated using the same criteria as the scale developed using a concurrent calibration with all linking items included and described in this report. The M1 and M2 transformation constants were derived to place the parameters in the theta metric onto the scale score metric and yield a scale score mean of 500 and a standard deviation of 50 for Grade 5. The M1 and M2 constants were 45.78755 and 500.45788, respectively.

The grade-level scale score means, standard deviations, mean difference between adjacent grades, and grade-level-specific scale bounds are presented in Table C.3. As seen in Table C.3, the scale score means increase as the grade level increases, but the mean differences between grades are not uniform across grade levels. Most growth across grades is observed between Grades 3 and 4, followed by growth between Grades 4 and 5, and between Grades 7 and 8. Less growth is observed between Grades 5 and 6, and between Grades 6 and 7. This growth pattern was found to be similar to the growth pattern observed for the scale established via concurrent calibration with all linking items included. However, the grade separation as indicated by the scale score means was smaller compared to the grade separation observed in concurrent calibration with all linking items included. The standard deviations were relatively uniform across grades, ranging from 45.6 for Grade 3 to 52.5 for Grade 7.

Looking at the scale score distribution at selected percentiles, it was observed that the scale scores increase as the percentile and grade level increase, showing continuous progress upward from Grades 3 through 8 at all selected percentiles except for the 10th and 25th percentiles for Grades 6 and 7. Higher scale scores for Grade 6 at the lower ability end indicate that lower-ability Grade 6 students may perform better on the ELA assessment compared to lower-ability Grade 7 students. This pattern was similar to the one observed for the scale established via concurrent calibration with all linking items included.

Figure C.1 shows TCCs and SE curves for the scale established using only below-grade-level linking items. For clarity of the graph, only one Grade 5 form and only one Grade 8 form were presented in the graph. As demonstrated in Figures 6.3, 6.4, 6.5, and 6.6 of this report, the TCCs and SE curves of the multiple forms in Grades 5 and 8 were well aligned.

As demonstrated in Figure C.1, the TCCs for Grades 3 and 4 are overlapping at the lower- and middle-ability range and crossing at the upper end of the ability scale, indicating that the Grade 3

and 4 tests were of similar difficulty for lower- and medium-ability students and that the Grade 3 test was more difficult than Grade 4 at the upper end of the ability scale. Grades 6, 7, and 8 TCCs, while ordinal in the middle range of the ability scale, are overlapping at the lower and higher ends of the scale, indicating that the tests may be of similar difficulty for lower- and higher-ability students. This TCC pattern is similar to that obtained from the concurrent calibration with all linking items included.

The SE curves in Figure C.2 are U-shaped, as expected, indicating a lower standard errors at the middle of the ability scale and a higher standard error at the lower and upper end of the scale.

C.3 ELA Scale Developed Using Above-Grade-Level Linking Items

Item Calibration: The following item sets were calibrated separately: base Grade 5 data with linking items from Grade 6; Grade 4 data with linking items from Grade 5; Grade 3 data with linking items from Grade 4; Grade 6 data with linking items from Grade 7; Grade 7 data with linking items from Grade 8; and Grade 8 data without any linking items. All items, except for one, converged in the calibration. One item in Grade 8 (Form 2, Writing Prompt, Component C) did not converge and was hand-fitted in Pardux. This item is an operational test item, and item suppression from scoring was not recommended. Item fit was evaluated using the criteria described in Section 6.3.3 of this report. There were 12 items flagged for poor fit across all grades. Table C.5 shows the statistics for each flagged item in separate calibrations with above-grade-level linking items.

Adjacent-Grade Linking: The Stocking and Lord (1983) Test Characteristic Curve (TCC) method was used for linking consecutive grades starting from the base Grade 5. First, Grade 4 was linked to Grade 5 using the common items (from Grade 5) between Grades 4 and 5. This linking placed Grade 4 assessment onto the base-grade scale. Next, Grade 3 was linked to Grade 4 using the common items (from Grade 4) between Grades 3 and 4. This linking placed Grade 3 assessment onto the common scale. Grade 6 was then linked to the common scale using items from Grade 6 administered to Grade 5 students. Grade 7 was linked to Grade 6 using common items between these two grades (Grade 7 items administered to Grade 8 students). Grade 8 assessment was linked to the common scale using a common set of Grade 8 items administered to Grade 7 students. There were 10 or 11 linking items between each pair of adjacent grades.

The linking results were evaluated and are presented in Table C.6. Overall, the linking results were acceptable and no anchor items were excluded from linking.

Scale Evaluation: The ELA scale developed using only above-grade-level linking items as anchors was evaluated using the same criteria as the scale developed using a concurrent calibration with all linking items included and described in this report. The M1 and M2 transformation constants were derived to place the parameters in the theta metric onto the scale score metric and yield a scale score mean of 500 and a standard deviation of 50 for Grade 5. The M1 and M2 constants were 45.74565 and 500.91491, respectively.

The grade-level scale score means, standard deviations, mean difference between adjacent grades, and grade-level-specific scale bounds are presented in Table C.7. As seen in Table C.7,

the scale score means increase as the grade level increases, but the mean differences between grades are not uniform across grade levels. Most growth across grades is observed between Grades 3 and 4, followed by growth between Grades 4 and 5, between Grades 6 and 7, and between Grades 7 and 8. Least growth is observed between Grades 5 and 6. This growth pattern was found to be slightly different from the growth pattern observed for the scale established via concurrent calibration with all linking items included and the scale established using only below-grade level-linking items. The grade separation as indicated by the scale score means was larger compared to the grade separation observed in concurrent calibration with all linking items included for Grades 3-to-4, 4-to-5, 6-to-7, and 7-to-8. However, mean difference between Grades 5 and 6 was smaller for the scale established with linking items from the grade above compared to the scale established with all anchor items. In Table C.7, the standard deviations ranged from approximately 51 for Grade 5 to approximately 43 for Grade 8 and were found to be decreasing between Grades 5 through 8.

Looking at the scale score distribution at selected percentiles, it was observed that the scale scores increase as the percentile and grade level increase, showing continuous progress upward from grades 3 through 8 at all selected percentiles.

As demonstrated in Figure C.3, the TCCs for Grades 3 and 4 are very close to each other at the lower- and middle-ability range and crossing at the upper end of the ability scale, indicating that the Grade 4 test was only slightly more difficult than the Grade 3 test for lower- and medium-ability students, and that the Grade 3 test was more difficult than Grade 4 at the upper end of the ability scale. Grade 4 through 8 TCCs are ordinal for most of the ability range, indicating increasing difficulty as the grade level increases.

The SE curves in Figure C.4 are U-shaped, as expected, indicating a lower standard errors at the middle of the ability scale and a higher standard error at the lower and upper end of the scale.

C.4 Mathematics Scale Developed Using Below-Grade-Level Linking Items

Item Calibration: The separate calibrations, starting from the base Grade 5, were conducted as described in Section C.2 of this appendix. All items, except for one, converged in the calibration. One Mathematics Grade 7 item (item 38) did not converge in calibration and was hand-fitted in Pardux. This item is an operational test item, and item suppression from scoring was not recommended. Item fit was evaluated using the criteria described in Section 6.3.3 of this report. There were seven items flagged for poor fit across all grades. Table C.9 shows the statistics for each flagged item in separate calibrations with below-grade-level linking items.

Adjacent-Grade Linking: The Stocking and Lord (1983) Test Characteristic Curve (TCC) method was used for linking consecutive grades starting from the base Grade 5 as described in Section C.2 of this Appendix. There were ten linking items between each pair of adjacent grades, except for the anchor set of eight items for linking Grades 6 and 7. The linking results are presented in Table C.10. Overall, the linking results were acceptable and no anchor items were excluded from linking.

Scale Evaluation: The Mathematics scale developed using only below-grade-level linking items as anchors was evaluated using the same criteria as the scale developed using the concurrent calibration with all linking items included and described in this report. The M1 and M2 transformation constants were derived to place the parameters in the theta metric onto the scale score metric and yield a scale score mean of 500 and a standard deviation of 50 for Grade 5. The M1 and M2 constants were 41.32231 and 503.30579, respectively.

The grade-level scale score means, standard deviations, mean difference between adjacent grades, and grade-level-specific scale bounds are presented in Table C.11. As seen in Table C.11, the scale score means increase as the grade level increases, but the amount of growth decreases as the grade level increases. The largest growth is observed between Grades 3 and 4 (approximately 20 scale score points) and the least growth (less than 5 scale score points) is seen between Grades 7 and 8. Less growth is observed between Grades 5 and 6, and between Grades 6 and 7. This growth pattern was found to be slightly different from the growth pattern observed for the scale established via concurrent calibration with all linking items included (which showed about the same amount of growth between Grades 5 and 6, and Grades 6 and 7, and relatively no growth between Grades 7 and 8). In Table C.11 the standard deviations are generally larger in lower grades (52 scale score points in Grades 3 and 4) and smaller in higher grades (approximately 40 scale score points in Grade 8).

Looking at the scale score distribution at selected percentiles, it was observed that the scale scores increase as the percentile and grade level increase, showing continuous progress upward from Grades 3 through 8 at all selected percentiles except for the 75th percentile and above for Grade 8. Higher scale scores for Grade 7 at the higher ability end indicate that higher-ability Grade 7 students may perform better on the Mathematics assessment compared to higher-ability Grade 8 students. This pattern was similar to the one observed for the scale established via concurrent calibration with all linking items included. Possible factors contributing to these results are discussed in Chapter 6 of this report.

As shown in Figure C.5, the TCCs for all grades, except Grades 5 and 6, are ordinal, indicating increasing test difficulty as the grade level increases. Grade 5 and 6 TCCs are overlapping, indicating that these two tests may be of the same difficulty. Grade 7 and 8 TCCs are very close to each other, suggesting that the Grade 8 test was only slightly more difficult than the Grade 7 test. This TCC pattern is similar to that obtained from the concurrent calibration with all linking items included.

Figure C.6 shows the SE pattern for all grades. The SE curves U-shaped, as expected, indicating a lower standard error at the middle of the ability scale and a higher standard error at the lower and upper ends of the scale.

C.5 Mathematics Scale Developed Using Above-Grade-Level Linking Items

Item Calibration: The separate calibrations, starting from the base Grade 5, were conducted as described in Section C.3. All items, except for one Grade 7 item (item 38) converged in the calibration. The non-convergent item was hand-fitted in Pardux (note: the same item did not converge in Grade 7 calibration with linking items from Grade 6). As stated in the previous

section, this item is an operational test item, and item suppression from scoring was not recommended. Item fit was evaluated using the criteria described in Section 6.3.3 of this report. There were three items flagged for poor fit across all grades. Table C.13 shows the statistics for each flagged item in separate calibrations with above-grade-level linking items.

Adjacent-Grade Linking: The Stocking and Lord (1983) Test Characteristic Curve (TCC) method was used for linking consecutive grades starting from the base Grade 5 as explained in Section C.3. There were ten linking items between each pair of adjacent grades. The linking results were evaluated and are presented in Table C.14. No anchor items were excluded from linking.

Scale Evaluation: The Mathematics scale developed using only above-grade-level linking items as anchors was evaluated using the same criteria as the scale developed using a concurrent calibration with all linking items included and described in the main body of the report. The M1 and M2 transformation constants were derived to place the parameters in the theta metric onto the scale score metric and yield a scale score mean of 500 and a standard deviation of 50 for Grade 5. The M1 and M2 constants were 40.81630 and 504.08163, respectively.

The grade-level scale score means, standard deviations, mean difference between adjacent grades, and grade-level-specific scale bounds are presented in Table C.15. As seen in Table C.15, the scale score means increase as the grade level increases from Grades 3 to 7, but the amount of growth decreases as the grade level increases. The largest growth is observed between Grades 3 and 4 (approximately 31 scale score points), and the least growth (approximately 13 scale score points) is seen between Grades 6 and 7. No growth is observed between Grades 7 and 8; additionally, the Grade 8 scale score mean was lower by approximately 1 scale score point than the Grade 7 scale score mean. This growth pattern was found to be slightly different from the growth pattern observed for the scale established via concurrent calibration with all linking items included (which showed about the same amount of growth between Grades 5 and 6, and Grades 6 and 7). As seen in Table C.15, the standard deviations are generally smaller in lower grades (39 scale score points in Grade 3) and larger in higher grades (approximately 62 scale score points in Grades 7 and 8). This standard deviation pattern is the opposite of the pattern observed for the Mathematics scale developed using only below-grade-level linking items.

Looking at the scale score distribution at selected percentiles, it was observed that the scale scores increase as the percentile and grade level increase, showing continuous progress upward from Grades 3 through 7 at all selected percentiles. The scale scores for Grade 8 are lower than the scale scores for Grade 7 at all percentiles except for the 50th percentile, at which the scale scores for Grade 8 are equal to the scale scores for Grade 7. The Grade 7 and 8 scale score distribution patterns seem to suggest that Grade 7 students may perform equally well or slightly better on the Mathematics test compared to Grade 8 students.

As demonstrated in Figure C.7, the TCCs for all grades are ordinal for most of the ability range, indicating increasing difficulty as the grade level increases. Some TCC crossover is observed for Grade 5 and 6 TCCs and for Grade 7 and 8 TCCs at the lower end of the ability scale.

The SE curves in Figure C.8 are U-shaped, as expected, indicating a lower standard error at the middle of the ability scale and a higher standard error at the lower and upper ends of the scale.

