Spring 2015 MAP Technical Report

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EXECUTIVE SUMMARY

This report is a technical summary of the 2015 administration of the Missouri Assessment Program (MAP). The MAP is a summative assessment in English Language Arts/Literacy (ELA) and Mathematics administered in Grades 3 through 8 and in Science administered in Grades 5 and 8. These tests are designed to measure students' knowledge of ELA, Mathematics, and Science. The ELA and Mathematics test forms were developed by Data Recognition Corporation/CTB/McGraw-Hill's (DRC/CTB) Test Development staff using Smarter Balanced Assessment Consortium's item bank with items on pre-established item response theory (IRT) scales for ELA and Mathematics. Braille and large print forms were developed by Smarter Balanced. Science tests were created by the University of Iowa and the Missouri Department of Elementary and Secondary Education (DESE) and included Missouri-owned items and items developed by the University of Iowa and licensed to DESE. All assessments except for Braille, large print, and accommodated paper-and-pencil forms were administered online. This section provides a summary of the Spring 2015 MAP 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/Grade-Level Expectations 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 2008, grade-span tests were administered in Science for the first time. 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 tests have undergone multiple alignment analyses with the latest changes in the 2014–15 administration for ELA and mathematics. The 2014–15 ELA and Mathematics assessments are not comparable content- and construct-wise to the assessments administered in prior years. 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 Smarter Balanced Common Core Claims and Targets. The 2013–14 assessments included DRC/CTB's *TerraNova* items yielding norm-reference scores, while the 2014–15 assessments did not include such items. The regular versions of the 2014–15 assessments were administered in the online mode, in contrast to the 2013–14 assessments, which were all administered in the paper-and-pencil mode. For the first time in the MAP testing program, Spanish versions of the Mathematics tests were developed and these forms were also administered online. In addition, technology-enhanced item types were introduced in the 2014–15 online test administration. Science assessment continued to be aligned with Science Grade-Level Expectations (GLE). Further details of the development of the 2014–15 MAP can be found in Chapter 3 of this report.

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E.2 Administration

In the spring of 2015, Missouri administered summative assessments in English Language Arts/Literacy and Mathematics to students in Grades 3 through 8 and in Science to students in Grades 5 and 8. The MAP was administered from March 30 to May 22, 2015. Test administration is discussed in Chapter 4 of this report.

Approximately 560 districts and charter schools administered English Language Arts/Literacy and Mathematics MAP tests in Grades 3 through 8. These districts and schools also administered Science MAP tests in Grades 5 and 8. Table E.1 shows participation rates based on Missouri student census data.[1] For the purposes of this report, participation rate is defined as the percentage of students who received a valid scale score given the total number of students who attempted to take the online test or received a test book. The Accountable columns show the total number of students who attempted 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 participation rates is provided in Chapter 7 of this report.

E.3 Student Performance

This is the tenth year of the grade-level MAP testing programs in English Language Arts/Literacy and Mathematics and the eighth year for the grade-span tests in Science. Tables E.2 and E.3 present the percentage of students classified as *Proficient* or *Advanced* in 2006 through 2015 in English Language Arts/Literacy and Mathematics, respectively. Table E.4 shows the percentage of students classified as *Proficient* or *Advanced* in 2008 through 2015 on the Science MAP.

Due to changes to the assessment content for ELA and Mathematics, the student performance in these two content areas is not directly comparable between the 2013–14 and 2014–15 administrations. Student performance in Science, on the other hand, can be compared to previous years. More information on student performance may be found in Chapter 7 of this report.

E.4 Validity and Test Scores

Most sections of this Technical Report are designed to provide validity evidence to support the use of the MAP test scores. Chapter 2 discusses the uses of the MAP test scores. Chapter 3 discusses the test development process used to create the MAP, which is important to the content-related validity of the MAP scores. Chapter 4 presents information on test administration. Chapter 5 discusses the scoring of constructed-response items, as well as the results of the inter-rater reliability studies. Chapter 6 presents the test scaling and linking procedures, student scoring methodology, and the results of other operational data analyses. Chapter 7 reviews the results of the 2014–15 administration and provides an overview of the score reports that were delivered to the districts electronically for distribution to schools and parents. Chapter 8 highlights the standard-setting procedures used for the MAP. Chapter 9 discusses reliability and construct-related validity. In addition, the assumption that the content-area MAP tests are unidimensional is evaluated. For example, the grade-level Mathematics MAP test should measure one primary dimension

[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.

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(Mathematics). Chapter 10 overviews the statistical and development processes used to ensure fairness of the MAP for all examinees. Some analyses in this document are based on the calibration sample, while others are based on census data. The sources of data used for particular analyses are indicated throughout the Technical Report.

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Table E.1: Participation Rates: All Students

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics	Accountable in Science	Percent Reportable in Science
3	68003	99.78%	68017	99.95%		
4	67015	99.78%	67029	99.96%		
5	66419	99.80%	66431	99.96%	66412	99.95%
6	66062	99.77%	66019	99.91%		
7	66000	99.75%	65038	99.88%		
8	66528	99.75%	52842*	99.84%	66526	99.86%

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

Table E.2: Percentage of Students Classified as *Proficient* or *Advanced* in 2006 through 2015 Using Census Data: English Language Arts/Literacy

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

Table E.3: Percentage of Students Classified as *Proficient* or *Advanced* in 2006 through 2015 Using Census Data: Mathematics

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

Table E.4: Percentage of Students Classified as *Proficient* or *Advanced* in 2008 through 2015 Using Census Data: Science

	Science								
Grade	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2015 – 2014**
5	44.5	45.1	48.9	50.5	51.4	51.3	47.3	47.0	-0.3
8	43.2	44.8	48.0	50.0	49.6	50.1	51.9	48.9	-3.0

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CHAPTER 1: INTRODUCTION

The 2015 Missouri Assessment Program (MAP) marked the tenth administration of the grade-level English Language Arts/Literacy (ELA) and Mathematics MAP tests in Missouri. It was the eighth administration of the grade-span Science MAP test at Grades 5 and 8. The MAP is designed to measure students' knowledge of English Language Arts/Literacy, Mathematics, and Science. This report provides a technical overview of the English Language Arts/Literacy, Mathematics, and Science assessments of the 2014–15 MAP. As such, it presents evidence for the validity of the 2014–15 MAP scores.

This chapter of the Technical Report serves to describe the background, history, purpose, and design of the MAP, 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. It also required that states have in place Science assessments to be administered at least once in Grades 3 through 5, Grades 6 through 9, and Grades 10 through 12 by the 2007–08 school year. 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. In the spring of 2005, Missouri administered a field test in Communication Arts and Mathematics, which was the basis for the construction of the 2006 and 2007 operational test forms.

The MAP tests have undergone multiple alignment analyses with the latest change in the 2014–15 administration for ELA and mathematics. The 2014–15 ELA and Mathematics assessments are not comparable content- and construct-wise to the assessments administered in prior years. 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 Smarter Balanced Common Core Claims and Targets. The regular and Spanish (for Mathematics) versions of the 2014–15 assessments were administered in the online mode, in contrast to the 2013–14 assessments, which were all administered in the paper-and-pencil mode. In addition, technology-enhanced item types were introduced in the 2014–15 online test

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administration. 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 Smarter Balanced on their item bank.

The construction of the new Science MAP has been on a different trajectory. In 2005, DESE contracted with CTB to construct a grade-span Science assessment in order to comply with the requirements of NCLB. In the spring of 2006, Missouri administered a field test in Science, which was the basis for the construction of the 2008 and 2010 operational Science forms. The contract to create grade-span Science assessments was renewed in 2007. This contract also extends through 2015.

In 2008, DESE, together with Riverside Publishing, developed End-of-Course Assessments for use at the high school level. With the development of the new test program, the MAP high school assessments were discontinued. The final administration of the MAP high school assessments by CTB was in the spring of 2008.

Table 1.2 shows a timeline of the development history of the NCLB-compliant testing program and transition to the assessment aligned with the Common Core State Standards under the Smarter Balanced Assessment Consortium patronage.

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 Science tests are designed to measure how well students acquire the skills and knowledge described in the Missouri Grade-Level Expectations (GLE). The assessments yield information on academic achievement at the student, class, school, district, and state levels. This information is used to diagnose individual student strengths and weaknesses 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 2015 MAP administration consisted of 14 operational grade-level assessments. Multiple test forms were administered in each grade level and content area. 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 2014–15 MAP 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 that confirm that the processes and procedures applied in the MAP 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.

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Use 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 scores. In Chapter 2, we discuss some of the uses of the MAP scores.

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 2015 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 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 Constructed-Response Items (Chapter 5)
Chapter 5 of the Technical Report describes the processes and activities for scoring constructed-response items. This chapter discusses the measures for training raters and for assuring 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 2015 MAP, which are composed of three major parts: the classical item analysis; calibration, scaling, and linking using item response theory (IRT) models; and student scoring. This chapter also describes the demographics of the calibration samples and compares it 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 2015 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 Smarter Balanced standard setting procedure and derivation of cut scores used to classify students into achievement levels for ELA and Mathematics. It also describes the cut score review activities that occurred for the MAP Science tests in the spring of 2015.