C.6 Precision of Measurement at the Cut Scores

The last set of the results of vertical scaling, the precision of measurement at the cut scores, was examined after the ELA and Mathematics standard setting during which three cut scores were established for each grade and content area. The established cut scores allow for classification of Missouri students into four achievement levels: *Below Basic*, *Basic*, *Proficient*, and *Advanced*.

The conditional standard error of measurement (CSEM), as described in detail in section 9.2.3 of this report, was examined at the cut scores. Minimizing the CSEM at the cut scores contributes to the accuracy of the student classification into a given achievement level.

The operational test cut scores (set on ELA and Mathematics scales developed via concurrent calibration with all linking items included) were translated into ELA and Mathematics scales, developed using separate calibrations using equipercentile procedure. That is, the cut scores on the ELA and Mathematics scales developed using separate calibrations, were derived in such a way that they yield comparable impact data to those of the operational tests. The CSEMs at the cut scores were examined and compared among the three methods of vertical scale development for each grade level and content area. While the scales developed using the three scaling methods utilized the same data for the operational on-grade level items and the target scale properties were set to be the same (a mean scale score of 500 and a standard deviation of 50) for the base Grade 5 across the three scaling methods, the linking items used in the vertical scale developments were different for each of the scaling methods, resulting in the scale differences and the scale scores from the three methods not being directly comparable. In addition, the variability of scale score distributions across grade levels was found to be different across the scaling methods. Consequently, the resulting CSEMs from the three scaling methods should not be directly compared. The evaluation of the CSEMs across the three scaling methods was, therefore, conducted after the CSEMs in each grade were expressed in the standard deviation units for that grade, for each of the scales.

Tables C.17 and C.18 present the cut scores, the associated CSEMs in scale score points, and the CSEMs expressed in the standard deviation units for each of the vertical scaling methods for ELA and Mathematics, respectively. The magnitude of differences between the CSEMs expressed in the standard deviation units at the corresponding cuts for the operational scales established using concurrent calibration and the scale established using separate calibrations with linking items from the grade below, and between the CSEMs expressed in the standard deviation units at the corresponding cuts for the operational scales established using concurrent calibration and the scale established using separate calibrations with linking items from the grade above were evaluated. For a purpose of this study a difference of 0 to 0.05 between the CSEMs expressed in the standard deviation units at the corresponding cuts across the scaling methods was considered “no difference”, a difference larger than 0.05 was considered a “difference”.

As shown in Tables C.17 and C.18, the CSEMs (expressed in standard deviation units) are comparable at all cuts and across all scaling methods for both ELA and Mathematics. The largest differences of 0.04 were observed at the *Proficient* cut for Grade 7 and the *Basic* cut for Grade 8,

Mathematics, between the scale developed using concurrent calibration with all linking items included and the scale developed using separate calibrations and linking items from the grade below.

C.7 Summary

In summary, the scale properties obtained from a concurrent calibration using linking items from below- and above-grade levels and the scale properties obtained from separate calibrations/chain-linking with either below- or above-grade-level linking items show several common patterns and also a few differences.

The mean scale scores increased as grade level increased regardless of the calibration method and the linking set used. An exception to this pattern was little or no growth occurring between Grades 7 and 8 in Mathematics. This phenomenon is discussed in Section 6.3.4 of this report.

The scale developed using only above-grade-level items tended to result in more growth between grades than the scale from the concurrent calibration with all linking items. The concurrent calibration scale developed with all linking items included, in turn, showed more growth between grades than the scale established using only below-grade-level linking items. This pattern was observed for both ELA and Mathematics.

When all available linking items were used in concurrent calibration, the resulting standard deviations tended to be more uniform across grades for both ELA and Mathematics. A similar pattern was also observed for separate calibrations with below-grade-level linking items for ELA.

On the other hand, when only above-grade-level items were used for linking of ELA tests, the standard deviation of the scale scores tended to be smaller for higher grade levels than for lower grade levels. The choice of linking items also appeared to affect the scale standard deviations for Mathematics. A pattern of decreasing standard deviations as the grade level increased was observed for the scale established using only below-grade-level linking items. The opposite pattern of increasing standard deviations as the grade level increased was noticed for the Mathematics scale developed using only above-grade-level items.

When scale score distributions were examined, a general upward progression of scale scores across Grades 3 through 8 for ELA and across Grades 3 through 7 for Mathematics was observed for all linking options. Again, the exception was the Mathematics Grade 8 scale score distribution, which showed little or no separation from the Grade 7 scale score distribution, particularly at the higher end of the ability scale.

When TCCs were examined, the scaling with above-grade-level linking items resulted in the most desirable TCCs in regard to their ordinality and separation for both ELA and Mathematics. The results from the concurrent calibration with all linking items included and from the separate calibrations and linking using only below-grade-level items were similar to each other. While they resulted in mostly ordinal TCCs, there were exceptions of crossing TCCs (ELA Grades 3 and 4) and overlapping TCCs (Mathematics Grades 5 and 6).

When precision of measurement was considered and the CSEMs at the cut scores were evaluated, little or no differences were found between the scales developed using concurrent calibration and the scales developed using separate calibration with linking items from below grade level, and between the scales developed using concurrent calibration and the scales developed using separate calibration with linking items from above grade level for both ELA and Mathematics.

Taken together, multiple factors were taken into consideration when evaluating the scales. While an argument could be made that the scales developed using only above-grade-level items may be technically superior, based on the largest amount of growth between the grades as indicated by the scale score means and the best ordinality of TCCs, a counterargument can be offered that using only items measuring the concepts the students did not have a chance to learn yet for linking may negatively affect the scale validity.

Including items from below- and above-grade levels for linking purposes provided students with an opportunity to demonstrate their ability on a wider range of the Missouri Learning Standards compared to the linking approach with only below- or only above-grade-level items. Given this content-based factor, as well as the satisfactory results of scaling, the concurrent calibration with all linking items included was determined to be the most appropriate method of vertical scale development for Missouri ELA and Mathematics tests.

Table C.1: Items Flagged for Poor Fit: ELA Separate Calibrations with Below-Grade-Level Linking Items

Item Position in Calib.	Item Grade	Model	ChiSqr	Chi DF	Total N	Z Score	Z Obsd	Z Pred	Obsd-Pred
41	3	2PPC	1080.6	8	69,186	268.15	0.4433	0.4435	-0.0002
14	4	3PL	799.71	7	67,643	211.86	0.7084	0.7102	-0.0017
56	4	2PPC	902.52	8	67,643	223.63	0.5098	0.5111	-0.0013
41	5	2PPC	954.29	8	66,630	236.57	0.4072	0.4098	-0.0026
15	6	2PPC	1048.72	8	63,885	260.18	0.1210	0.1248	-0.0038
36	6	3PL	1104.54	7	63,885	293.33	0.0622	0.0670	-0.0049
35	7	2PPC	1823.22	8	63,467	453.81	0.4567	0.4581	-0.0015
37	7	3PL	660.92	7	63,467	174.77	0.6252	0.6277	-0.0025
38	8	2PPC	1119.31	8	63,458	277.83	0.2666	0.2693	-0.0027

Table C.2: Equating Summary: ELA Linking with Below-Grade-Level Linking Items

Grade	K1	K2	# of Iterations	F Value	Corr A	# of Outliers	Corr B	# of Outliers	Corr C	# of Outliers
3	0.8705	-0.6480	6	0.656179	0.96	0	0.93	0	-0.03	0
4	0.8915	-0.1683	8	0.233596	0.88	0	0.97	0	0.87	0
6	0.8656	0.2557	18	0.443474	0.93	0	0.91	0	0.97	1
7	1.0162	0.3206	21	0.153081	0.84	0	0.50	0	0.53	0
8	0.9954	0.4664	11	0.291158	0.94	1	0.91	0	0.87	0

Table C.3: Scale Properties: ELA Scaling with Below-Grade-Level Linking Items

Grade	Scale Statistics		Mean Difference between Grades (in Scale Score Points)	LOSS	HOSS
	Mean	SD			
3	467.49	45.55		250	730
4	489.52	46.48	22.03	260	740
5	499.90	50.71	10.38	270	780
6	508.22	45.91	8.32	280	790
7	510.71	52.47	2.49	290	800
8	521.12	50.35	10.41	300	830

Table C.4: Scale Score Distribution at Selected Percentiles: ELA Scaling with Below-Grade-Level Linking Items

Grade	Percentile				
	10th	25th	50th	75th	90th
3	411	439	468	497	523
4	430	460	491	520	545
5	436	468	502	534	560
6	451	480	510	539	565
7	443	477	513	547	575
8	458	489	522	554	583

Table C.5: Items Flagged for Poor Fit: ELA Separate Calibrations with Above-Grade-Level Linking Items

Item Position in Calib.	Item Grade	Model	ChiSqr	Chi DF	Total N	Z Score	Z Obsd	Z Pred	Obsd-Pred
41	3	2PPC	1116.93	8	69,186	277.23	0.4433	0.4435	-0.0002
14	4	3PL	873.90	7	67,642	231.69	0.7084	0.7107	-0.0022
56	4	2PPC	888.71	8	67,642	220.18	0.5098	0.5109	-0.0011
61	4	2PPC	100.47	8	7,304	23.12	0.3739	0.3777	-0.0038
41	5	2PPC	935.74	8	66,629	231.94	0.4072	0.4096	-0.0025
77	5	3PL	128.36	7	7,446	32.43	0.0469	0.0506	-0.0038
15	6	2PPC	1065.58	8	63,885	264.40	0.1210	0.1248	-0.0038
36	6	3PL	1075.43	7	63,885	285.55	0.0622	0.0670	-0.0048
70	6	3PL	120.17	7	7,858	30.25	0.5774	0.5817	-0.0043
35	7	2PPC	1834.77	8	63,466	456.69	0.4567	0.4579	-0.0012
37	7	3PL	661.58	7	63,466	174.94	0.6252	0.6275	-0.0023
38	8	2PPC	1086.24	8	63,454	269.56	0.2666	0.2695	-0.0030

Table C.6: Equating Summary: ELA Linking with Above-Grade Level Linking Items

Grade	K1	K2	# of Iterations	F Value	Corr A	# of Outliers	Corr B	# of Outliers	Corr C	# of Outliers
3	0.9170	-1.0340	4	0.370172	0.89	0	0.97	0	0.15	1
4	0.9709	-0.4262	9	0.092993	0.98	0	0.99	0	0.45	0
6	0.8909	0.1981	7	0.898629	0.32	0	0.98	0	0.55	1
7	0.8587	0.5234	24	0.372946	0.85	0	0.62	0	-0.65	0
8	0.8377	0.7771	15	0.615348	0.84	0	0.92	0	0.95	1

Table C.7: Scale Properties: ELA Scaling with Above-Grade-Level Linking Items

Grade	Scale Statistics		Mean Difference between Grades (in Scale Score Points)	LOSS	HOSS
	Mean	SD			
3	448.99	49.03		230	730
4	478.61	50.55	29.62	240	740
5	500.01	50.91	21.40	250	780
6	505.57	47.39	5.56	260	790
7	521.14	44.62	15.57	280	810
8	536.26	42.57	15.12	290	820

Table C.8: Scale Score Distribution at Selected Percentiles: ELA Scaling with Above-Grade-Level Linking Items

Grade	Percentile				
	10th	25th	50th	75th	90th
3	390	420	451	481	508
4	415	448	481	512	539
5	436	468	502	534	560
6	447	476	507	537	564
7	464	492	523	551	575
8	484	510	538	564	588

Table C.9: Items Flagged for Poor Fit: Mathematics Separate Calibrations with Below-Grade-Level Linking Items

Item Position in Calib.	Item Grade	Model	ChiSqr	Chi DF	Total N	Z Score	Z Obsd	Z Pred	Obsd- Pred
42	5	2PPC	5088.82	8	66,811	1270.2	0.4007	0.3981	0.0026
29	6	2PPC	716.03	8	66,337	177.01	0.1391	0.1424	-0.0033
58*	6	2PPC	326.68	8	24,602	79.67	0.1730	0.1748	-0.0019
3	7	3PL	673.70	7	65,135	178.18	0.1579	0.1622	-0.0043
34	7	2PPC	860.01	8	65,135	213.00	0.1178	0.1196	-0.0018
57*	7	3PL	2641.12	7	23,924	704.00	0.1239	0.2398	-0.1159
1*	8	2PPC	433.25	8	26,704	106.31	0.0810	0.0825	-0.0014

Note: * in the first column indicate a linking item

Table C.10: Equating Summary: Mathematics Linking with Below-Grade-Level Linking Items

Grade	K1	K2	# of Iterations	F Value	Corr A	# of Outliers	Corr B	# of Outliers	Corr C	# of Outliers
3	1.0975	-0.8574	19	0.069209	0.89	1	0.98	0	0.82	0
4	1.0621	-0.3782	32	0.279261	0.91	1	0.90	1	0.69	0
6	0.9585	0.0954	28	0.639622	0.80	0	0.99	0	0.98	0
7	0.9138	0.3418	49	1.079371	0.78	1	0.96	0	0.28	1
8	0.6949	0.4695	58	0.095241	0.89	0	0.93	0	0.98	0

Table C.11: Scale Properties: Mathematics Scaling with Below-Grade-Level Linking Items

Grade	Scale Statistics		Mean Difference between Grades (in Scale Score Points)	LOSS	HOSS
	Mean	SD			
3	465.63	52.19		290	650
4	485.65	52.32	20.02	320	680
5	499.97	50.45	14.32	330	710
6	506.07	44.91	6.10	340	730
7	511.55	48.67	5.48	350	740
8	516.15	39.64	4.60	390	770