Reliability and Validity Evidence (Chapter 9)
Chapter 9 of the Technical Report provides evidence of reliability and validity of the MAP 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 validity for the MAP scores.

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Fairness (Chapter 10)
Chapter 10 of the Technical Report discusses fairness and how the MAP 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 if 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 operational administration of MAP based on Common Core State Standards for ELA and Mathematics

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Table 1.3: Spring 2015 MAP Test Design

Form Type	Number of Test Forms				
	English Language Arts		Mathematics		Science
	3, 4, 6, and 7	5 and 8	3, 4, 6, and 7	5 and 8	5 and 8
Regular Core (CA)	3	3	3	3	2
Regular Performance Task (PA)	0	3	0	2	1
Braille or Large Print Core (CT)	1	1	1	1	1
Braille or Large Print Performance Task (PT)	0	1	0	1	0
Spanish Core (CS)	n/a	n/a	1	1	n/a
Spanish Performance Task (PS)	n/a	n/a	0	1	n/a

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CHAPTER 2: THE USES OF TEST SCORES

Validity is the overarching component of the MAP 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 use of the test scores. Validity evidence that supports the uses of the MAP test scores is provided in this Technical Report. In this section, we examine some possible uses of the MAP 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 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 scores. To this end, DESE conducted a study on consequential validity that was implemented by the Assessment Resource Center (see *MAP and Missouri Schools: A Consequential Validity Study,* ARC, 2008).

2.1 Uses of Test Scores

The validity of a test score ultimately rests on how that test score is used. To understand whether a test score is being used properly, we must first understand the purpose of the test. The intended uses of the MAP scores include the following:

- identifying students' strengths and weaknesses in Missouri's student performance
- 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), Claim-level scores, and Claim achievement level classifications.

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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, Mathematics, or Science. 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 Data Recognition Corporation/CTB/McGraw-Hill's (DRC/CTB) Test Development staff using Starter Balanced Assessment Consortium's item bank with items on pre-established IRT scales for ELA and Mathematics. Braille and large print forms were developed by Smarter Balanced. Science test forms were developed by the University of Iowa and the Missouri Department of Elementary and Secondary Education (DESE) and included Missouri-owned items (authored by Missouri educators, edited by DESE and DRC/CTB staff, and subsequently reviewed and approved for use by Missouri educators) and selected-response items developed by the University of Iowa and licensed to DESE.

The following sections discuss two types of test-level scores that are reported to indicate a student's achievement on the 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 each content area on the MAP. The overall scale score for a content area quantifies the achievement being measured by the ELA, Mathematics, or Science test. In other words, the scale score represents the student's level of achievement, where higher scale scores indicate higher levels of achievement on the test and lower scale scores indicate lower levels of achievement.

2.2.2 Levels of Achievement

A student's performance on the ELA, Mathematics, or Science MAP is reported in one of four levels of achievement: *Below Basic*, *Basic*, *Proficient*, or *Advanced*.
The cut scores for the ELA and Mathematics level of achievement were established by Smarter Balanced Assessment Consortium during the standard setting which occurred in three phases: online panel, in-person workshop, and cross-grade review in October 2014. Missouri educators were involved in all three phases of the cut score setting.

The cut scores for the levels of achievement were recommended by Missouri educators and citizens at the Bookmark Standard Setting workshop in July 2008 for Science and upheld after the Cut Point Validation workshop in June 2015. The cut scores reflect the expectations of Missouri educators and citizens of what Missouri students should know and be able to do in Science. (See Chapter 8 of this report for a discussion of the MAP 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).

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2.2.3 Use of Test-Level Scores

The MAP scale scores and achievement levels provide summary evidence of student achievement in ELA, Mathematics, or Science. 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, Mathematics, and Science.

2.3 Claim-Level and GLE Strand-Level Subscores

The Claim-level subscores indicate student performance in terms of percent-correct score for each Claim in ELA and Mathematics. In addition, the Claim achievement levels are reported for ELA and Mathematics for each student. A student's performance on the ELA and Mathematics Claims are reported in one of three levels of achievement: *Below Standard*, *At/Near Standard*, or *Above Standard*. The GLE Strand-level subscores (percent-correct) are reported for Science.

2.3.1 Use of the Claim-Level and GLE Strand-Level Subscores

The purpose of reporting Claim- or GLE Strand-level subscores on MAP tests is to show for each student the relationship between the overall achievement being measured and the skills in each of the areas delimited by the Claims in ELA, Mathematics, and GLE Strands in Science. Teachers may use these subscores for individual students as indicators of strengths and weaknesses, but they are best corroborated by other evidence, such as homework, class participation, diagnostic test scores, or observation. Chapter 3 of this Technical Report provides evidence of content validity that supports the use of the Claim- or GLE Strand-level subscores. Chapter 9 of this Technical Report provides evidence of construct validity that further supports the use of these subscores.

District and school administrators may compare their aggregate results with the state means to better understand their strengths and weaknesses within a content area. Caution should be exercised when comparing Claim- or GLE Strand-level subscores between students or across years because different items will comprise these subscores and these items may vary in difficulty.

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CHAPTER 3: TEST CONTENT DEVELOPMENT

Content-related validity in achievement tests is evidenced by a correspondence between test content and a specification of the content domain. 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 and students with disabilities, and through alignment studies performed by independent groups. In this section, we will provide a detailed discussion of the test development cycle. In particular, this section will show how the MAP follows rigorous procedures to construct 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. In this chapter, we describe steps taken to create the MAP tests, from the development of test specifications to the selection of operational forms.

3.1 Test 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 domains are generally defined as the knowledge and skills that are identified within the Missouri Learning Standards for English Language Arts/Literacy (ELA), Mathematics, and Science. This framework, 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 MAP test specifications evolve from the

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tension between the constraints of the assessment program and the benefits sought from the examination of students. Many of the benefits sought are not scientific in nature, nor are many of the constraints; rather, they are policy considerations.

The MAP test specifications consist of a test blueprint and a test design for each grade level/content area. For ELA and Mathematics, the 2015 MAP test blueprints were finalized in April, 2014. Smarter Balanced content experts carefully scrutinized each blueprint to ensure optimal content coverage and prudent use of time and resources. In general, the Smarter Balanced blueprints represent content sampling proportions that reflect intended emphasis in instruction and mastery at each grade level. Specifications for numbers of items by claim, assessment target, depth-of-knowledge, and item type demonstrate the desired proportions within test delivery constraints. The blueprints were subject to state approval through a formal vote. The test designs for ELA and Mathematics were finalized in February 2015 by DESE and DRC/CTB. Performance tasks were included in the assessments at Grades 5 and 8 only. For Science, the 2015 MAP test selection specifications were finalized by DESE and the University of Iowa. All assessments were fixed forms.

The key structural aspect of the MAP tests is the test blueprint, which specifies the target score points for each Smarter Balanced Claim (ELA and Mathematics) and GLE Strand (Science), as shown in Table 3.1. The blueprint represents a compromise among many constraints, including the target weights for each Claim and GLE recommended by Smarter Balanced and the University of Iowa, availability of items from field testing, and results of multiple reviews by content specialists. Test design elements include such elements as number and types of items/tasks for each of the scores reported. The degree to which the 2015 MAP operational forms matched the test blueprint can be assessed by comparing the targeted score point distributions defined in the test blueprint with the actual point distributions displayed in Tables 3.4–3.6. Actual point distributions on the 2015 MAP operational forms matched blueprint targets within 10%, which was the tolerance for variation approved by DESE.

3.2 Item Development

Item development is discussed in this section in compliance with the AERA, APA, & NCME (2014) standards. Standard 4.7 states the following:

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

ELA and Mathematics: Development of item content for the 2015 MAP operational test was completed by the Smarter Balanced Assessment Consortium during 2012–2014. The Consortium tested items and refined its approach to item development through three steps: small-scale tryouts in fall 2012, a large pilot test in 2013, and a field test in spring 2014. Items/tasks administered for the 2015 MAP operational test complied with the Consortium's content specifications and with the item and task specifications that were refined after the pilot test and before the field test. Operational forms were selected based on MAP test blueprint specifications supported by statistical data from field testing. Further details can be found in Chapter 3 of the *Smarter Balanced Technical Report* (2015), available at

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http://www.smarterbalanced.org/wordpress/wp-content/uploads/2015/05/Chapter-03-Item_Development.pdf.

Science: Development of constructed-response (CR) and performance event (PE) item content for the 2015 MAP operational test occurred during 2004–2009. The plan specified two item development and selection cycles. The first cycle included item writing workshops; a local pilot study; revision of items based on pilot results; content and bias reviews, item refinements, and form construction; subsequent rounds of formal field testing; the selection of operational forms based on statistical data from field testing; and, ultimately, operational testing at Grades 5 and 8. The second cycle (2007–2009) excluded local pilot testing and item revisions based on pilot results. Each of these steps is described in greater detail below. Development of selected-response (SR) item content for the 2015 MAP operational test was completed by the University of Iowa.