Table C.12: Scale Score Distribution at Selected Percentiles: Mathematics Scaling with Below-Grade-Level Linking Items

Grade	Percentile				
	10th	25th	50th	75th	90th
3	401	434	468	500	528
4	423	456	489	520	546
5	438	470	503	533	559
6	451	479	509	536	560
7	458	488	516	543	566
8	470	498	521	541	559

Table C.13: Items Flagged for Poor Fit: Mathematics Separate Calibrations with Above-Grade Level Linking Items

Item Position in Calib.	Item Grade	Model	ChiSqr	Chi DF	Total N	Z Score	Z Obsd	Z Pred	Obsd-Pred
13	5	3PL	727.59	7	66,811	192.58	0.7247	0.7202	0.0045
42	5	2PPC	5004.90	8	66,811	1249.23	0.4007	0.3977	0.0029
34	7	2PPC	847.89	8	65,132	209.97	0.1178	0.1196	-0.0019

Table C.14: Equating Summary: Mathematics Linking with Above-Grade-Level Linking Items

Grade	K1	K2	# of Iterations	F Value	Corr A	# of Outliers	Corr B	# of Outliers	Corr C	# of Outliers
3	0.8085	-1.3345	25	0.562189	0.61	0	0.49	0	0.88	0
4	1.0017	-0.5505	46	0.344658	0.84	0	0.96	2	0.95	1
6	1.3245	0.4538	7	0.331747	0.94	1	0.95	1	0.33	1
7	1.2610	0.8948	67	0.981519	0.53	1	0.92	0	0.93	0
8	1.2524	0.9110	43	0.232792	0.84	1	0.91	1	0.85	0

Table C.15: Scale Properties: Mathematics Scaling with Above-Grade-Level Linking Items

Grade	Scale Statistics		Mean Difference between Grades (in Scale Score Points)	LOSS	HOSS
	Mean	SD			
3	448.06	38.63		290	650
4	479.78	49.09	31.72	320	680
5	499.93	50.59	20.15	330	710
6	521.09	59.55	21.16	340	730
7	533.83	62.26	12.74	350	740
8	532.46	62.19	-1.37	390	770

Table C.16: Scale Score Distribution at Selected Percentiles: Mathematics Scaling with Above-Grade-Level Linking Items

Grade	Percentile				
	10th	25th	50th	75th	90th
3	400	425	450	473	494
4	421	452	483	511	536
5	438	471	503	533	559
6	445	484	525	562	594
7	459	500	539	576	607
8	447	497	539	574	606

Table C.17: CSEM at the Cut Scores for all Calibration Methods: English Language Arts

Calibration and Linking Method	Operational Test Concurrent Calibration (All Items)					
Grade	3	4	5	6	7	8
Cut Score Below Basic/Basic	416	436	449	468	476	486
CSEM Below Basic/Basic in Scale Score Points	14	14	15	13	15	14
CSEM Below Basic/Basic in SD Units	0.28	0.28	0.29	0.29	0.28	0.27
Cut Score Basic/Proficient	447	473	488	499	506	518
CSEM Basic/Proficient in Scale Score Points	12	12	12	11	14	12
CSEM Basic/Proficient in SD Units	0.24	0.24	0.23	0.25	0.26	0.23
Cut Score Proficient/Advanced	502	526	541	550	563	570
CSEM Proficient/Advanced in Scale Score Points	14	13	13	14	14	13
CSEM Proficient/Advanced in SD Units	0.28	0.26	0.25	0.32	0.26	0.25
Calibration and Linking Method	Separate Calibration (Linking Items from Grade Below)					
Grade	3	4	5	6	7	8
Cut Score Below Basic/Basic	430	443	449	470	473	480
CSEM Below Basic/Basic in Scale Score Points	13	12	14	13	15	14
CSEM Below Basic/Basic in SD Units	0.29	0.26	0.28	0.28	0.29	0.28
Cut Score Basic/Proficient	457	477	487	500	502	511
CSEM Basic/Proficient in Scale Score Points	11	11	12	11	13	12
CSEM Basic/Proficient in SD Units	0.24	0.24	0.24	0.24	0.25	0.24
Cut Score Proficient/Advanced	506	526	540	551	556	561
CSEM Proficient/Advanced in Scale Score Points	12	13	14	14	13	13
CSEM Proficient/Advanced in SD Units	0.26	0.28	0.28	0.30	0.25	0.26
Calibration and Linking Method	Separate Calibration (Linking Items from Grade Above)					
Grade	3	4	5	6	7	8
Cut Score Below Basic/Basic	409	429	450	466	489	501
CSEM Below Basic/Basic in Scale Score Points	14	13	14	13	12	11
CSEM Below Basic/Basic in SD Units	0.29	0.26	0.27	0.27	0.27	0.26
Cut Score Basic/Proficient	438	465	487	498	514	528
CSEM Basic/Proficient in Scale Score Points	12	12	12	11	11	10
CSEM Basic/Proficient in SD Units	0.24	0.24	0.24	0.23	0.25	0.23
Cut Score Proficient/Advanced	490	518	540	549	559	570
CSEM Proficient/Advanced in Scale Score Points	13	14	14	14	11	11
CSEM Proficient/Advanced in SD Units	0.27	0.28	0.27	0.30	0.25	0.26

Table C.18: CSEM at the Cut Scores for all Calibration Methods: Mathematics

Calibration and Linking Method	Operational Test Concurrent Calibration (All Items)					
Grade	3	4	5	6	7	8
Cut Score Below Basic/Basic	415	438	463	470	482	496
CSEM Below Basic/Basic in Scale Score Points	14	19	20	15	19	19
CSEM Below Basic/Basic in SD Units	0.29	0.34	0.40	0.31	0.38	0.39
Cut Score Basic/Proficient	457	486	508	518	528	544
CSEM Basic/Proficient in Scale Score Points	11	10	11	12	11	11
CSEM Basic/Proficient in SD Units	0.23	0.18	0.22	0.25	0.22	0.22
Cut Score Proficient/Advanced	495	521	544	555	564	572
CSEM Proficient/Advanced in Scale Score Points	12	10	10	10	9	10
CSEM Proficient/Advanced in SD Units	0.25	0.18	0.20	0.21	0.18	0.20
Calibration and Linking Method	Separate Calibration (Linking Items from Grade Below)					
Grade	3	4	5	6	7	8
Cut Score Below Basic/Basic	421	439	464	472	484	501
CSEM Below Basic/Basic in Scale Score Points	14	17	19	14	17	14
CSEM Below Basic/Basic in SD Units	0.27	0.32	0.38	0.31	0.35	0.35
Cut Score Basic/Proficient	466	486	506	517	524	537
CSEM Basic/Proficient in Scale Score Points	12	11	11	11	9	9
CSEM Basic/Proficient in SD Units	0.23	0.21	0.22	0.24	0.18	0.23
Cut Score Proficient/Advanced	507	524	544	551	557	561
CSEM Proficient/Advanced in Scale Score Points	13	11	10	9	8	8
CSEM Proficient/Advanced in SD Units	0.25	0.21	0.20	0.20	0.16	0.20
Calibration and Linking Method	Separate Calibration (Linking Items from Grade Above)					
Grade	3	4	5	6	7	8
Cut Score Below Basic/Basic	416	437	464	475	494	503
CSEM Below Basic/Basic in Scale Score Points	10	16	19	19	23	24
CSEM Below Basic/Basic in SD Units	0.26	0.33	0.38	0.32	0.37	0.39
Cut Score Basic/Proficient	448	480	507	534	550	567
CSEM Basic/Proficient in Scale Score Points	9	10	11	15	13	15
CSEM Basic/Proficient in SD Units	0.23	0.20	0.22	0.25	0.21	0.24
Cut Score Proficient/Advanced	478	515	543	581	594	609
CSEM Proficient/Advanced in Scale Score Points	9	10	10	12	11	14
CSEM Proficient/Advanced in SD Units	0.23	0.20	0.20	0.20	0.18	0.23

In Figures C.1 to C.8 the TCCs and the SE curves are color-coded as follows:
Grade 3=Blue; Grade 4=Pink, Grade 5 Form 1=Green; Grade 6=Brown; Grade 7=Dark Blue; Grade 8=Lime.