3.2.1 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)

ELA and Mathematics: Smarter Balanced developed Bias and Sensitivity Guidelines to help ensure that the assessments 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. Smarter Balanced strongly relied on the Bias and Sensitivity Guidelines in the development of the assessments, particularly in item writing and review. Items had to comply with the Bias and Sensitivity Guidelines in order to be included in the Smarter Balanced assessments. For details on the process used by Smarter Balanced to ensure assessment fairness, refer to Chapter 5 of the *Smarter Balanced Technical Report* (2015) posted on the Smarter Balanced website at http://www.smarterbalanced.org/wordpress/wp-content/uploads/2011/12/Chapter-05-Test-Fairness-FINAL-2015-05-15-mm.pdf

Science: There was no new item development for the 2014–15 Science forms and previously developed items were included in the 2014–15 test forms. Historically, the MAP item development took place within well-established content development workflow processes and methodologies. These processes include editing items for both content and style, the latter of which includes multiple reviews of each question to ensure proper grammar, punctuation, and compliance with the established style. Clarity and fair access for all examinees also fall within the purview of the style reviews, which occurred at scheduled milestones within the overall test development process.

During Science item writing/content development workshops (described later), content developers were provided with specific training about how to write items that require minimal reading loads for assessing content knowledge. Science developers were encouraged to use only strictly relevant information in their items, even for those items that require some kind of background explanation of a scenario or scientific experiment.

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Once item writing workshops were completed, content development editors reviewed all item content generated at the workshops and performed a post-workshop analysis. During this process, editors rejected items that did not meet specific criteria; items that did not directly assess the intended targets or could not be modified in such a way as to comply with the established style and quality of the existing MAP items (due to excessive wordiness, linguistic complexity, or overall fair access concerns) were summarily filtered out from the pool. Only the remaining material was submitted to a thorough style review.

The established MAP content development workflow calls for style reviews to occur at other milestones, which include (but are not limited to) pilot testing, formal content and bias reviews, and form selection. Style reviews also occurred after the results of the Score, Revise, Rewrite (SRR) workshops.

3.2.2 Item Writing

ELA and Mathematics: Smarter Balanced item/task development occurred from 2012 to 2014. The Consortium worked with qualified educators from member states throughout the test development cycle to develop items. The selected educators were trained on the Consortium's content specifications, item and task specifications, and stimulus specifications (ELA). In addition, professional item writers and the Consortium held regular meetings to provide direction and feedback to the educators. Educators, state partners, and assessment vendors developed the items in the Consortium's item pool. Using the summative and test blueprints, the number and distribution of items to be written were specified for item writing teams. Pools of items/tasks were written specifically to support the operational blueprint.

Science: In November 2004, a group comprised of Missouri educators, Regional Instructional Facilitators (RIFs), DESE staff, and CTB personnel participated in a four-day Science Item Writing Workshop (IWW) in Columbia, Missouri. The workshop was conducted with 37 teacher participants selected by DESE on the basis of their prior experience and expertise in item development for the MAP Science and to represent educational sites throughout Missouri. The purpose of the IWW was to revise existing items and write new items to ensure a well-balanced item pool for the 2008–2015 MAP Science operational forms. The existing items came from the MAP Science item pool previously developed for operational testing at Grades 3 and 7. During the first two days of the IWW, the existing items were revised to target the new MAP Science GLEs. These new GLEs were the basis for the 2008–2015 assessments, administered at Grades 5 and 8. During the third and fourth days of the IWW, Science participants wrote new CR items and PE items. A new MAP Science performance event development template was introduced at the IWW. This template specified the types of tasks and numbers of items that comprise a performance event. Science item development was also included in the January 2007 IWW at Lake of the Ozarks and followed the same methods described for the 2004 IWW. CR and PE items from these IWWs were used in the 2015 MAP test. SR items used in the 2015 MAP test were developed by the University of Iowa. The IWWs in November 2004 and January 2007 provided a basis upon which items written for the Science grade-level assessments could be selected for use on small-scale local pilot tests administered throughout Missouri.

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3.2.3 Pilot Tests

ELA and Mathematics: The Smarter Balanced pilot test administration in spring 2013 was designed to collect data on the statistical quality of items and tasks and to implement the basic elements of the program before the field test in order to make adjustments accordingly. The Consortium's content specifications and item and task specifications were adjusted after the pilot test, prior to development of new items and tasks for the field test. Further details can be found in Chapter 6 of the *Smarter Balanced Technical Report* (2015) posted at http://www.smarterbalanced.org/wordpress/wp-content/uploads/2011/12/Chapter-6.pdf.

Science: In March 2005, a small-scale pilot test was administered in a limited number of classrooms throughout Missouri. The pilot test consisted of items from the November 2004 IWWs. Teachers who administered the pilot tests were generally selected by DESE from the pool of IWW participants. The items from the 2007 IWW were not subjected to local pilot testing. Ten Science forms per grade, consisting of approximately fifteen CR items each, were piloted for each of Grades 5 and 8. In addition to these ten pilot forms for Science, eight performance events were piloted at each grade level.

3.2.4 Score, Revise, Rewrite Workshop

Science: In April 2005, the items included in the 2005 local pilot tests underwent further evaluation during a Score, Revise, Rewrite (SRR) Workshop. The items from the 2007 IWW were not subjected to the SRR Workshop. The purpose of the SRR Workshop was for the participants to score the items piloted in Missouri classrooms and to revise the items and rubrics/scoring guides based on the scoring process, student results, and subsequent discussion. DESE invited approximately five to seven Missouri educators per grade to participate in this step of the development process. CTB and DESE personnel were present to facilitate the SRR Workshop. The participants individually scored the students' pilot forms, tallied the results, and then reviewed the items as a group. District test coordinators were also present and participated in the process. Overall, the goals of the workshop were to improve the item quality prior to the next step in the process, Content and Bias Review, and to ensure that quality items were developed for future use in the MAP. Most participants commented that this workshop was successful in this regard.

3.2.5 Item Reviews

The Bias Review committee was comprised of representatives from various backgrounds whose purpose was to screen the items for racial, socioeconomic, gender, and other sensitivity issues. This follows AERA, APA, & NCME (2014) Standard 3.1 and 3.2, which state the following:

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)

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ELA and Mathematics: Panels of educators reviewed all items, performance tasks, 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 spring 2013 field test, 122 ELA educators and 106 Mathematics educators reviewed items and performance tasks for accessibility, bias/sensitivity, and content, and 60 educators reviewed the ELA stimuli. Prior to the spring 2014 field test, 107 ELA educators and 157 Mathematics educators from 14 states reviewed items and performance tasks, and 95 educators from 13 states reviewed the ELA stimuli. During the accessibility reviews, panelists identified issues that could negatively affect a student's ability to access stimuli, items, or performance tasks, or to elicit valid evidence about an assessment target. During the bias and sensitivity review, panelists identified content in stimuli, items, or performance tasks that could negatively affect a student's ability to produce a correct response because of their background. The content review focused on developmental appropriateness and alignment of stimuli, items, and tasks to the content specifications and appropriate depths of knowledge. Panelists in the content review also checked the accuracy of the content, answer keys, and scoring materials. Items flagged for accessibility, bias/sensitivity, and/or content concerns were either revised to address the issues identified by the panelists or removed from the item pool.

Science: Content and Bias Review (CBR) workshops were conducted in May 2005 and June 2007. DESE staff, Missouri educators, RIFs, and CTB staff participated in all meetings. The 2005 and 2006 CBRs were conducted in Columbia, Missouri, and the 2007 CBR was conducted in Jefferson City, Missouri. Both CBRs followed the same procedures. For the Content Review, DESE invited participants from educational sites throughout Missouri to review items, performance events, and scoring guides for content accuracy and grade-level appropriateness. In addition, participants verified each item's alignment to the Missouri curriculum by reviewing the Content Standard, Process Standard, and GLE assignment. The Content Review was accomplished over the course of one or two days and was followed by a one- or two-day Bias Review. More than 30 Missouri educators participated in the process to help ensure content validity and screen items for potential bias. Review committees could revise or reject items because of issues related to possible bias. More than 90% of reviewed items were accepted by each review committee at each of the CBRs. The general consensus was that the items as a group were well written and edited and that the revisions made during and after the SRR Workshop had contributed to a smooth CBR workshop. The accepted items became candidates for the next step in the process, the MAP field test. The most recent CBR of Science items was conducted by CTB and American Institute for Research (AIR) in December 2013, during which items were evaluated for content, bias, and suitability for online administration.

3.3 Field Test Selection and Administration

ELA and Mathematics: Approved items/tasks were included the Consortium's field test administration from March to June 2014. The major purposes of the field test were to administer and calibrate a sufficiently large number of items to ensure a successful operational launch of summative assessments; to obtain classical statistics and produce differential item functioning (DIF) analyses to inform item data reviews; to establish the final operational horizontal and vertical scales; to set the achievement level standards; 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 order to achieve these varied purposes,

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15,673 items resulted from the field test for ELA and Mathematics across all grade levels (K–12). These items and tasks were delivered to 1,742,208 students from the Smarter Balanced Governing States. More details on item field testing can be found in Chapter 7 of the *Smarter Balanced Technical Report* (2015) published at http://www.smarterbalanced.org/wordpress/wp-content/uploads/2011/12/Chapter-07-Field-Test-Design-Sampling-and-Administration-FINAL-20150504-mm.pdf.

Science: The items approved by CBR committees became the basis for the formation of stand-alone field test forms administered in 2006 and 2007 and embedded field testing in 2008 and 2009. The custom-written material was arranged into test forms using *TerraNova* Survey as a common set of items across forms. (The same Survey form was used as the norm-referenced test (NRT) portion of the 2008 and 2009 operational tests; a new *TerraNova* Survey form was field tested in 2009 for operational use in 2010–2014.) Field test items were selected and placed into forms so that the combined coverage of the NRT and custom portions of the test met the established blueprint requirements for content coverage; each field test form was constructed using the same design.

The MAP Spring 2006 Science Field Test consisted of four parallel forms per grade level, which were administered in Grades 5 and 8 in May 2006. All field test forms were reviewed and approved by DESE prior to administration. The field tests generated item statistics that were used to select two years of parallel operational forms to be administered in 2008 and 2009. Due to budget constraints, none of the CR items field tested in 2009 was scored; therefore, some of the items used operationally in 2007–08 were made available for operational test selection in 2010–2014. The CR items not scored in 2009 were scored in 2013 and were available for operational tests beginning in 2014. The most recent field testing of Science items took place in spring 2014, when approximately 150 items, previously administered to Missouri student in paper-and-pencil administrations, were administered online to samples of Grade 5 and 8 students. Items owned by University of Iowa were not field tested in Missouri.

3.4 Operational Test Selection

ELA and Mathematics: Operational item selections for 2015 were performed in February 2015 by CTB and DRC. The selection process followed strict statistical criteria specified by DRC/CTB Research staff and approved by DESE. The selection criteria were based on both content requirements and statistical criteria, including the following:

1. Test length and item types match the DESE-approved test design.
2. Content coverage matches DESE-approved test blueprint.
3. The following items are avoided, whenever possible:
    a. CR items worth 3 or more points where more than 50% of students were able to attain the top score points
    b. p-value ≤ 0.10 or ≥ 0.90
    c. Omit rates $\geq 5\%$
    d. Poor Fit statistics (Q1)
    e. Significant DIF statistics: If an item with DIF has to be included for blueprint coverage, examine the item to determine if any content reason exists for the DIF flag (sometimes items will demonstrate statistical bias but no content reason can be determined for the bias).

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Science: Operational item selections for 2015 were performed in 2014 by the University of Iowa. Constructed-response items field-tested online in spring 2014 and selected-response items owned by University of Iowa comprised item pool for 2014–15 Science form selection. The same statistical criteria as presented above for ELA and Mathematics were used in selection of the items for operational administration. Constructed-response items were selected first such that the test characteristic curves for these sets were aligned with the test characteristic curves of the online field test item pool. These items were designated to serve as anchor items on the 2014–15 test forms.

Production of the 2015 operational test forms and ancillary materials commenced in October 2014. Items were ordered and placed into online test forms in preparation for online operational testing, and a process of reviews between DRC/CTB and DESE ensued until final approvals were in place in March 2015, prior to the beginning of the spring 2015 operational test.

3.5 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 3.2 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 2015 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)

Universal design requires that grade-level assessments measure the performance of students with a wide range of abilities and skill repertoires, ensuring that students with diverse learning needs receive opportunities to demonstrate competence on the same content. To accommodate the greatest number of students within 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.

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3.6 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 test administration accommodation 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 Administration Manual* presented in Appendix A.

Braille and large print versions were constructed for each grade/content area to enable visually challenged students to participate in the MAP testing. Braille and Large Print forms for ELA and Mathematics were selected by Smarter Balanced. 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 teachers in February 2015 to ensure that both the Braille and large print versions of the 2015 MAP assessment would be accessible to Missouri's visually challenged students. DESE and the teacher committee made recommendations, as needed, for how to further revise the transcription to best serve the needs of visually challenged students.

While the goal is to maximize the number of items on the Braille form, it was not possible to transcribe all items into Braille, because some items represent concepts that are simply not appropriate for students who take the Braille form. In Science it was necessary to omit items from the Braille version due to excessive difficulty associated with the Braille transcription. Table 3.3 lists the items that were omitted from the 2015 Braille forms.

3.7 Standards and Content Specifications

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)

ELA and Mathematics: The Consortium's item and task specifications are designed to ensure that the assessment items measure the assessment's claims. Indeed, the purpose of the item and task specifications is to define the characteristics of the items and tasks that will provide the evidence to support one or more claims. To do this, the item and task specifications delineate the types of evidence, or targets, that should be elicited for each claim 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 and task specifications provide guidance on how to measure the targets (standards) first found in the content specifications. The item and task specifications provide guidelines on how to create the items that are specific to each assessment target and claim through

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the use of task models. In mathematics a task model provides a description of an item/task's key features. These task models describe the knowledge, skills, and processes being measured by each of the item types aligned to particular targets. In addition, the task models sometimes provide examples of plausible distractors. Exemplar items are provided within every task model. In ELA these functions are carried out through item specifications.

These task models were developed for each grade level and target in order to delineate the expectations of knowledge and skill to be included on test questions in each grade. In addition, the ELA and mathematics item and stimulus specifications provide guidance on determining the grade appropriateness of task and stimulus materials (the materials that a student must refer to in working on a test question). The task and stimulus models also provide information on characteristics of stimuli or activities to avoid because they are not important to the knowledge, skill, or process being measured. This is important because it underscores the Consortium's efforts to develop items that are accessible to the widest range of students possible; in other words, Consortium items are created according to the principle of universal design.

The alignment studies demonstrated the degree to which (a) the Smarter Balanced test specifications captured the Common Core State Standards and (b) the items adequately represent the domains delineated in the test specifications.

The alignment study conducted for the Consortium by the Human Resources Research Organization (HumRRO) discusses alignment among elements of content standards, content specifications, item specifications, and blueprints. The study itself is extensive, but its overall finding is that the Consortium's summative tests and supporting item pools exceed levels of depth of knowledge (DOK) representation recommended by Dr. Norman Webb. The analysis is done with test blueprint, item and test specifications and item pools.

Tables 3.4 and 3.5 provide the distribution of items and points on the 2015 MAP by Smarter Balanced Claim for ELA and Mathematics, respectively.

Science: The MAP assessed version 2.0 of the Missouri GLEs. Prior to selecting the operational tests, CTB and DESE performed an in-depth comparison of the version 2.0 GLEs against the former version in place since 2006. This comparison was conducted beginning in early 2008 through the approval of the 2010–2013 MAP test specifications. The analysis included an alignment of the entire MAP item pool to the version 2.0 GLEs, which was reviewed and approved by DESE. The results of the comparison found that the changes to the content domain between the original GLEs and version 2.0 were limited in scope. A small number of GLEs that were formerly tested were no longer assessable on the statewide test but still present in the curriculum (denoted as "locally assessed"). These changes caused the loss of some items from the MAP item pool and resulted in the need to reuse operational items from 2008 for the 2013 MAP tests. However, the Content Standards/GLE strands used as reporting categories in the 2006–2009 MAP remained intact across grades/content areas in the version 2.0 GLEs. The conclusion from the comparison between the former GLEs and the version 2.0 GLEs was that the same overall content domains would be measured by the 2010–2013 versions of the MAP tests that were measured by the former versions (2006–2009). The alignment study conducted by HumRRO indicated that there were some alignment deficiencies in the 2013 MAP test forms for Science (range-of-knowledge) which was mainly attributed to a large number of GLEs at each grade level. Recommendations were made to

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broaden the scope of item development so more GLEs could be tested; increase the cognitive complexity of new test items; and reduce the number of Science GLEs so a greater proportion can be tested each year.

DESE followed these recommendations in development of the 2015 test forms. HumRRO was contracted again to review and analyze the alignment of the 2015 Science assessments for grades 5 and 8 to the 2009 revision of the Missouri Learning Standards for Science. Overall, the results of the alignment review provide positive support for the content validity of the Science assessments for each grade (5 and 8) based on two outcomes:

(1) It was found that the test items assessed a level of cognitive complexity that was at or above the cognitive complexity level of the GLE associated with each item for both forms in each grade.

(2) Items were distributed rather evenly across the content expectations.

However, the results also indicated an insufficient number of items on a form to cover all content strands, and the range-of-knowledge results implied a restricted range of content assessed by items. These findings stem from more GLEs than items being available for the assessment. In turn, this is a direct result of the Science assessments being grade-span assessments, and the way in which the Webb indicators do not account for the state's intentions/emphasis of content particularly for a grade span assessment (HumRRO, 2014).

Table 3.6 provides the distribution of items and points on the 2015 MAP by GLE strand for Science.

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/CTB in developing the MAP address multiple best practices of the test industry but, in particular, are 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 3.9—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

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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.