Figure C.1: TCCs: ELA Scaling with Below-Grade-Level Linking Items

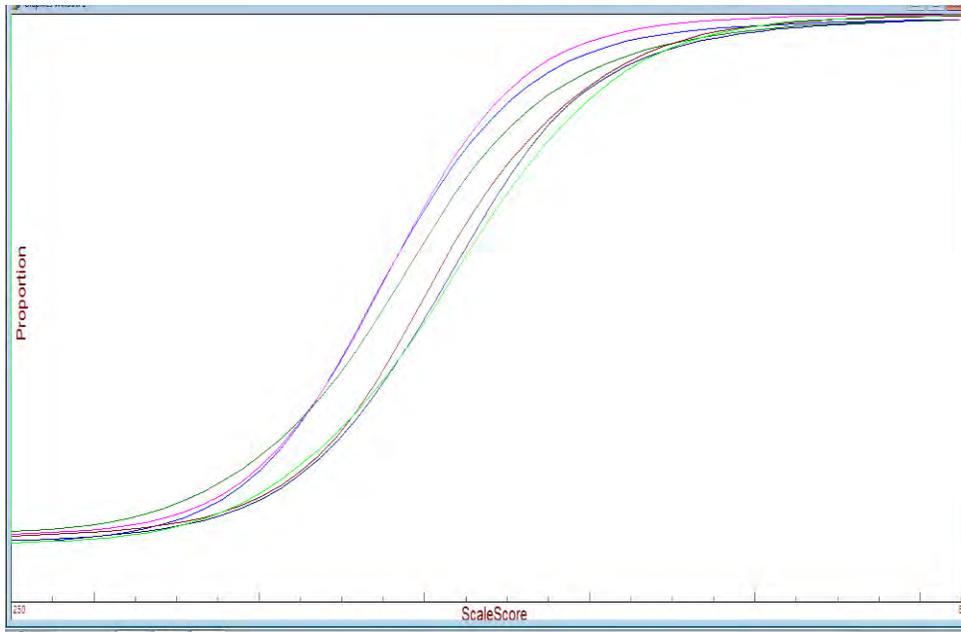


Figure C.2: SE Curves: ELA Scaling with Below-Grade-Level Linking Items

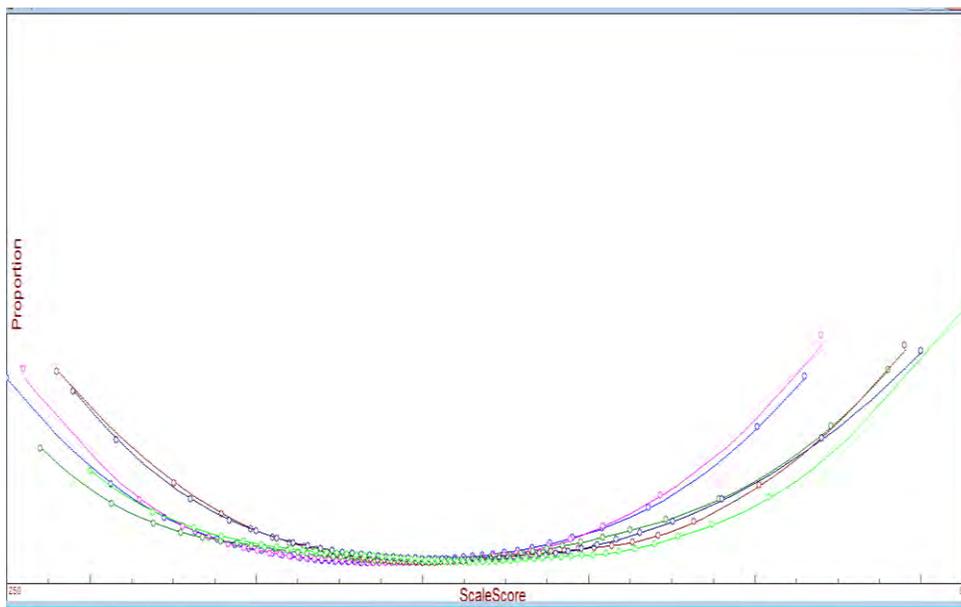


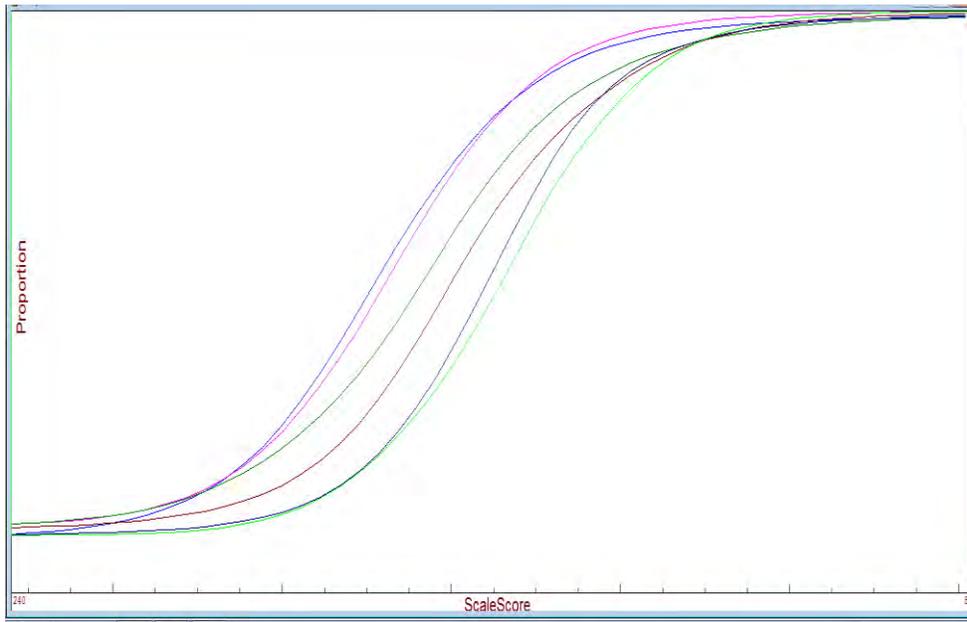
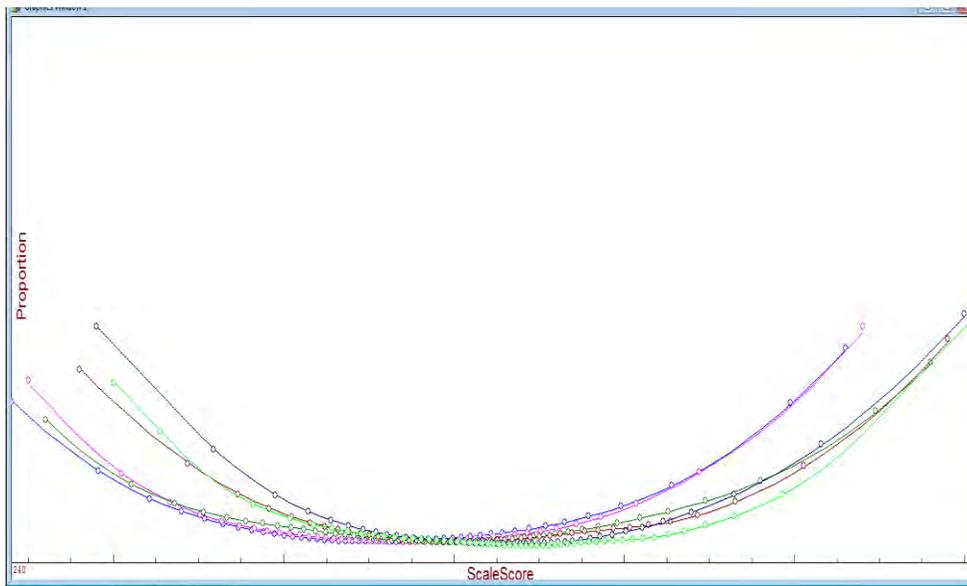
Figure C.3: TCCs: ELA Scaling with Above-Grade-Level Linking Items**Figure C.4: SE Curves: ELA Scaling with Above-Grade-Level Linking Items**

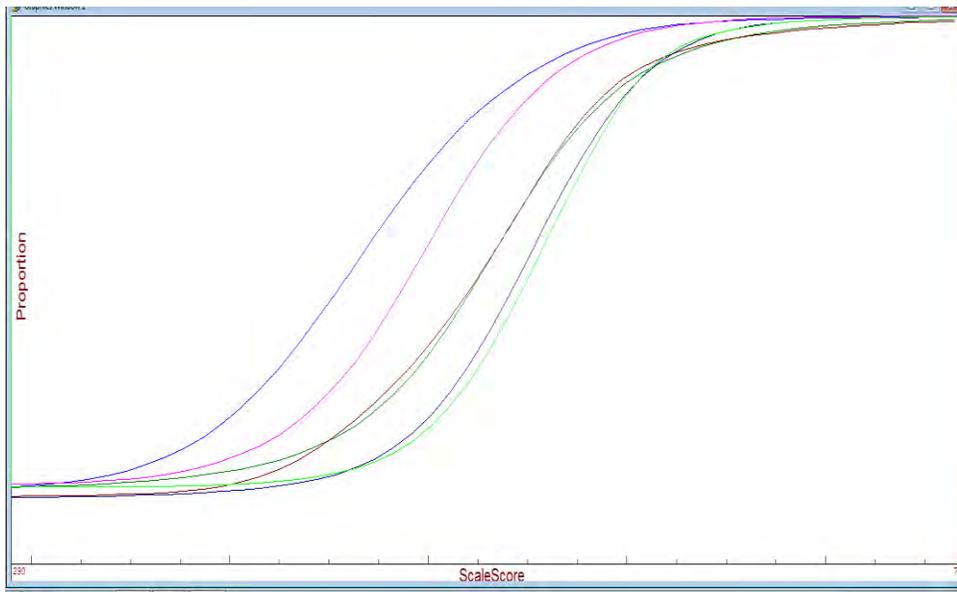
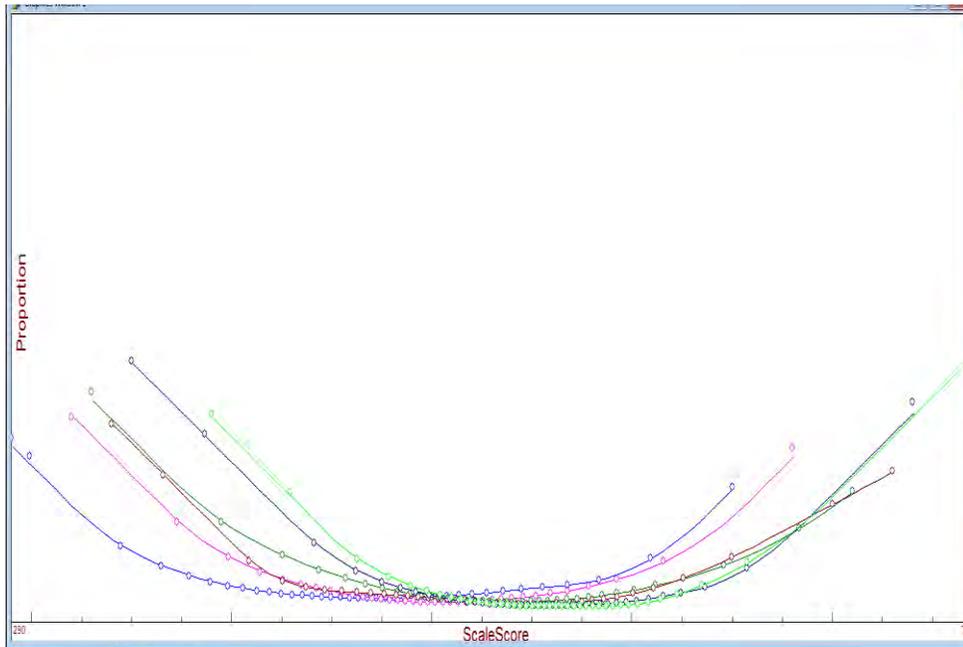
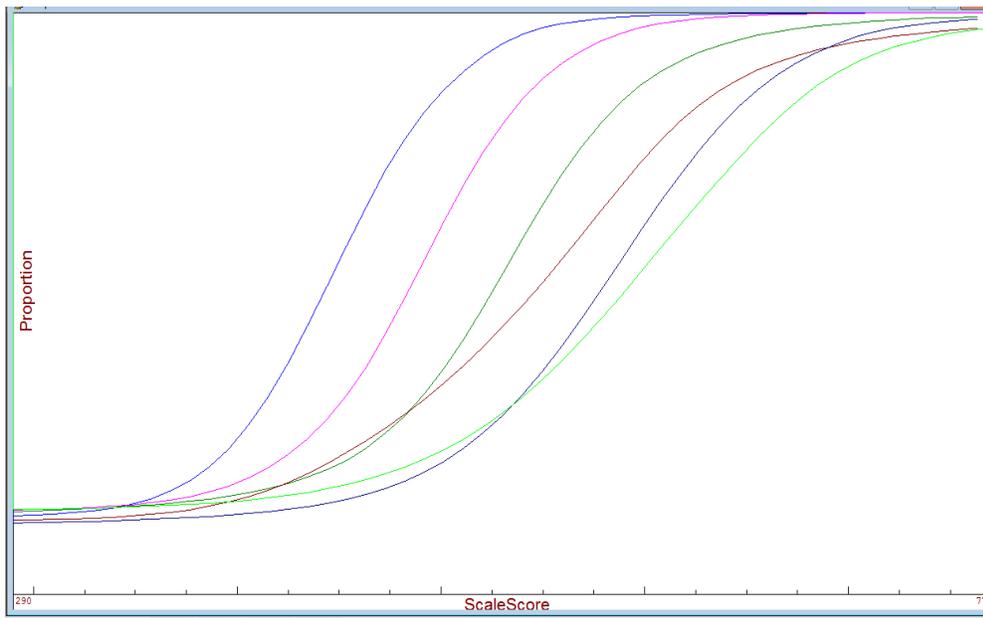
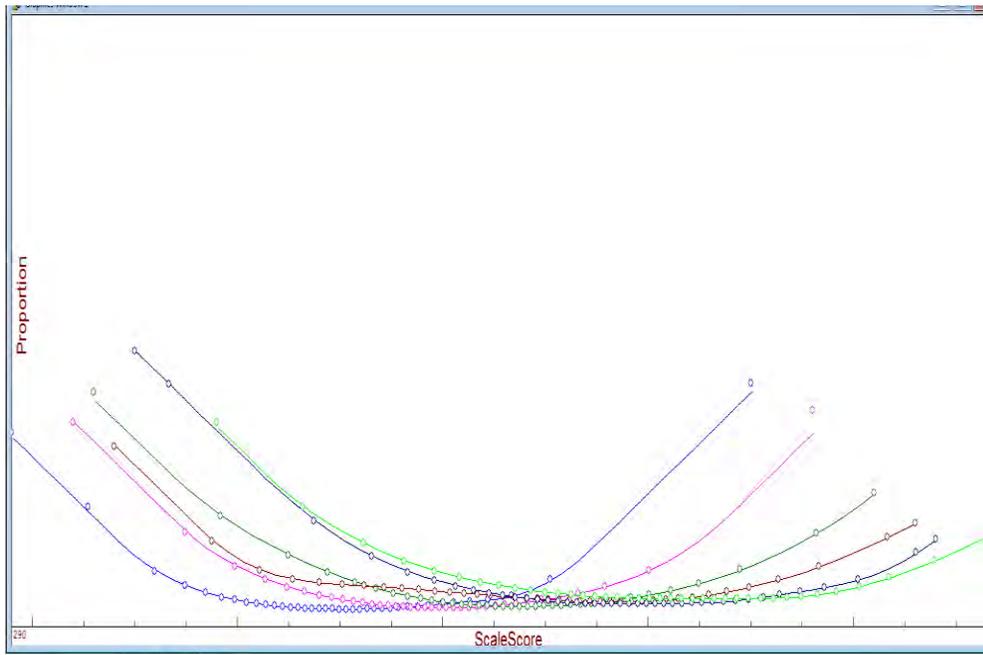
Figure C.5: TCCs: Mathematics Scaling with Below-Grade-Level Linking Items**Figure C.6: SE Curves: Mathematics Scaling with Below-Grade-Level Linking Items**

Figure C.7: TCCs: Mathematics Scaling with Above-Grade-Level Linking Items**Figure C.8: SE Curves: Mathematics Scaling with Above-Grade-Level Linking Items**

Appendix D: MAP Guide to Interpreting Results

Missouri Assessment Program Grade-Level Assessments



Guide to Interpreting Results

Summative Assessments
*English Language Arts,
Mathematics, and Science*

August 2016

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This guide has been prepared by Data Recognition Corporation (DRC) to provide an overview for interpreting reports generated from the Missouri Assessment Program (MAP). It is intended to help educators apply MAP data to the needs of individual students and the district as a whole.

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INTRODUCTION

Educational Assessment: A Primary Tool

Assessment, or testing, fulfills a vital role in today's educational environment. Assessment results often are a major force in shaping public perceptions about the capabilities of our students and the quality of our schools. As a primary tool for educators and policymakers, assessment is used for many important purposes. Educators use assessment results to help improve teaching and learning and to evaluate programs and schools. Policy decisions are often based, in part, on assessment data. Because of its important role, educational assessment is used in every school, district, and state. It is vital to innovation, higher standards, and educational excellence.

Originally developed in response to Missouri's Outstanding Schools Act of 1993, the **Missouri Assessment Program (MAP)** encompasses several statewide assessments that meet state and federal statutory requirements. **MAP Grade-Level Assessments** are administered to students in grades 3 through 8 to determine their progress toward the Show-Me Standards/Missouri Learning Standards. As directed by the Outstanding Schools Act, the Show-Me Standards were developed by the Missouri Department of Elementary and Secondary Education (DESE), in cooperation with teachers, school administrators, parents, and business professionals throughout the state, to identify the knowledge, skills, and competencies that Missouri students should acquire prior to graduating from high school. For a more detailed explanation of the Show-Me Standards, refer to the DESE website (<http://dese.mo.gov/show-me-standards>). The Missouri Learning Standards articulate the Show-Me Standards in each content area across the grade levels. MAP Grade-Level Assessment items are aligned with the Missouri Learning Standards, which are available on the DESE website (<http://dese.mo.gov/college-career-readiness/curriculum/missouri-learning-standards>).

The spring 2016 Grade-Level MAP includes the following required assessments:

English Language Arts (ELA)—Grades 3–8

Mathematics—Grades 3–8

Science—Grades 5 and 8

The ELA assessments for students in grades 3, 4, 6, and 7 required approximately 1½ to 2½ hours of test administration time. The ELA assessments for students in grades 5 and 8 required approximately 2½ to 4 hours. The Mathematics assessments for students in grades 3–5 required approximately 1 to 1½ hours of test administration time. The Mathematics assessments for students in grades 6–8 required approximately 1½ to 2 hours. In addition, students in grades 5 and 8 took a Science assessment that required an additional 2 to 2½ hours of test administration. All assessments were administered online, unless students required a Braille, Large Print, or paper/pencil form as an accommodation.

For all grade levels (3 through 8), the MAP Grade-Level Assessments in ELA and Mathematics include multiple item types. **Selected-response items** (also known as multiple-choice) present students with a question followed by three or more response options. **Short-text items** require students to type an appropriate response. **Technology-enhanced items** use innovative technology to allow students to demonstrate their knowledge in ways that are not possible using paper/pencil assessments. For example, the items may require students to drag and drop data into a table, click on "hot spots" within a graphic, or indicate their response on a grid. Short-text items are scored by trained readers using specific criteria. Trained readers are always humans, not machines. Some technology-enhanced items (for example, matching interaction) are machine scorable. Others are scored by trained readers.

The ELA assessments in grades 5 and 8 also include a **writing prompt**. Writing prompts are a special type of performance event in which a student demonstrates their proficiency at writing. The ELA writing prompt is scored by trained human readers using a 10-point rubric that evaluates purpose and organization, evidence and elaboration, and conventions. Additional information on the rubrics for the writing process can be found on the DESE website (<http://dese.mo.gov/college-career-readiness/curriculum/english-language-arts/ela-assessment-resources>).

The MAP Grade-Level Assessments in Science include selected-response items, as well as **constructed-response items**, which require students to supply their answer (similar to short-text items), and **performance events**. Science performance events require students to provide an extended response, and require students to apply their knowledge and understanding in real-life situations. Science constructed-response items and performance events are scored by trained readers using established scoring criteria.

The Department uses the information obtained through MAP to monitor the progress of Missouri's students toward meeting the Show-Me Standards in order to inform the public and the state legislature about student performance and to help make informed decisions about educational issues. The information obtained through MAP provides the academic performance data that drive student services throughout the state. The **MAP Grade-Level Assessment reports** provide useful information for determining the performance of individual students, as well as student performance at the classroom, building, and district levels.

ASSESSMENT TERMS AND TYPES OF SCORES

Familiarity with the testing terms and the types of scores used in the MAP reports and other components will help you interpret test information accurately and efficiently.

MAP Scale Score

Data Recognition Corporation (DRC), the MAP Grade-Level Assessments testing vendor, uses the student's correct responses to derive a MAP scale score. The scale score describes achievement on a continuum that in most cases spans the complete range of grades 3–8. These scores range in value from 470 to 895 for Science. The English Language Arts and Mathematics score range values will be available by September 1, 2016.

Achievement Levels

Student performance can be reported in terms of four performance, or achievement, levels that describe a pathway to proficiency and college and career readiness. Each achievement level represents standards of performance for each assessed content area (English Language Arts, Mathematics, and Science). Panels drawn from education, business, and professional communities determined the achievement standards. Achievement-level scores provide a description of what students can do in terms of the content and skills assessed, as described in the Missouri Learning Standards.

Lowest Obtainable Scale Score and Level Not Determined

Within each grade level and content area, a Lowest Obtainable Scale Score (LOSS) is established for students whose scores are below the level expected by guessing. Students with certain accommodations that impact the construct being assessed (e.g., read-aloud of ELA passages for students in grades 3–5) also receive a LOSS.

A student may receive "Level Not Determined" (LND) instead of a MAP scale score. Students who receive LND are not assigned to an achievement level. Students may receive LND for either of the following reasons:

- A student does not attempt any items in one or more content areas of the MAP test.
- A student is absent for all testing sessions for a particular content area.

Standard Error of Measurement

No test provides a perfect measure of a student's ability. This situation is expected because all tests have a known Standard Error of Measurement (SEM). The SEM reports the amount of variability that can be expected in a student's test score due to the inherent imprecision of the test. The SEM for the MAP test will be reported in the 2016 MAP Technical Report.

ACHIEVEMENT-LEVEL DESCRIPTORS

English Language Arts, Reporting Achievement-Level Descriptors

Grade 3

Below Basic

Students performing at the Below Basic level on the Missouri Assessment Program demonstrate a minimal command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills inconsistently and/or incorrectly in reading processes responding to literary and informational texts, and in writing. Students performing at the Below Basic level use few strategies to comprehend and interpret texts, demonstrate little understanding of literary forms, and apply few strategies for accessing information. They demonstrate little or no ability to organize and/or develop writing, or exhibit little command of the conventions of standard English.

MAP score range: 230–415

Basic

Students performing at the Basic level on the Missouri Assessment Program demonstrate a partial or uneven command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills inconsistently in reading processes responding to both literary and informational texts, and in writing. In addition to demonstrating, understanding, and applying the skills at the Below Basic level, students performing at the Basic level use some strategies to comprehend and interpret a variety of texts, demonstrate a partial understanding of literary forms, and inconsistently apply some strategies for accessing and summarizing information. They demonstrate an inconsistent ability to organize and/or develop writing and exhibit an inconsistent command of the conventions of standard English.

MAP score range: 416–446

Proficient

Students performing at the Proficient level on the Missouri Assessment Program demonstrate an adequate command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills consistently and competently in reading processes in responding to literary and informational text, and in writing. In addition to demonstrating, understanding, and applying the skills at the Basic level, students performing at the Proficient level use a range of strategies to comprehend and interpret a variety of texts, demonstrate an understanding of literary forms, and apply strategies for accessing and summarizing information. They demonstrate an adequate ability to organize and develop writing and exhibit a competent command of the conventions of standard English.

MAP score range: 447–501

Advanced

Students performing at the Advanced level on the Missouri Assessment Program consistently demonstrate a thorough command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills consistently and skillfully in reading processes in responding to literary and informational text, and in writing efficiently. In addition to demonstrating, understanding, and applying the skills at the Proficient level, students performing at the Advanced level use a wide range of strategies to comprehend and interpret a variety of texts, demonstrate a complete and thorough understanding of literary forms, and skillfully apply a wide range of different strategies for accessing and summarizing information. They demonstrate an effective and thorough ability to organize and develop writing and exhibit an adequate command of the conventions of standard English.

MAP score range: 502–730

Grade 4

Below Basic

Students performing at the Below Basic level on the Missouri Assessment Program demonstrate a minimal command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills inconsistently and/or incorrectly in reading processes responding to literary and informational texts, and in writing. Students performing at the Below Basic level use few strategies to comprehend and interpret texts, demonstrate little understanding of literary forms, and apply few strategies for accessing information. They demonstrate little or no ability to organize and/or develop writing, or exhibit little command of the conventions of standard English.

MAP score range: 240–435

Basic

Students performing at the Basic level on the Missouri Assessment Program demonstrate a partial or uneven command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills inconsistently in reading processes responding to both literary and informational texts, and in writing. In addition to demonstrating, understanding, and applying the skills at the Below Basic level, students performing at the Basic level use some strategies to comprehend and interpret a variety of texts, demonstrate a partial understanding of literary forms, and inconsistently apply some strategies for accessing and summarizing information. They demonstrate an inconsistent ability to organize and/or develop writing and exhibit an inconsistent command the conventions of standard English.

MAP score range: 436–472

Proficient

Students performing at the Proficient level on the Missouri Assessment Program demonstrate an adequate command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills consistently and competently in reading processes in responding to literary and informational text, and in writing. In addition to demonstrating, understanding, and applying the skills at the Basic level, students performing at the Proficient level use a range of strategies to comprehend and interpret a variety of texts, demonstrate an understanding of literary forms, and apply strategies for accessing and summarizing information. They demonstrate an adequate ability to organize and develop writing and exhibit a competent command of the conventions of standard English.

MAP score range: 473–525

Advanced

Students performing at the Advanced level on the Missouri Assessment Program consistently demonstrate a thorough command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills consistently and skillfully in reading processes in responding to literary and informational text, and in writing efficiently. In addition to demonstrating, understanding, and applying the skills at the Proficient level, students performing at the Advanced level use a wide range of strategies to comprehend and interpret a variety of texts, demonstrate a complete and thorough understanding of literary forms, and consistently apply a wide range of different strategies for accessing and summarizing information. They demonstrate an effective and thorough ability to organize and develop writing and exhibit an adequate command of the conventions of standard English.

MAP score range: 526–740

Grade 5

Below Basic

Students performing at the Below Basic level on the Missouri Assessment Program demonstrate a minimal command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills inconsistently and/or incorrectly in reading processes responding to literary and informational texts, and in writing. Students performing at the Below Basic level use few strategies to comprehend and interpret texts, demonstrate little understanding of literary forms, and apply few strategies for accessing information. They demonstrate little or no ability to organize and/or develop writing, or exhibit little command of the conventions of standard English.

MAP score range: 250–448

Basic

Students performing at the Basic level on the Missouri Assessment Program demonstrate a partial or uneven command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills inconsistently in reading processes responding to both literary and informational texts, and in writing. In addition to demonstrating, understanding, and applying the skills at the Below Basic level, students performing at the Basic level use some strategies to comprehend and interpret a variety of texts, demonstrate a partial understanding of literary forms, and inconsistently apply some strategies for accessing and summarizing information. They demonstrate an inconsistent ability to organize and/or develop writing and exhibit an inconsistent command the conventions of standard English.

MAP score range: 449–487

Proficient

Students performing at the Proficient level on the Missouri Assessment Program demonstrate an adequate command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills consistently and competently in reading processes in responding to literary and informational text, and in writing. In addition to demonstrating, understanding, and applying the skills at the Basic level, students performing at the Proficient level use a range of strategies to comprehend and interpret a variety of texts, demonstrate an understanding of literary forms, and apply strategies for accessing and summarizing information. They demonstrate an adequate ability to organize and develop writing and exhibit a competent command of the conventions of standard English.

MAP score range: 488–540

Advanced

Students performing at the Advanced level on the Missouri Assessment Program consistently demonstrate a thorough command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills consistently and skillfully in reading processes in responding to literary and informational text, and in writing efficiently. In addition to demonstrating, understanding, and applying the skills at the Proficient level, students performing at the Advanced level use a wide range of strategies to comprehend and interpret a variety of texts, demonstrate a thorough understanding of literary forms, and consistently apply a wide range of different strategies for accessing and summarizing information. They demonstrate an effective and thorough ability to organize and develop writing and exhibit an adequate command of the conventions of standard English.

MAP score range: 541–780

Grade 6

Below Basic

Students performing at the Below Basic level on the Missouri Assessment Program demonstrate a minimal command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills inconsistently and/or incorrectly in reading processes responding to literary and informational texts, and in writing. Students performing at the Below Basic level use few strategies to comprehend and interpret texts, demonstrate little understanding of literary forms, and apply few strategies for accessing information. They demonstrate little or no ability to organize and/or develop writing, or exhibit little command of the conventions of standard English.

MAP score range: 260–467

Basic

Students performing at the Basic level on the Missouri Assessment Program demonstrate a partial or uneven command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills inconsistently in reading processes responding to both literary and informational texts, and in writing. In addition to demonstrating, understanding, and applying the skills at the Below Basic level, students performing at the Basic level use some strategies to comprehend and interpret a variety of texts, demonstrate a partial understanding of literary forms, and inconsistently apply few strategies for accessing and summarizing information. They demonstrate an inconsistent ability to organize and/or develop writing and exhibit an inconsistent command of the conventions of standard English.

MAP score range: 468–498

Proficient

Students performing at the Proficient level on the Missouri Assessment Program demonstrate an adequate command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills consistently and competently in reading processes in responding to literary and informational text, and in writing. In addition to demonstrating, understanding, and applying the skills at the Basic level, students performing at the Proficient level use a range of strategies to comprehend and interpret a variety of texts, demonstrate an understanding of literary forms, and apply strategies for accessing and summarizing information. They demonstrate an adequate ability to organize and develop writing and exhibit a competent command of the conventions of standard English.

MAP score range: 499–549

Advanced

Students performing at the Advanced level on the Missouri Assessment Program consistently demonstrate a thorough command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills consistently and skillfully in reading processes in responding to literary and informational text, and in writing efficiently. In addition to demonstrating, understanding, and applying the skills at the Proficient level, students performing at the Advanced level use a wide range of strategies to comprehend and interpret a variety of texts, demonstrate a complete and thorough understanding of literary forms, and consistently apply a wide range of different strategies for accessing and summarizing information. They demonstrate an effective and thorough ability to organize and develop writing and exhibit an adequate command of the conventions of standard English.

MAP score range: 550–790

Grade 7

Below Basic

Students performing at the Below Basic level on the Missouri Assessment Program demonstrate a minimal command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills inconsistently and/or incorrectly in reading processes responding to literary and informational texts, and in writing. Students performing at the Below Basic level use few strategies to comprehend and interpret texts, demonstrate little understanding of literary forms, and apply few strategies for accessing information. They demonstrate little or no ability to organize and/or develop writing, or exhibit little command of the conventions of standard English.

MAP score range: 280–475

Basic

Students performing at the Basic level on the Missouri Assessment Program demonstrate a partial or uneven command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills inconsistently in reading processes responding to both literary and informational texts, and in writing. In addition to demonstrating, understanding, and applying the skills at the Below Basic level, students performing at the Basic level use some strategies to comprehend and interpret a variety of texts, demonstrate a partial understanding of literary forms, and inconsistently apply few strategies for accessing and summarizing information. They demonstrate an inconsistent ability to organize and/or develop writing and exhibit an inconsistent command the conventions of standard English.