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Table 3.1: 2015 MAP Test Blueprint: Target Score Points by Smarter Balanced Claim (English Language Arts/Literacy and Mathematics) or GLE Strand (Science)

Content Area	Grade					
Content Claim or GLE Strand	**3**	**4**	**5**	**6**	**7**	**8**
English Language Arts/Literacy						
Reading	22	22	22	23	23	23
Writing	11	11	17	11	11	17
Speaking/Listening	9	9	9	9	9	9
Research	5	5	10	5	5	10
Mathematics						
Concepts and Procedures	20	20	20	19	20	20
Problem Solving & Modeling and Data Analysis	5–10	5–10	8–20	5–10	5–10	8–20
Communicating Reasoning	6–12	6–12	8–16	6–12	6–12	8–16
Science						
Matter and Energy			8			8
Force and Motion			6			5
Characteristics of Living Organisms			6			6
Interactions of Organisms			7			5
Earth Systems			7			8
The Universe			6			6
Scientific Inquiry			15			17
Science, Technology, and Human Activity			5			5

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Table 3.2: 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 (e.g., all items can be Brailled).
Simple, Clear, and Intuitive Instructions and Procedures	All instructions and procedures are simple, clear, and presented in understandable language.
Maximum Readability and Comprehensibility	A variety of 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.

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Table 3.3: Items Omitted from the MAP Spring 2015 Braille Version

Grade	Content Area	Type	Session	Item
5	Science	CR	3	2
8	Science	CR	3	6

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Table 3.4: MAP 2015 Content Category Item/Point Distributions, English Language Arts/Literacy

Grade	Content Category (Claim)	MC/TE Items	CR/PT Items	Total Items	MC/TE Points	CR/PT Points	Total Points	% of Total Points
3	Reading	18	2	20	18	4	22	47%
	Writing	9	1	10	9	2	11	23%
	Speaking/Listening	9		9	9		9	19%
	Research	5		5	5		5	11%
	Total	41	3	44	41	6	47	100%
4	Reading	18	2	20	18	4	22	47%
	Writing	9	1	10	9	2	11	23%
	Speaking/Listening	9		9	9		9	19%
	Research	5		5	5		5	11%
	Total	41	3	44	41	6	47	100%
5	Reading	18	2	20	18	4	22	38%
	Writing	9	2	11	9	8	17	29%
	Speaking/Listening	9		9	9		9	16%
	Research	5	3	8	5	5	10	17%
	Total	41	7	48	41	17	58	100%
6	Reading	19	2	21	19	4	23	48%
	Writing	9	1	10	9	2	11	23%
	Speaking/Listening	9		9	9		9	19%
	Research	5		5	5		5	10%
	Total	42	3	45	42	6	48	100%
7	Reading	19	2	21	19	4	23	48%
	Writing	9	1	10	9	2	11	23%
	Speaking/Listening	9		9	9		9	19%
	Research	5		5	5		5	10%
	Total	42	3	45	42	6	48	100%
8	Reading	19	2	21	19	4	23	39%
	Writing	9	2	11	9	8	17	29%
	Speaking/Listening	9		9	9		9	15%
	Research	5	3	8	5	5	10	17%
	Total	42	7	49	42	17	59	100%

Note: Data in this table reflect item and point distribution for one test form in each grade. Item number or point distribution per content category may vary slightly across test forms in a given grade, but all forms are aligned with the test blueprint.

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Table 3.5: MAP 2015 Content Category Item/Point Distributions, Mathematics

Grade	Content Category (Claim)	MC/TE Items	CR/PT Items	Total Items	MC/TE Points	CR/PT Points	Total Points	% of Total Points
3	Concepts and Procedures	20		20	21		21	64%
	Problem Solving & Modeling and Data Analysis	5		5	5		5	15%
	Communicating Reasoning	6		6	7		7	21%
	Total	31		31	33		33	100%
4	Concepts and Procedures	20		20	20		20	61%
	Problem Solving & Modeling and Data Analysis	5		5	6		6	18%
	Communicating Reasoning	6		6	7		7	21%
	Total	31		31	33		33	100%
5	Concepts and Procedures	20		20	20		20	44%
	Problem Solving & Modeling and Data Analysis	5	4	9	7	7	14	31%
	Communicating Reasoning	6	2	8	7	4	11	24%
	Total	31	6	37	34	11	45	100%
6	Concepts and Procedures	19		19	19		19	61%
	Problem Solving & Modeling and Data Analysis	5		5	6		6	19%
	Communicating Reasoning	6		6	6		6	19%
	Total	30		30	31		31	100%
7	Concepts and Procedures	20		20	20		20	63%
	Problem Solving & Modeling and Data Analysis	5		5	5		5	16%
	Communicating Reasoning	5	1	6	5	2	7	22%
	Total	30	1	31	30	2	32	100%
8	Concepts and Procedures	20		20	22		22	49%
	Problem Solving & Modeling and Data Analysis	5	4	9	5	5	10	22%
	Communicating Reasoning	5	3	8	8	5	13	29%
	Total	30	7	37	35	10	45	100%

Note: Data in this table reflect item and point distribution for one test form in each grade. Item number or point distribution per content category may vary slightly across test forms in a given grade, but all forms are aligned with the test blueprint.

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Table 3.6: MAP 2014 GLE Strand Item/Point Distributions, Science

Grade	GLE Strand	SR Items	CR/PE Items	Total Items	SR Points	CR/PE Points	Total Points	% of Total Points
5	Matter and Energy	3	2	5	3	4	7	12%
	Force and Motion	1	2	3	1	4	5	8%
	Characteristics of Living Organisms	3	2	5	3	4	7	12%
	Interactions of Organisms	5	2	7	5	4	9	15%
	Earth Systems	4	2	6	4	4	8	13%
	The Universe	2	2	4	2	4	6	10%
	Scientific Inquiry		9	9		14	14	23%
	Science, Technology, and Human Activity		2	2		4	4	7%
	Total	18	23	41	18	42	60	100%
8	Matter and Energy	4	2	6	4	4	8	13%
	Force and Motion		2	2		4	4	7%
	Characteristics of Living Organisms	2	2	4	2	4	6	10%
	Interactions of Organisms	2	2	4	2	4	6	10%
	Earth Systems	5	2	7	5	4	9	15%
	The Universe	2	2	4	2	4	6	10%
	Scientific Inquiry		9	9		17	17	28%
	Science, Technology, and Human Activity	1	2	3	1	4	5	8%
	Total	16	23	39	16	45	61	100%

Note: Data in this table reflect item and point distribution for one test form in each grade. Item number or point distribution per GLE strand may vary slightly across test forms in a given grade, but all forms are aligned with the test blueprint.

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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 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/CTB. 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 for 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. DESE also provides assistance with and interpretation of Grade-Level Assessment data and test results.

The Assistant Director of Assessment trained the district test coordinators in the following components of Grade-Level Assessment administration: the *Test Administration 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 2014.

Appendix A of this report contains DESE's presentations on the *Test Administration Manual*. During these presentations, the Assistant Director of Assessment walked the district test coordinators and other department staff through an annotated version of the *Test Administration Manual.* The district test coordinators, in turn, used this information to train staff within their districts.

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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 2015 test administration, DRC/CTB produced one administration manual: the *Test Administration Manual*. DESE Curriculum and Assessment staff reviewed, provided feedback, and gave final approval for this manual.

The *Test Administration Manual* is common to all grades and content areas. It provides detailed instructions for administering the Missouri Assessment Program Guide-Level Assessments. The manual includes instructions for test preparation, scripts for administering the tests (including links to secure listening scripts for accommodated versions of the assessments), and post-test administration procedures. Information included in the *Test Administration Manual* is listed below.

- 1.0 Overview of Important Information for the MAP Grade-Level Assessments
  - 1.1 This Test Administration Manual
  - 1.2 Glossary of Terms
  - 1.3 About the Tests
  - 1.4 Schedule of Important Dates for Spring 2015
  - 1.5 Test Administration Policies
  - 1.6 Scheduling the Tests
  - 1.7 Accommodations and Special Populations
  - 1.8 Tutorials and Practice Tests
- 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 During Online Testing
  - 3.1 Specific Administration Information
  - 3.2 Moving a Student During an Assessment
- 4.0 After Online Testing
  - 4.1 Submitting All Tests/Close of Testing Window
  - 4.2 Reporting Test Invalidations
  - 4.3 How to Handle Student Absence
  - 4.4 Securely Destroy Materials
  - 4.5 Individual Student Reports
- 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: Handling Student Transfers and Changes in Testing Status

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Appendix C: Contaminated Test Materials
Appendix D: Test Book Accountability Form
Appendix E: INSIGHT Keyboard Shortcuts and Icons

This section presents the AERA, APA, & NCME (2014) Standards relevant to test administration and how information in the MAP *Test Administration 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 *Test Administration 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 *Test Administration 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.

Tutorials and practice tests are provided in each content area to familiarize students with how to navigate the online system and practice with the item types and the functionality of the testing environment.