MAP score range: 476–505

Proficient

Students performing at the Proficient level on the Missouri Assessment Program demonstrate an adequate command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills consistently and competently in reading processes in responding to literary and informational text, and in writing. In addition to demonstrating, understanding, and applying the skills at the Basic level, students performing at the Proficient level use a range of strategies to comprehend and interpret a variety of texts, demonstrate an understanding of literary forms, and apply strategies for accessing and summarizing information. They demonstrate an adequate ability to organize and develop writing and exhibit a competent command of the conventions of standard English.

MAP score range: 506–562

Advanced

Students performing at the Advanced level on the Missouri Assessment Program consistently demonstrate a thorough command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills consistently and skillfully in reading processes in responding to literary and informational text, and in writing efficiently. In addition to demonstrating, understanding, and applying the skills at the Proficient level, students performing at the Advanced level use a wide range of strategies to comprehend and interpret a variety of texts, demonstrate a thorough understanding of literary forms, and consistently apply a wide range of different strategies for accessing and summarizing information. They demonstrate an effective and thorough ability to organize and develop writing and exhibit an adequate command of the conventions of standard English.

MAP score range: 563–810

Grade 8

Below Basic

Students performing at the Below Basic level on the Missouri Assessment Program demonstrate a minimal command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills inconsistently and/or incorrectly in reading processes responding to literary and informational texts, and in writing. Students performing at the Below Basic level use few strategies to comprehend and interpret texts, demonstrate little understanding of literary forms, and apply few strategies for accessing information. They demonstrate little or no ability to organize and/or develop writing, or exhibit little command of the conventions of standard English.

MAP score range: 290–485

Basic

Students performing at the Basic level on the Missouri Assessment Program demonstrate a partial or uneven command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills inconsistently in reading processes responding to both literary and informational texts, and in writing. In addition to demonstrating, understanding, and applying the skills at the Below Basic level, students performing at the Basic level use some strategies to comprehend and interpret a variety of texts, demonstrate a partial understanding of literary forms, and inconsistently apply few strategies for accessing and summarizing information. They demonstrate an inconsistent ability to organize and/or develop writing, and exhibit an inconsistent command of the conventions of standard English.

MAP score range: 486–517

Proficient

Students performing at the Proficient level on the Missouri Assessment Program demonstrate an adequate command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills consistently and competently in reading processes in responding to literary and informational text, and in writing. In addition to demonstrating, understanding, and applying the skills at the Basic level, students performing at the Proficient level use a range of strategies to comprehend and interpret a variety of texts, demonstrate an understanding of literary forms, and apply strategies for accessing and summarizing information. They demonstrate an adequate ability to organize and develop writing and exhibit a competent command of the conventions of standard English.

MAP score range: 518–569

Advanced

Students performing at the Advanced level on the Missouri Assessment Program consistently demonstrate a thorough command of the skills and processes identified in the Missouri Learning Standards. They demonstrate these skills consistently and skillfully in reading processes in responding to literary and informational text, and in writing efficiently. In addition to demonstrating, understanding, and applying the skills at the Proficient level, students performing at the Advanced level use a wide range of strategies to comprehend and interpret a variety of texts, demonstrate a thorough understanding of literary forms, and consistently apply a wide range of different strategies for accessing and summarizing information. They demonstrate an effective and thorough ability to organize and develop writing and exhibit an adequate command of the conventions of standard English.

MAP score range: 570–820

Mathematics, Reporting Achievement-Level Descriptors

Grade 3

Below Basic

Students do not yet demonstrate proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students need substantial academic support to be prepared for the next grade level or course and to be on track for *college and career readiness*.

MAP score range: 290–414

Basic

Students demonstrate partial proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students need additional academic support to ensure success in the next grade level or course and to be on track for *college and career readiness*.

MAP score range: 415–456

Proficient

Students demonstrate proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students are prepared for the next grade level or course and are on track for *college and career readiness*.

MAP score range: 457–494

Advanced

Students demonstrate advanced proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students are well prepared for the next grade level or course and are well prepared for *college and career readiness*.

MAP score range: 495–650

Grade 4

Below Basic

Students do not yet demonstrate proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students need substantial academic support to be prepared for the next grade level or course and to be on track for *college and career readiness*.

MAP score range: 320–437

Basic

Students demonstrate partial proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students need additional academic support to ensure success in the next grade level or course and to be on track for *college and career readiness*.

MAP score range: 438–485

Proficient

Students demonstrate proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students are prepared for the next grade level or course and are on track for *college and career readiness*.

MAP score range: 486–520

Advanced

Students demonstrate advanced proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students are well prepared for the next grade level or course and are well prepared for *college and career readiness*.

MAP score range: 521–680

Grade 5

Below Basic

Students do not yet demonstrate proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students need substantial academic support to be prepared for the next grade level or course and to be on track for *college and career readiness*.

MAP score range: 340–462

Basic

Students demonstrate partial proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students need additional academic support to ensure success in the next grade level or course and to be on track for *college and career readiness*.

MAP score range: 463–507

Proficient

Students demonstrate proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students are prepared for the next grade level or course and are on track for *college and career readiness*.

MAP score range: 508–543

Advanced

Students demonstrate advanced proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students are well prepared for the next grade level or course and are well prepared for *college and career readiness*.

MAP score range: 544–710

Grade 6

Below Basic

Students do not yet demonstrate proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students need substantial academic support to be prepared for the next grade level or course and to be on track for *college and career readiness*.

MAP score range: 350–469

Basic

Students demonstrate partial proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students need additional academic support to ensure success in the next grade level or course and to be on track for *college and career readiness*.

MAP score range: 470–517

Proficient

Students demonstrate proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students are prepared for the next grade level or course and are on track for *college and career readiness*.

MAP score range: 518–554

Advanced

Students demonstrate advanced proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students are well prepared for the next grade level or course and are well prepared for *college and career readiness*.

MAP score range: 555–730

Grade 7***Below Basic***

Students do not yet demonstrate proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students need substantial academic support to be prepared for the next grade level or course and to be on track for *college and career readiness*.

MAP score range: 360–481

Basic

Students demonstrate partial proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students need additional academic support to ensure success in the next grade level or course and to be on track for *college and career readiness*.

MAP score range: 482–527

Proficient

Students demonstrate proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students are prepared for the next grade level or course and are on track for *college and career readiness*.

MAP score range: 528–563

Advanced

Students demonstrate advanced proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students are well prepared for the next grade level or course and are well prepared for *college and career readiness*.

MAP score range: 564–740

Grade 8***Below Basic***

Students do not yet demonstrate proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students need substantial academic support to be prepared for the next grade level or course and to be on track for *college and career readiness*.

MAP score range: 390–495

Basic

Students demonstrate partial proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students need additional academic support to ensure success in the next grade level or course and to be on track for *college and career readiness*.

MAP score range: 496–543

Proficient

Students demonstrate proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students are prepared for the next grade level or course and are on track for *college and career readiness*.

MAP score range: 544–571

Advanced

Students demonstrate advanced proficiency in the knowledge and skills necessary at this grade level/course of learning, as specified in content expectations. These students are well prepared for the next grade level or course and are well prepared for *college and career readiness*.

MAP score range: 572–770

Science, Abbreviated Achievement-Level Descriptors

Grade 5

Below Basic

Students identify the relationship between mass and force; classify bodies of water; identify weather instruments and their uses; identify characteristics of the solar system; compare amounts/measurements given in a simple format; identify appropriate tools for simple scientific measurements; identify how technological advances may be helpful to humans.

MAP score range: 470–625

Basic

Students explain the relationship between mass and force; describe how specialized body structures help animals survive; match environments to the plants and animals they support; identify environmental problems and find solutions; determine the appropriate scientific tool and its function in an investigation; determine how technological advances address problems and enhance life.

MAP score range: 626–668

Proficient

Students describe changes in properties of matter; identify uses of simple machines; explain how work is done; identify forces of magnetism; describe the motion of objects; identify plant parts and their functions; classify vertebrates and invertebrates; classify producers, consumers, or decomposers; predict changes in food chains; identify the effects of human activities on other organisms; describe the Sun as a source of light and heat, or the moon as a reflector of light; explain the day/night cycle; interpret data; distinguish between man-made and natural objects; apply problem solving skills to a situation.

MAP score range: 669–691

Advanced

Students identify energy transformations; predict the effect of heat energy on water; diagram a complete electrical circuit; predict how simple machines affect the force needed to do work; describe the effects of weathering and erosion on Earth's surface; describe relationships in weather data; explain how the Sun's position and the length and position of shadows relate to the time of day; interpret and apply knowledge from a data table; identify appropriate steps and tools in an investigation.

MAP score range: 692–855

Grade 8

Below Basic

Students identify simple terms related to matter and energy; demonstrate beginning understanding of properties of light and how it travels; identify structures of plants and animals needed for survival; identify levels of organization in multicellular organisms; read simple graphs and make simple data comparisons.

MAP score range: 540–670

Basic

Students identify an example of a force; demonstrate simple understanding of how traits are passed from one generation to the next; have a basic understanding of climate; identify a simple hypothesis; recognize a trend in a data table; demonstrate some awareness of how various factors influence and are influenced by science and technology.

MAP score range: 671–702

Proficient

Students classify types of motion; calculate the speed of an object; demonstrate simple understanding of life processes; classify and/or show relationships between organisms; explain how adaptations help organisms survive; explain how species are affected by environmental change; understand and describe a food web; explain rock and fossil evidence of changes in the Earth; explain how Earth's systems interact; draw conclusions from tables or graphs; demonstrate basic understanding of the solar system; recognize the need for, and calculate, averages; use appropriate tools and methods to collect data; describe tools and discoveries that advance scientific knowledge.

MAP score range: 703–734

Advanced

Students explain the physical and chemical properties of matter; apply knowledge of energy and energy transfer; demonstrate understanding of physical and chemical processes of organisms; evaluate the effects of balanced and unbalanced forces; predict the impact of environmental change in ecosystems; justify how adaptations help organisms survive; demonstrate understanding of the water cycle; compare and contrast weather and climate; explain the cause of seasons on Earth; demonstrate understanding of the solar system; apply the concept of light years; apply awareness of the influence of science and technology in society.

MAP score range: 735–895

SAMPLE REPORTS

Individual Student Report (ISR)

The Individual Student Report (ISR) provides information about performance on the MAP Grade-Level Assessments, describing results in terms of four levels of achievement in a content area. This information may be used for instructional planning, as a point of reference during a parent/teacher conference, and for permanent record keeping. Other sources of information, such as classroom performance, should be used along with this report when determining the student's areas of strength or need.

Achievement-level scores describe what students can do in terms of the content and skills assessed by the MAP. Because the English Language Arts and Mathematics Missouri Learning Standards are grounded in expectations for college and career readiness, the MAP Grade-Level Assessments are designed to measure each student's progress toward meeting those expectations. Teachers, students, and parents/guardians can use this information in addition to how the student performs in the classroom to determine what skills and abilities need to be acquired to enable the student to progress to higher achievement levels. A student in the Proficient or Advanced level has met the standard. Students in the Below Basic and Basic levels have typically mastered skills described for their levels, but need to work on skills in higher levels.

The following page contains a sample Individual Student Report.

- ❶ **Student Report for:** This area of the report is reserved for the name and biographical data of the student taking the assessment.
- ❷ **How did your child perform?** This is your child's scale score. The scale score is also printed in the left column under "Overview of Performance."
- ❸ **Your child's achievement level is Proficient.** Achievement levels (whether Advanced, Proficient, Basic, or Below Basic) are based on the test score ranges listed beneath each achievement level shown in the right column.
- ❹ **Overview of Performance.** The **Scale Score** is derived from student responses to assessment items. It summarizes the overall level of performance attained by your child for a particular content area.

Missouri Grade-Level Assessment Program 2016 Individual Student Report



1 Student Report for:

Name: WEBBER, PEGGY
 Student ID: 1234567890
 Birthdate: 12/02/2000
 Grade: Grade 8
 School: AMY SCHOOL
 District: ANY DISTRICT

2 How did your child perform in Science?

Your child received a score of 736.

One way to measure performance is by achievement levels, which are based on scale scores. Achievement levels describe what your child's score means.

3 Your child's achievement level is Advanced.



Advanced
 Scores of 735 and above demonstrate a thorough understanding of the content at this grade level.

Proficient
 Scores at 703-734 demonstrate an understanding of the content expected at this grade level.

Basic
 Scores at 671-702 demonstrate a partial understanding of the content expected at this grade level.

Below Basic
 Scores at 670 and below do not demonstrate an understanding of the content expected at this grade level.

4 Overview of Performance

Scale Score: 736

This report provides information about achievement on the Missouri Assessment Program (MAP).

It is the policy of the Missouri Department of Elementary and Secondary Education not to discriminate on the basis of race, color, religion, gender, national origin, age, or disability in its programs or employment practices as required by Title VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, the Age Discrimination Act of 1975 and title II of the Americans with Disabilities Act of 1990. Inquiries related to the Department programs and to the location of services, activities, and facilities that are accessible by persons with disabilities may be directed to the Jefferson State Office Building, Office of the General Counsel, Coordinator-Civil Rights Compliance (Title VI/Title IX/504/ADA/Age Act), 6th Floor, 205 Jefferson Street, P.O. Box 480, Jefferson City, MO 65102-0480; telephone number (573) 526-4757 or TTY: (800) 735-2986; fax (573) 526-4883; email civilrights@doese.mo.gov.