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 administration manual. It should be noted that adhering to the test schedule is also one critical component. The *Test Administration Manual* includes instructions for scheduling the test within the

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state testing window of March 30–May 22, 2015. The *Test Administration Manual* contains the schedule for timing each test session and notes 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)

Department staff administer reports on testing concerns, which cover 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 by tapping 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/Literacy 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 Plan (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)

Step 2.3 in the *Test Administration Manual* overviews the following steps that teachers should take to prepare for computer-based testing for administering the MAP online test:

- 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 *Test Administration Manual* presents instructions for post-test activities to ensure that online tests are submitted and printed test materials are handled properly to ensure the integrity of student information and test scores. Detailed instructions guide test examiners in submitting all online test

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records. For students who were 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 the responses appear 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 Administration Manual* instructs test coordinators in procedures for organizing and packing materials and returning them to DRC/CTB for secure inventory purposes. DESE curriculum and assessment staff has 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.

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 a *Test Book Accountability Form* that details the number of test books or printed test forms returned. This form also requires that districts/schools 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 2015 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 *Test Administration 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,

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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.

4.4 Test Administration

The 2015 test was administered to students within the state testing window of March 30–May 22, 2015. Systems 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

Each section of each content area test was timed to provide sufficient time for students to attempt all items. The *Test Administration Manual* provided examiners with timing guidelines for the assessments. For the MAP's custom sessions, examiners were instructed to allow students to complete the assessment if they were making adequate progress. The timing schedule of the MAP is presented in Table 4.1.

4.4.2 Accommodations

Accommodations are allowed on the MAP. What were previously known as accommodations have been split into three areas: universal tools, designated supports, and accommodations.

- Universal tools are available to all students taking a Grade-Level Assessment.
- Designated supports are available to students when deemed appropriate by a team of educators.
- Accommodations must appear in a student's IEP/504 Plan.

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, and 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, the grade-specific MAP *Test Administration Manual* contains the list of universal tools, designated supports, and accommodations permissible for the MAP assessments. The tables of accommodations presented in the *Test Administration Manual* are shown in Tables 4.2 through 4.4. If a specific accommodation is not on the list of accommodations in the *Test Administration 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/Literacy test or paraphrasing any of the tests. Detailed information regarding testing accommodations can be found on the DESE website at http://dese.mo.gov/college-career-readiness/assessment

Braille and Large Print forms are provided for students who are visually challenged.

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Table 4.5 summarizes the numbers of reportable students receiving accommodations by accommodation type for the 2015 MAP. The analyses in Table 4.5 are based on census data and include only those students who received accommodations and received a scale score on the English Language Arts/Literacy, Mathematics, or Science MAP.

In 2015, the separate setting accommodation and having the test read aloud were the most frequently used for the English Language Arts/Literacy, Mathematics, and Science MAP. For the Mathematics MAP, using calculators and multiplication table were also among the most frequently used accommodations.

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 program 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 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 address multiple best practices of the testing industry but in particular are related to the following *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 2014):

- 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.

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- Standard 6.7—Test users have the responsibility of protecting the security of test materials at all times.

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

Grade	Session	English Language Arts	Mathematics	Science
3	1	45	45	
	2	45	45	
4	1	45	45	
	2	45	45	
5	1	45	45	45–55
	2	45	45	20–25
	3	120**	60**	45–65
6	1	45	35–50	
	2	45	45–70	
7	1	45	15–35	
	2	45	50–85	
8	1	45	15–35	45–55
	2	45	50–85	20–25
	3	120**	60**	45–65

*All time are estimates and all sessions are untimed.
** Listed time excludes untimed 30-minute classroom activity administered prior to performance tasks.

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Table 4.2: MAP Universal Tools

Universal Tools

- The following is a list of universal tools for the Grade-Level Assessments.
- These tools are available to all students.

Tool	Format	Description
Break (Pause)	Online	The system allows all students to pause the assessment for up to 20 minutes. There is no limit on the amount of times a student may use this tool.
	Any	All students may take breaks of up 20 minutes as needed.
Calculator (For calculator-allowed items only)	Online	The system allows all students, on items where calculator use is allowed, to have access to an embedded digital calculator.
	Any	All students may have access, on items where calculator use is allowed, to a physical calculator.
English Dictionary	Online	The system allows all students access to an embedded English dictionary for use on the writing performance task.
	Any	All students may have access to a physical English dictionary for use on the writing performance task.
Highlighter	Online	The system allows all students to have access to a highlighter for marking desired text, questions, and answers.
	Any	All students may have access to a physical highlighter.
Keyboard Navigation	Online	The system allows all students to navigate through the text by using the keyboard.
Mark for Review	Online	The system allows all students to mark an item for review.
Notepad (Scratch paper)	Online	The system allows all students to use a digital notepad (called "Sticky Notes") to make notes about an item.
	Paper	All students may have access to physical scratch paper to make notes about an item. Physical scratch paper should be collected and destroyed immediately upon the conclusion of the testing session, except during the ELA and Mathematics performance tasks.
Protractor	Online	The system allows all students to use an embedded protractor on specific items where appropriate.
	Paper	All students may have access to a physical protractor for use on specific items where appropriate.
Ruler	Online	The system allows all students to use an embedded ruler on specific items where appropriate.
	Paper	All students may have access to a physical ruler for use on specific items where appropriate.
Spell Check	Online	The system allows students to use an embedded spell check feature on specific items where appropriate. NOTE: This feature must be manually turned on to be activated in the system.
Strikethrough (Called ”Cross Off”)	Online	The system allows all students to cross out answer options.
Thesaurus	Any	All students may have access to a physical thesaurus during the writing performance task.
Writing Tools	Online	The system allows all students to use selected writing tools on specific items where appropriate. The tools include the ability to bold text, italicize text, create bullets points. There is also an undo/redo feature.
Zoom (Called “Magnifier”)	Online	The system allows all students to zoom in or zoom out on text or graphics to make them appear larger or smaller than the default size.
	Paper	All students may have access to devices that allow them to change the size of text, formulas, tables, graphics, etc.

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Table 4.3: MAP Designated Supports

Designated Supports

- The following is a list of designated supports for the Grade-Level Assessments.
- These supports are available to students when deemed appropriate by a team of educators.
- These supports are available to ELL students.

Support	Format	Description	Code
Bilingual Dictionary	Any	ELL students may have access to a physical bilingual dictionary for use on the writing performance task.	S431
Color Contrast	Online	The system allows students to adjust background or font color based on student needs or preferences.	S101
	Paper	Students may have the test presented to them printed in different colors based on student needs or preferences.	S102
Color Overlay	Paper	Students may have a color transparency placed over the test presented to them based on student needs or preferences.	S103
Magnification	Online—Not Embedded	The system allows students to use assistive technology devices to change the size of text, formulas, tables, graphics, etc., beyond the capabilities of the zoom tool.	S105
Masking	Online	The system allows students to block off content that is not of immediate need or that may be distracting by using an embedded masking tool.	S106
	Paper	Students may use a masking tool to block off content that is not of immediate need or that may be distracting.	S107
Read-Aloud (For all items in any subject, excluding ELA reading passages)	Online	The system allows items in mathematics and English language arts to be read aloud to the student via embedded text-to-speech technology. The student can control the speed and volume of the voice.	S041
	Online— Not Embedded	Students may use assistive technology text-to-speech software to allow all items in any subject, not including ELA reading passages, to be read aloud.	S042
	Any	Students may have items in mathematics, science, and English language arts read aloud to them by a trained reader. Reading aloud of ELA reading passages requires an IEP or 504 Plan.	S043
	Any	ELL students may have items in mathematics, science, and English language arts read aloud to them in their native language by a trained translator. Reading aloud of ELA reading passages requires an IEP or 504 Plan.	S111
Scribe (For all items in any subject, excluding ELA writing)	Any	Students may dictate their responses to a trained scribe, who must follow the administration guidelines. Scribing of ELA writing requires an IEP or 504 Plan.	S351
Separate Setting	Any	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
Translation	Online	The system allows ELL students to use stacked Spanish translations on selected construct-irrelevant math items.	S108
	Any	ELL students may have test directions for math, science, and social studies translated. ELL students may respond to any assessment in their native language. The responses must be translated and then transcribed by a trained scribe, who must follow the administration guidelines. ELL students taking the paper-based, Braille or Large Print assessment may have access to a specific glossary, to be included with the assessment. This glossary can be translated locally.	S109

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Table 4.4: MAP Accommodations for Students with Disabilities

Accommodations for Students with Disabilities

- The following is a list of accommodations for the Grade-Level Assessments.
- The accommodations must appear in an IEP or a 504 Plan to be allowed.
- These supports are available to ELL students.