A single exam can provide only limited information. You should confirm your child's strengths and needs in these topics by reviewing classroom work, standards-based assessments and your child's progress reports during the year.

For more resources, go to

<http://doese.mo.gov/college-career-readiness/assessment>



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02-18-2016

Student Label

MISSOURI ASSESSEMENT PROGRAM SAMPLE, STUDENT1 ① Grade: Grade 5 Test Date: 04/04/2016 DOB: 01/01/2003 MOSIS State ID: 1234567890	Content Area English Language Arts
	Achievement Level Proficient ② MAP Scale Score 505 ③
02/22/2016	

Above is a sample of the MAP student label. The student label is designed so that each student's test results can be placed in the student's permanent record. A label is provided for every student who participated in the spring 2016 administration of the MAP. Each label has a self-adhesive backing so that it can be peeled from the sheet and placed in the student's cumulative school record. The label presents a snapshot of the student's results on the MAP. Separate labels are generated for each grade and content area; thus, a student will have multiple labels—one for each of the content areas administered within a grade.

- ① **Student Demographic Information.** The left side of the label lists the name and biographical data of the student taking the assessment.
- ② **Achievement Level.** This is the student's Achievement Level (Advanced, Proficient, Basic, or Below Basic).
- ③ **Scale Score.** This is the student's Scale Score for the content area listed at the top of the label.

NOTICE OF NON-DISCRIMINATION

It is the policy of the Missouri Department of Elementary and Secondary Education not to discriminate on the basis of race, color, religion, gender, national origin, age, or disability in its programs or employment practices as required by Title VI and VII of the Civil Rights Act of 1964, Title IX of the Education Amendments of 1972, Section 504 of the Rehabilitation Act of 1973, the Age Discrimination Act of 1975, and Title II of the Americans with Disabilities Act of 1990.

Inquiries related to Department employment practices may be directed to the Jefferson State Office Building, Human Resources Director, 8th Floor, 205 Jefferson Street, P.O. Box 480, Jefferson City, MO 65102-0480; telephone number (573) 751-9619 or TYY (800) 735-2966. Inquiries related to Department programs and to the location of services, activities, and facilities that are accessible by persons with disabilities may be directed to the Jefferson State Office Building, Office of the General Counsel, Coordinator–Civil Rights Compliance (Title VI/Title IX/504/ADA/Age Act), 6th Floor, 205 Jefferson Street, P.O. Box 480, Jefferson City, MO 65102-0480; telephone number (573) 526-4757 or TYY (800) 735-2966, email civilrights@dese.mo.gov.

Anyone attending a meeting of the State Board of Education who requires auxiliary aids or services should request such services by contacting the Executive Assistant to the State Board of Education, Jefferson State Office Building, 205 Jefferson Street, Jefferson City, MO 65102-0480; telephone number (573) 751-4446 or TTY (800) 735-2966.

Inquiries or concerns regarding civil rights compliance by school districts or charter schools should be directed to the local school district or charter school Title IX/non-discrimination coordinator. Inquiries and complaints may also be directed to the Office for Civil Rights, Kansas City Office, U.S. Department of Education, 8930 Ward Parkway, Suite 2037, Kansas City, MO 64114; telephone number (816) 268-0550; FAX (816) 823-1404; TDD (877) 521-2172.

Appendix E: MAP Sample Reports and GRF Layout

MAP Sample Reports and GRF Layout

Figure E.1: Student Roster

Report Filter Options

TEST ADMINISTRATION: MO MAP GLA Summ...
 DISTRICT CODE AND NAME: 0123456 MY DIST...
 RACE/ETHNICITY: ALL
 GENDER: ALL

SCHOOL CODE AND NAME: 1234 MY SCHOOL...
 GRADE: ALL
 BRAILLE: ALL
 STUDENT GROUPS: Public School (Defa...)

CONTENT AREA: English Language A...
 EXAMINER: ALL
 LARGE PRINT: ALL

Page 1 of 1

Student Roster

Test Administration: MO MAP GLA Summative 2016, District Code: 0123456, District Name: MY DISTRICT, School Code: 1234, School Name: MY SCHOOL, Content Area: English Language Arts, Student Groups: Public School (Default)

Student Name	MOSIS ID	Grade	Gender	English Language Arts		
				SS	Mastery	Examiner
ASTUDENT_JASON	0123456789	Grade 4	Male	498	●	MCCOY, LEONARD
BSTUDENT_DAVID	1234567890	Grade 4	Male	500	●	MCCOY, LEONARD
CSTUDENT_JOANNA	2345678910	Grade 5	Female	502	●	KRK, JAMES
DSTUDENT_PAUL E	3456789123	Grade 5	Male	307	●	KRK, JAMES
ESTUDENT_JIMMY	4567891234	Grade 5	Male		●	KRK, JAMES
FSTUDENT_JOE	5678901234	Grade 5	Male	507	●	KRK, JAMES

● Advanced
 ● Proficient
 ● Basic
 ● Below Basic
 ● Level Not Determined
 - No data available

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 DRC/Missouri Help Desk: Toll Free 1-800-554-8888 Email: MAPhelpdesk@drcdatarecognition.com

Figure E.2: Individual Student Report

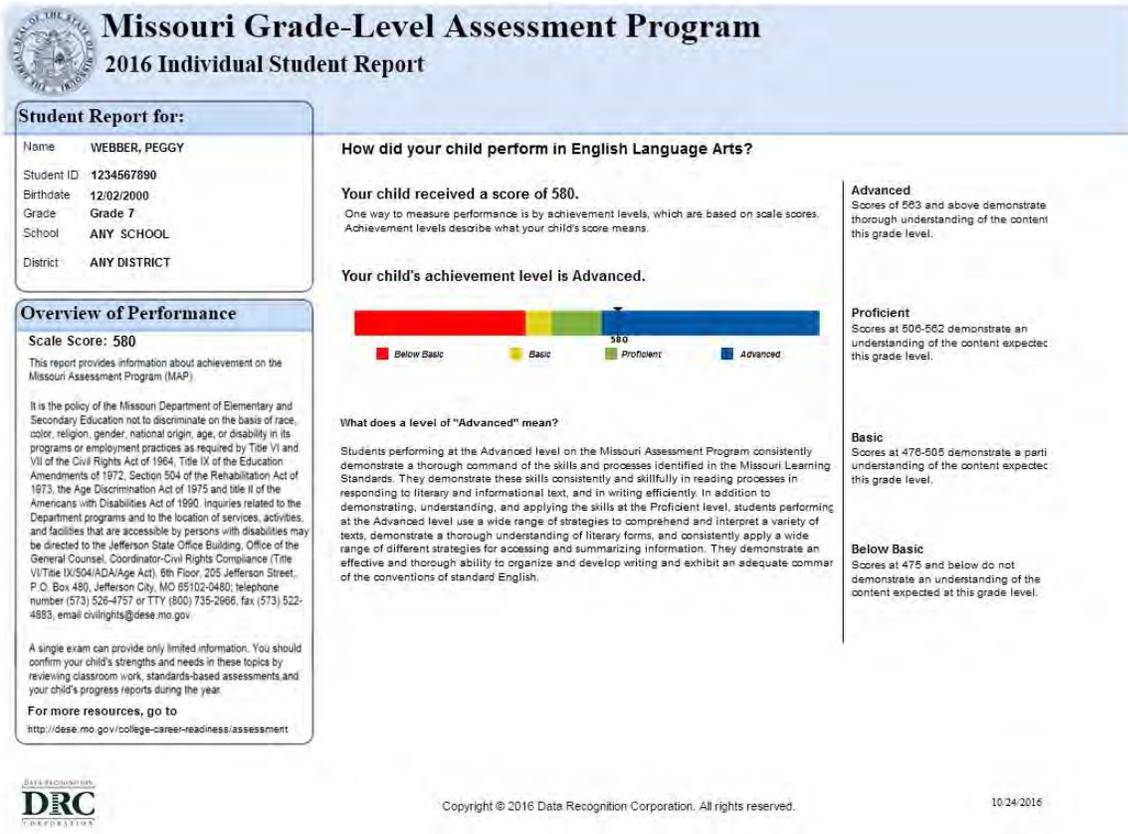
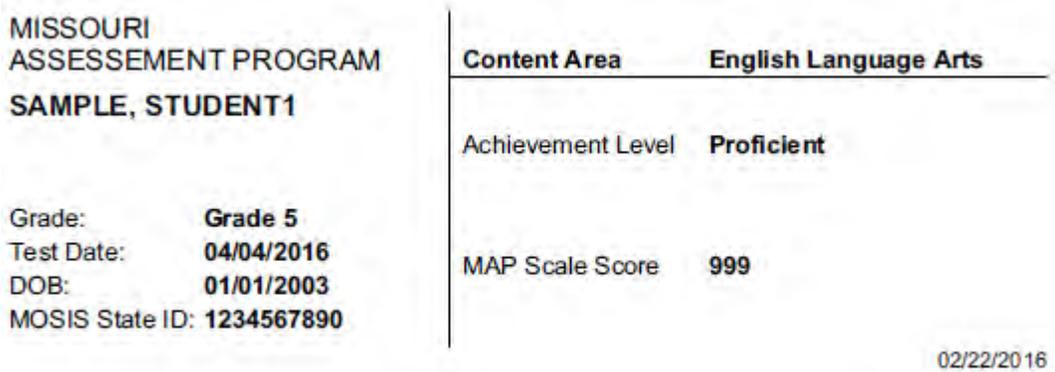


Figure E.3: Student Score Label



MO MAP GLA Spring 2016 GRF Layout_v1.2					
Start	End	Len	Field	Valid Values	Comments/Description
190	209	20	Local Student ID	0-9; blank	
210	219	10	StateID	0-9; blank	MOSIS ID - State assigned student identifier. See http://dese.mo.gov/MOSIS for more information.
220	279	60	Last Name	Legal last name. Supported Characters : A-Z, a-z, 0-9, "-", "_", "' ", ".", space	Student Last Name
280	339	60	First Name	Legal first name Supported Characters : A-Z, a-z, 0-9, "-", "_", "' ", ".", space	Student First Name
340	399	60	Middle Name	Legal middle name Supported Characters : A-Z, a-z, 0-9, "-", "_", "' ", ".", space	Student Middle Name
400	409	10	Suffix	Legal name suffix. E.g. Jr, Sr Supported Characters : A-Z, a-z, 0-9, "-", "_", "' ", ".", space	
410	419	10	Birth Date	mmddyyyy Month = Jan = '01', Feb = '02', Mar = '03', Apr = '04', May = '05', June = '06', July = '07', Aug = '08', Sept = '09', Oct = '10', Nov = '11', Dec = '12' Day = 01 to 31 Year = Each position: 0-9	
420	420	1	Gender	F = Female, M = Male	

MO MAP GLA Spring 2016 GRF Layout_v1.2					
Start	End	Len	Field	Valid Values	Comments/Description
421	421	1	RaceEthnicity	A = Asian B = Black H = Hispanic I = Indian (American Indian or Alaskan Native) W = White P = Native Hawaiian or Other Pacific Islander M = Multi-Racial	
422	422	1	Filler	blank	Reserved for future use
423	423	1	Filler	blank	Reserved for future use
424	424	1	State Use 1	Y if marked, Blank if not marked.	Will be blank for all; not currently used.
425	425	1	State Use 2	Y if marked, Blank if not marked.	Will be blank for all; not currently used.
426	426	1	State Use 3	Y if marked, Blank if not marked.	Will be blank for all; not currently used.
427	427	1	State Use 4	Y if marked, Blank if not marked.	Will be blank for all; not currently used.
428	428	1	State Use 5	Y if marked, Blank if not marked.	Will be blank for all; not currently used.
429	429	1	State Use 6	Y if marked, Blank if not marked.	Will be blank for all; not currently used.
430	430	1	State Use 7	Y if marked, Blank if not marked.	Will be blank for all; not currently used.
431	431	1	State Use 8	Y if marked, Blank if not marked.	Will be blank for all; not currently used.
432	432	1	State Use 9	Y if marked, Blank if not marked.	Will be blank for all; not currently used.
433	433	1	State Use 10	Y if marked, Blank if not marked.	Will be blank for all; not currently used.
434	435	2	Period	01-10, blank	From the Precode File.
			CONTENT AREA INFORMATON		
436	437	2	Content Code	01 = English Language Arts, 02 = Mathematics, 03 = Science	
438	443	6	Content Form	IDEAS six-digit Form ID, blank	Form is at the Content level.
444	503	60	ExaminerFirstName	Supported Characters : A-Z, a-z, 0-9, "-", "_", "' ", ".", space	From the Test Session Name in eDIRECT.