Accommodation	Format	Description	Invalidates	Code
Abacus	Any	Students may have access to an abacus.		A391
Alternate Response Options	Any	Students may respond to items using an alternate option, including, but not limited to: Adapted Keyboards, StickyKeys, MouseKeys, FilterKeys, Adapted Mouse, Touch Screen, Head Wand, Switches.		A441
American Sign Language (ASL) (For math and science items and ELA listening items)	Online	The system allows students to access math items and ELA listening items by viewing ASL video.		A051
	Any	Students may have math, science, social studies items and ELA listening items translated into ASL.		A052
Braille	Paper	Students with visual impairments may access the assessment via a Braille version. Tactile overlays and graphics tools may be used to assist the student in accessing the content.		A012
Calculator GRADE 3 ONLY (For non-calculator-allowed items only)	Any	All students in grade 3 may have access, on items where calculator use is not allowed, to a physical calculator. NOTE: Use of this will result in invalidation— Student will receive lowest obtainable scale score (LOSS).	√	A392
Calculator GRADES 4–8 ONLY (For non-calculator-allowed items only)	Any	All students in grades 4–8 may have access, on items where calculator use is not allowed, to a physical calculator.		A393
Large Print	Paper	Students with visual impairments may access the assessment via a Large Print version.		A021
Multiplication Table GRADE 3 ONLY	Any	Students in grade 3 may have access to a single-digit multiplication table. NOTE: Use of this will result in invalidation— Student will receive lowest obtainable scale score (LOSS).	√	A394
Multiplication Table GRADES 4–8	Any	Students in grades 4–8 may have access to a single-digit multiplication table.		A395
Paper-Based Assessment	Paper	Students may have access to a paper-based version of the assessment.		A102
Read-Aloud GRADES 3–5 ONLY (ELA reading passages)	Any	Students in grades 3–5 may have English language arts reading passages read aloud to them by a trained reader. NOTE: Use of this will result in invalidation— Student will receive lowest obtainable scale score (LOSS).	√	A041
	Online— Not Embedded	Students in grades 3–5 may use assistive technology text-to-speech software to allow ELA NOTE: Use of this will result in invalidation— Student will receive lowest obtainable scale score (LOSS).	√	A042
	Any	ELL students in grades 3–5 may have English language arts reading passages read aloud to them in their native language by a trained translator. NOTE: Use of this will result in invalidation— Student will receive lowest obtainable scale score (LOSS).	√	A111
Read-Aloud GRADES 6–8 ONLY (ELA reading passages)	Online— Not Embedded	Students may use assistive technology text-to- speech software to allow ELA reading passages to be read aloud.		A044
	Any	Students may have English language arts reading passages read aloud to them by a trained reader.		A045
	Any	ELL students may have English language arts reading passages read aloud to them in their native language by a trained translator.		A112
Read-Aloud (ELA reading passages)	Paper	Blind students in any grade who do not yet have adequate Braille skills may have ELA reading passages read aloud.		A046
Scribe (For ELA writing)	Any	Students may dictate their responses to a trained scribe, who must follow the administration guidelines.		A351
Specialized Calculator (For calculator-allowed items only)	Any	Students may have access, on items where calculator use is allowed, to a specialized calculator, including talking calculators or Braille calculators, when appropriate.		A396

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Table 4.5: Number and Percent of Students Receiving Accommodations by Accommodation Type, MAP 2015 Regular Edition, Braille, and Large Print

Grade	Accommodation	English Language Arts/Literacy		Mathematics		Science	
		Freq.	Pct.	Freq.	Pct.	Freq.	Pct.
3	Braille	8	0.01%	8	0.01%		
3	Large Print	26	0.04%	26	0.04%		
3	Signing of assessment (ASL) (online)	8	0.01%	8	0.01%		
3	Signing of assessment (ASL) (online or paper)	19	0.03%	19	0.03%		
3	Paper based assessment	178	0.26%	205	0.30%		
3	Use of specialized calculator	1	0.00%	21	0.03%		
3	Alternate response options	23	0.03%	23	0.03%		
3	Use of bilingual dictionary	81	0.12%	56	0.08%		
3	Support color contrasting text	416	0.61%	409	0.60%		
3	Support color chooser	531	0.78%	529	0.78%		
3	Support color contrast	4	0.01%	3	0.00%		
3	Color overlay	28	0.04%	28	0.04%		
3	Magnification	284	0.42%	284	0.42%		
3	Masking (online)	462	0.68%	457	0.67%		
3	Masking (paper)	10	0.01%	12	0.02%		
3	Read-aloud embedded technology	9611	14.13%	11805	17.36%		
3	Read-aloud assistive technology	59	0.09%	205	0.30%		
3	Read-Aloud Translator	50	0.07%	161	0.24%		
3	Scribe	1355	1.99%	1562	2.30%		
3	Separate setting	9165	13.48%	9295	13.67%		
3	Support translated test directions	71	0.10%	125	0.18%		
3	Translation (Stacked)			47	0.07%		
3	Support glossary	25	0.04%	27	0.04%		
3	Read-Aloud ELA Reading passages (Grades 3-5) - trained reader	76	0.11%				
3	Read-Aloud ELA Reading passages (Grades 3-5) - assistive technology	13	0.02%				
3	Read-Aloud ELA Reading passages (Grades 3-5) - translator	3	0.00%				
3	Read-Aloud - trained reader	1889	2.78%	3658	5.38%		
3	Read-Aloud ELA Reading passages (Blind students)	3	0.00%				
3	Scribe - ELA Writing	532	0.78%				
3	Abacus			39	0.06%		
3	Calculator (Grade 3)	11	0.02%	127	0.19%		
3	Multiplication table (Grade 3)			100	0.15%		
3	Non-accommodation special case - paper based assessment	8	0.01%	9	0.01%		

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Table 4.5: Number and Percent of Students Receiving Accommodations by Accommodation Type, MAP 2015 Regular Edition, Braille, and Large Print (cont.)

Grade	Accommodation	English Language Arts/Literacy		Mathematics		Science	
		Freq.	Pct.	Freq.	Pct.	Freq.	Pct.
4	Braille	6	0.01%	6	0.01%		
4	Large Print	36	0.05%	36	0.05%		
4	Signing of assessment (ASL) (online)	8	0.01%	8	0.01%		
4	Signing of assessment (ASL) (online or paper)	17	0.03%	18	0.03%		
4	Paper based assessment	190	0.28%	223	0.33%		
4	Use of specialized calculator	1	0.00%	28	0.04%		
4	Alternate response options	11	0.02%	11	0.02%		
4	Use of bilingual dictionary	65	0.10%	54	0.08%		
4	Support color contrasting text	530	0.79%	531	0.79%		
4	Support color chooser	655	0.98%	658	0.98%		
4	Support color contrast	8	0.01%	8	0.01%		
4	Color overlay	33	0.05%	30	0.04%		
4	Magnification	302	0.45%	302	0.45%		
4	Masking (online)	474	0.71%	472	0.70%		
4	Masking (paper)	6	0.01%	10	0.01%		
4	Read-aloud embedded technology	9207	13.74%	11318	16.89%		
4	Read-aloud assistive technology	52	0.08%	205	0.31%		
4	Read-Aloud Translator	36	0.05%	130	0.19%		
4	Scribe	1409	2.10%	1595	2.38%		
4	Separate setting	9237	13.78%	9354	13.96%		
4	Support translated test directions	54	0.08%	101	0.15%		
4	Translation (Stacked)			45	0.07%		
4	Support glossary	36	0.05%	40	0.06%		
4	Read-Aloud ELA Reading passages (Grades 3-5) - trained reader	62	0.09%				
4	Read-Aloud ELA Reading passages (Grades 3-5) - assistive technology	19	0.03%				
4	Read-Aloud ELA Reading passages (Grades 3-5) - translator	1	0.00%				
4	Read-Aloud - trained reader	1615	2.41%	3295	4.92%		
4	Read-Aloud ELA Reading passages (Blind students)	3	0.00%				
4	Scribe - ELA Writing	591	0.88%				
4	Abacus			44	0.07%		
4	Calculator (Grades 4-8)	130	0.19%	2140	3.19%		
4	Multiplication table (Grades 4-8)			2492	3.72%		
4	Non-accommodation special case - paper based assessment	9	0.01%	8	0.01%		

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Table 4.5: Number and Percent of Students Receiving Accommodations by Accommodation Type, MAP 2015 Regular Edition, Braille, and Large Print (cont.)