MO MAP GLA Spring 2016 GRF Layout_v1.2					
Start	End	Len	Field	Valid Values	Comments/Description
504	563	60	ExaminerLastName	Supported Characters : A-Z, a-z, 0-9, "-", "_", "' ", ".", space	From the Test Session Name in eDIRECT.
564	633	70	ExaminerEmail	Up to 70 characters, valid email format (xxx@xxx.xxx), Blank if no email included.	
634	648	15	Content Export Date Time	YYYYMMDDHHMMSS (24 Hr Time Frame in GMT Format)	(24 HOUR FORMAT - IF MORE THAN ONE REORD IN OUR PROCESSING WE KEEP THE LATEST RECEIVED RECORD) NOTE: The first 14 positions will have the DateTime stamp, starting at position 634, and the very last position in the field (15) is blank.
649	658	10	Test Date (MMDDCCYY)	MMDDCCYY	This date is the generic first date of the testing window.
659	659	1	Precode Flag	Y = yes, blank = no	Only set to "Y" if the student comes in on a precode file. Blank if student was manually entered.
660	709	50	Filler	blank	Reserved for future use
			Accommodations and Universal Tools		
710	710	1	Accommodation Braille (A012)	Blank = Not Indicated Y = Indicated	Content Areas = ELA, Math, Science. Grades = 3-8. Code A012 refers to Braille administered via Paper format
711	711	1	Accommodation Large Print (A021)	Blank = Not Indicated Y = Indicated	Content Areas = ELA, Math, Science Grades = 3-8. Paper format only
712	712	1	Filler	blank	Reserved for future use
713	713	1	Accommodation Sign Language (A052)	Blank = Not Indicated Y = Indicated	Content Areas = ELA, Math, Science Grades = 3-8
714	714	1	Accommodation Paper Based Assessment (A102)	Blank = Not Indicated Y = Indicated	Content Areas = ELA, Math, Science Grades = 3-8
715	715	1	Accommodation Specialized Calculator (For Calculator Allowed Items Only) (A396)	Blank = Not Indicated Y = Indicated	Content Area = Math only Grades = 3-8

MO MAP GLA Spring 2016 GRF Layout_v1.2					
Start	End	Len	Field	Valid Values	Comments/Description
716	716	1	Accommodation Alternate Response Options (A441)	Blank = Not Indicated Y = Indicated	Content Areas = ELA, Math, Science Grades = 3-8
717	717	1	Universal Tool Bilingual Dictionary (S431)	Blank= Not Indicated Y = Indicated	Content Area = ELA, Math, Science Grades = 3-8
718	718	1	Filler	blank	Reserved for future use
719	719	1	Filler	blank	Reserved for future use
720	720	1	Universal Tool Color Contrast - Paper (S102)	Blank = Not Indicated Y = Indicated	Content Areas = ELA, Math, Science Grades = 3-8
721	721	1	Universal Tool Color Overlay (S103)	Blank = Not Indicated Y = Indicated	Content Areas = ELA, Math, Science Grades = 3-8. Paper
722	722	1	Universal Tool Magnification - Assistive Technology (S105)	Blank = Not Indicated Y = Indicated	Content Areas = ELA, Math, Science Grades = 3-8
723	723	1	Filler	blank	Reserved for future use
724	724	1	Universal Tool Masking - Paper (S107)	Blank = Not Indicated Y = Indicated	Content Areas = ELA, Math, Science Grades = 3-8
725	725	1	Universal Tool Read-Aloud (For all items in any subject, Not Including ELA Reading Passages) - Text-To-Speech (S041)	Blank = Not Indicated Y = Indicated	Content Areas = ELA, Math, Science Grades = 3-8
726	726	1	Universal Tool Read-Aloud (For all items in any subject,-Not Including ELA Reading Passages) - Assistive Technology (S042)	Blank = Not Indicated Y = Indicated	Content Areas = ELA, Math, Science Grades = 3-8
727	727	1	Universal Tool Read-Aloud (For all items in any subject,-Not Including ELA Reading Passages) - Native Language (S111)	Blank = Not Indicated Y = Indicated	Content Areas = ELA, Math, Science Grades = 3-8
728	728	1	Universal Tool Scribe (S351)	Blank = Not Indicated Y = Indicated	Content Areas = ELA, Math, Science Grades = 3-8
729	729	1	Universal Tool Separate Setting (S501)	Blank = Not Indicated Y = Indicated	Content Areas = ELA, Math, Science Grades = 3-8
730	730	1	Universal Tool Translation (S109)	Blank = Not Indicated Y = Indicated	Content Areas = ELA, Math, Science Grades = 3-8

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Start	End	Len	Field	Valid Values	Comments/Description
731	731	1	Accommodation Read Aloud (ELA Reading Passages) - Text-To-Speech (GRADES 6-8) (A043)	Blank = Not Indicated Y = Indicated	Content Area = ELA only Grades = 6-8
732	732	1	Accommodation Read Aloud (ELA Reading Passages) - Text-To-Speech (GRADES 3-5 ONLY) (A040) **INVALIDATION ELA**	Blank = Not Indicated Y = Indicated	Content Area = ELA only Grades = 3-5
733	733	1	Accommodation Read-Aloud (ELA Reading Passages) - Human Reader (GRADES 3-5 ONLY) (A041) **INVALIDATION ELA**	Blank = Not Indicated Y = Indicated	Content Area = ELA only Grades = 3-5
734	734	1	Accommodation Read-Aloud (ELA Reading Passages) - Assistive Technology (GRADES 3-5 ONLY) (A042) **INVALIDATION ELA**	Blank = Not Indicated Y = Indicated	Content Area = ELA only Grades = 3-5
735	735	1	Accommodation Read-Aloud (ELA Reading Passages) - Native Language (GRADES 3-5 ONLY) (A111) **INVALIDATION ELA**	Blank = Not Indicated Y = Indicated	Content Area = ELA only Grades = 3-5
736	736	1	Universal Tool Read-Aloud (For all items in any subject, Not Including ELA Reading Passages) - Human Reader (S043)	Blank = Not Indicated Y = Indicated	Content Areas = ELA, Math, Science Grades = 3-8
737	737	1	Accommodation Read-Aloud (ELA Reading Passages) - Assistive Technology (GRADES 6-8) (A044)	Blank = Not Indicated Y = Indicated	Content Area = ELA only Grades = 6-8
738	738	1	Accommodation Read-Aloud (ELA Reading Passages) - Human Reader (GRADES 6-8) (A045)	Blank = Not Indicated Y = Indicated	Content Area = ELA only Grades = 6-8

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Start	End	Len	Field	Valid Values	Comments/Description
739	739	1	Accommodation Read-Aloud (ELA Reading Passages) - Native Language (GRADES 6-8) (A112)	Blank = Not Indicated Y = Indicated	Content Area = ELA only Grades = 6-8
740	740	1	Accommodation Read-Aloud (ELA Reading Passages -Blind Students (A046)	Blank = Not Indicated Y = Indicated	Content Area = ELA only Grades = 6-8
741	741	1	Accommodation Speech-To-Text - Assistive Technology (A352)	Blank = Not Indicated Y = Indicated	Content Areas = ELA, Math, Science Grades = 3-8
742	742	1	Accommodation Abacus (A391)	Blank = Not Indicated Y = Indicated	Content Areas = Math, Science only Grades = 3-8
743	743	1	Accommodation Calculator (For Non-Calculator Allowed Items Only) (GRADE 3 ONLY) (A392) **INVALIDATION MATH**	Blank = Not Indicated Y = Indicated	Content Area = Math only Grade = 3
744	744	1	Accommodation Calculator (For Non-Calculator Allowed Items Only) (GRADES 4-8) (A393)	Blank = Not Indicated Y = Indicated	Content Area = Math only Grades = 4-8
745	745	1	Accommodation Multiplication Table (GRADE 3 ONLY) (A394) ** INVALIDATION MATH**	Blank = Not Indicated Y = Indicated	Content Area = Math only Grade = 3
746	746	1	Accommodation Multiplication Table (GRADES 4-8) (A395)	Blank = Not Indicated Y = Indicated	Content Area = Math, Science only Grades = 4-8
747	747	1	Universal Tool Non-Accommodation Paper Based Assessment (S112)	Blank = Not Indicated Y = Indicated	Content Areas = ELA, Math, Science Grades = 3-8
748	767	20	Filler	blank	Reserved for future use
			Teacher Invalidations		

MO MAP GLA Spring 2016 GRF Layout_v1.2					
Start	End	Len	Field	Valid Values	Comments/Description
768	768	1	Teacher Invalidation	Blank = No Invalidation marked Y = Invalidated	"Teacher Invalidation" are populated from eDIRECT. When invalidation is marked this will invalidate the content area for all sessions.
			Absent		
769	769	1	Absent	Blank = Not Marked, Y = Marked	Absent populated from eDIRECT
770	818	49	Blank for Future Use	Filler	Blank for future use
			Item Responses		
819	839	21	Content Area Title	"English Language Arts", "Mathematics", "Science"	
840	939	100	Item Responses for Session 1	0-9, ABCDE, blank	For all Item Response Strings, Item sequence in string = item sequence in test map For MC item responses: Correct = A, B, C, D; Incorrect = 1, 2, 3, 4; Omit/blank = 0 All other item types will be represented with a numeric score value or a condition code.
940	1039	100	Item Responses for Session 2	0-9, ABCDE, blank	
1040	1139	100	Item Responses for Session 3	0-9, ABCDE, blank	
1140	1239	100	Item Responses for Session 4	0-10, ABCDE, blank	Total score for writing prompt (WP) item.
			Item Scores		
1240	1242	3	Total Raw Score	0-100, blank	Raw Score for MC Items + Raw Score for CR Items (including WP) + Raw Score for TE Items
1243	1243	1	Completion Criteria	N = not met, Y = met	(Completion Criteria Met = Valid Attempt)

MO MAP GLA Spring 2016 GRF Layout_v1.2					
Start	End	Len	Field	Valid Values	Comments/Description
1244	1247	4	Percent Correct	0.0 - 100, blank	Whole Number plus one decimal position (99.9). Percent Correct = Total Raw Score / Total Raw Score Possible. Report to the tenth. No decimal point for 100. Rounding rules: round up from anything half-way between tenths (for example, 22.25 rounds to 22.3)
1248	1251	4	Scale Score	0000-9999, blank	
1252	1252	1	Content Achievement Level	Values 0, 2-5 0 = if Absent or No Valid Attempt (Level Not Determined) 2 = Below Basic or Invalidated Test 3 = Basic 4 = Proficient 5 = Advanced.	
1253	1282	30	Blank for Future Use	Filler	Reserved for future use
			MLS Score Data		
1283	1286	4	Strand #1	1	For all strands, Strand_Code from mapping.
1287	1290	4	Strand #1 Pts. Earned	0.0 - 100, blank	For all strands, Strand # Pts. Earned = Raw Score for the strand/ Total Raw Score Possible for the strand.
1291	1294	4	Strand #2	2	
1295	1298	4	Strand #2 Pts. Earned	0.0 - 100, blank	
1299	1302	4	Strand #3	3	
1303	1306	4	Strand #3 Pts. Earned	0.0 - 100, blank	
1307	1310	4	Strand #4	4	
1311	1314	4	Strand #4 Pts. Earned	0.0 - 100, blank	

MO MAP GLA Spring 2016 GRF Layout_v1.2					
Start	End	Len	Field	Valid Values	Comments/Description
1315	1318	4	Strand #5	5, blank	
1319	1322	4	Strand #5 Pts. Earned	0.0 - 100, blank	
1323	1326	4	Strand #6	6, blank	
1327	1330	4	Strand #6 Pts. Earned	0.0 - 100, blank	
1331	1334	4	Strand #7	7, blank	
1335	1338	4	Strand #7 Pts. Earned	0.0 - 100, blank	
1339	1342	4	Strand #8	8, blank	
1343	1346	4	Strand #8 Pts. Earned	0.0 - 100, blank	
1347	1350	4	Content Category #1	##, blank	For all content categories, Content Category_Code from mapping.
1351	1354	4	Content Category #1 Pts. Earned	0.0 - 100, blank	For all content categories, Content Category # Pts. Earned = Raw Score for the content category/ Total Raw Score Possible for the content category.
1355	1358	4	Content Category #2	##, blank	
1359	1362	4	Content Category #2 Pts. Earned	0.0 - 100, blank	
1363	1366	4	Content Category #3	##, blank	
1367	1370	4	Content Category #3 Pts. Earned	0.0 - 100, blank	
1371	1374	4	Content Category #4	##, blank	
1375	1378	4	Content Category #4 Pts. Earned	0.0 - 100, blank	
1379	1382	4	Content Category #5	##, blank	
1383	1386	4	Content Category #5 Pts. Earned	0.0 - 100, blank	
1387	1390	4	Content Category #6	##, blank	
1391	1394	4	Content Category #6 Pts. Earned	0.0 - 100, blank	
1395	1398	4	Content Category #7	##, blank	
1399	1402	4	Content Category #7 Pts. Earned	0.0 - 100, blank	
1403	1406	4	Content Category #8	##, blank	

MO MAP GLA Spring 2016 GRF Layout_v1.2					
Start	End	Len	Field	Valid Values	Comments/Description
1407	1410	4	Content Category #8 Pts. Earned	0.0 - 100, blank	
1411	1414	4	Content Category #9	##, blank	
1415	1418	4	Content Category #9 Pts. Earned	0.0 - 100, blank	
1419	1422	4	Content Category #10	##, blank	
1423	1426	4	Content Category #10 Pts. Earned	0.0 - 100, blank	
1427	1430	4	Content Category #11	##, blank	
1431	1434	4	Content Category #11 Pts. Earned	0.0 - 100, blank	
1435	1438	4	Content Category #12	##, blank	
1439	1442	4	Content Category #12 Pts. Earned	0.0 - 100, blank	
1443	1446	4	Content Category #13	##, blank	
1447	1450	4	Content Category #13 Pts. Earned	0.0 - 100, blank	
1451	1454	4	Content Category #14	##, blank	
1455	1458	4	Content Category #14 Pts. Earned	0.0 - 100, blank	