Grade	Accommodation	English Language Arts/Literacy		Mathematics		Science	
		Freq.	Pct.	Freq.	Pct.	Freq.	Pct.
5	Braille	3	0.00%	3	0.00%	3	0.00%
5	Large Print	41	0.06%	40	0.06%	40	0.06%
5	Signing of assessment (ASL) (online)	9	0.01%	4	0.01%		
5	Signing of assessment (ASL) (online or paper)	15	0.02%	12	0.02%	13	0.02%
5	Paper based assessment	199	0.30%	220	0.33%	216	0.33%
5	Use of specialized calculator	5	0.01%	68	0.10%	21	0.03%
5	Alternate response options	13	0.02%	13	0.02%	13	0.02%
5	Use of bilingual dictionary	122	0.18%	95	0.14%	94	0.14%
5	Support color contrasting text	505	0.76%	473	0.71%	470	0.71%
5	Support color chooser	626	0.94%	592	0.89%	593	0.89%
5	Support color contrast	5	0.01%	5	0.01%	5	0.01%
5	Color overlay	20	0.03%	20	0.03%	19	0.03%
5	Magnification	253	0.38%	247	0.37%	247	0.37%
5	Masking (online)	322	0.48%	318	0.48%	314	0.47%
5	Masking (paper)	9	0.01%	12	0.02%	15	0.02%
5	Read-aloud embedded technology	9113	13.72%	11059	16.65%	10939	16.47%
5	Read-aloud assistive technology	66	0.10%	223	0.34%	264	0.40%
5	Read-Aloud Translator	45	0.07%	157	0.24%	146	0.22%
5	Scribe	1269	1.91%	1507	2.27%	1528	2.30%
5	Separate setting	8971	13.51%	9064	13.64%	8845	13.32%
5	Support translated test directions	67	0.10%	119	0.18%	108	0.16%
5	Translation (Stacked)			55	0.08%		
5	Support glossary	10	0.02%	10	0.02%		
5	Read-Aloud ELA Reading passages (Grades 3-5) - trained reader	63	0.09%				
5	Read-Aloud ELA Reading passages (Grades 3-5) - assistive technology	13	0.02%				
5	Read-Aloud ELA Reading passages (Grades 3-5) - translator	2	0.00%				
5	Read-Aloud - trained reader	1411	2.12%	2901	4.37%	2875	4.33%
5	Read-Aloud ELA Reading passages (Blind students)	5	0.01%				
5	Scribe - ELA Writing	746	1.12%				
5	Abacus			51	0.08%	30	0.05%
5	Calculator (Grades 4-8)	211	0.32%	2659	4.00%	1563	2.35%
5	Multiplication table (Grades 4-8)			2564	3.86%	1030	1.55%
5	Non-accommodation special case - paper based assessment	8	0.01%	8	0.01%	7	0.01%

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Table 4.5: Number and Percent of Students Receiving Accommodations by Accommodation Type, MAP 2015 Regular Edition, Braille, and Large Print (cont.)

Grade	Accommodation	English Language Arts/Literacy		Mathematics		Science	
		Freq.	Pct.	Freq.	Pct.	Freq.	Pct.
6	Braille	1	0.00%	1	0.00%		
6	Large Print	40	0.06%	39	0.06%		
6	Signing of assessment (ASL) (online)	14	0.02%	14	0.02%		
6	Signing of assessment (ASL) (online or paper)	17	0.03%	17	0.03%		
6	Paper based assessment	153	0.23%	166	0.25%		
6	Use of specialized calculator	9	0.01%	53	0.08%		
6	Alternate response options	9	0.01%	9	0.01%		
6	Use of bilingual dictionary	98	0.15%	116	0.18%		
6	Support color contrasting text	295	0.45%	295	0.45%		
6	Support color chooser	326	0.49%	327	0.50%		
6	Support color contrast	9	0.01%	8	0.01%		
6	Color overlay	9	0.01%	6	0.01%		
6	Magnification	331	0.50%	331	0.50%		
6	Masking (online)	261	0.40%	261	0.40%		
6	Masking (paper)	8	0.01%	10	0.02%		
6	Read-aloud embedded technology	8685	13.15%	9973	15.11%		
6	Read-aloud assistive technology	97	0.15%	163	0.25%		
6	Read-Aloud Translator	30	0.05%	103	0.16%		
6	Scribe	784	1.19%	891	1.35%		
6	Separate setting	7972	12.07%	7967	12.07%		
6	Support translated test directions	40	0.06%	77	0.12%		
6	Translation (Stacked)			38	0.06%		
6	Support glossary	11	0.02%	9	0.01%		
6	Read-Aloud - trained reader	1535	2.32%	2378	3.60%		
6	Read-Aloud ELA Reading passages (Grades 6-8) - assistive technology	334	0.51%				
6	Read-Aloud ELA Reading passages (Grades 6-8) - trained reader	2734	4.14%				
6	Read-Aloud ELA Reading passages (Grades 6-8) - translator	43	0.07%				
6	Read-Aloud ELA Reading passages (Blind students)	1	0.00%				
6	Scribe - ELA Writing	412	0.62%				
6	Abacus			46	0.07%		
6	Calculator (Grades 4-8)	299	0.45%	3419	5.18%		
6	Multiplication table (Grades 4-8)			1883	2.85%		
6	Non-accommodation special case - paper based assessment	18	0.03%	22	0.03%		

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Table 4.5: Number and Percent of Students Receiving Accommodations by Accommodation Type, MAP 2015 Regular Edition, Braille, and Large Print (cont.)

Grade	Accommodation	English Language Arts/Literacy		Mathematics		Science	
		Freq.	Pct.	Freq.	Pct.	Freq.	Pct.
7	Braille	7	0.01%	7	0.01%		
7	Large Print	37	0.06%	37	0.06%		
7	Signing of assessment (ASL) (online)	16	0.02%	12	0.02%		
7	Signing of assessment (ASL) (online or paper)	16	0.02%	15	0.02%		
7	Paper based assessment	150	0.23%	155	0.24%		
7	Use of specialized calculator	10	0.02%	50	0.08%		
7	Alternate response options	7	0.01%	7	0.01%		
7	Use of bilingual dictionary	90	0.14%	97	0.15%		
7	Support color contrasting text	253	0.38%	255	0.39%		
7	Support color chooser	301	0.46%	303	0.47%		
7	Support color contrast	5	0.01%	5	0.01%		
7	Color overlay	3	0.00%	2	0.00%		
7	Magnification	359	0.54%	361	0.56%		
7	Masking (online)	274	0.42%	270	0.42%		
7	Masking (paper)	3	0.00%	9	0.01%		
7	Read-aloud embedded technology	7946	12.04%	9206	14.15%		
7	Read-aloud assistive technology	167	0.25%	258	0.40%		
7	Read-Aloud Translator	55	0.08%	92	0.14%		
7	Scribe	476	0.72%	515	0.79%		
7	Separate setting	7048	10.68%	7096	10.91%		
7	Support translated test directions	48	0.07%	86	0.13%		
7	Translation (Stacked)			35	0.05%		
7	Support glossary	8	0.01%	9	0.01%		
7	Read-Aloud - trained reader	1347	2.04%	1972	3.03%		
7	Read-Aloud ELA Reading passages (Grades 6-8) - assistive technology	332	0.50%				
7	Read-Aloud ELA Reading passages (Grades 6-8) - trained reader	2419	3.67%				
7	Read-Aloud ELA Reading passages (Grades 6-8) - translator	29	0.04%				
7	Read-Aloud ELA Reading passages (Blind students)	5	0.01%				
7	Scribe - ELA Writing	280	0.42%				
7	Abacus			48	0.07%		
7	Calculator (Grades 4-8)	311	0.47%	3892	5.98%		
7	Multiplication table (Grades 4-8)			1096	1.69%		
7	Non-accommodation special case - paper based assessment	28	0.04%	34	0.05%		

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Table 4.5: Number and Percent of Students Receiving Accommodations by Accommodation Type, MAP 2015 Regular Edition, Braille, and Large Print (cont.)

Grade	Accommodation	English Language Arts/Literacy		Mathematics		Science	
		Freq.	Pct.	Freq.	Pct.	Freq.	Pct.
8	Braille	8	0.01%	8	0.02%	8	0.01%
8	Large Print	27	0.04%	26	0.05%	27	0.04%
8	Signing of assessment (ASL) (online)	6	0.01%	5	0.01%		
8	Signing of assessment (ASL) (online or paper)	7	0.01%	6	0.01%	8	0.01%
8	Paper based assessment	150	0.23%	168	0.32%	175	0.26%
8	Use of specialized calculator	5	0.01%	49	0.09%	16	0.02%
8	Alternate response options	7	0.01%	4	0.01%	4	0.01%
8	Use of bilingual dictionary	242	0.36%	197	0.37%	216	0.32%
8	Support color contrasting text	338	0.51%	297	0.56%	342	0.51%
8	Support color chooser	361	0.54%	309	0.58%	365	0.55%
8	Support color contrast	2	0.00%	3	0.01%	4	0.01%
8	Color overlay	2	0.00%	2	0.00%	2	0.00%
8	Magnification	324	0.49%	289	0.55%	327	0.49%
8	Masking (online)	505	0.76%	445	0.84%	505	0.76%
8	Masking (paper)			3	0.01%	3	0.00%
8	Read-aloud embedded technology	7755	11.66%	7929	15.01%	9000	13.53%
8	Read-aloud assistive technology	191	0.29%	244	0.46%	290	0.44%
8	Read-Aloud Translator	60	0.09%	108	0.20%	126	0.19%
8	Scribe	454	0.68%	468	0.89%	496	0.75%
8	Separate setting	6744	10.14%	6574	12.44%	6625	9.96%
8	Support translated test directions	53	0.08%	104	0.20%	113	0.17%
8	Translation (Stacked)			28	0.05%		
8	Support glossary	12	0.02%	2	0.00%		
8	Read-Aloud - trained reader	1267	1.90%	1805	3.42%	1836	2.76%
8	Read-Aloud ELA Reading passages (Grades 6-8) - assistive technology	357	0.54%				
8	Read-Aloud ELA Reading passages (Grades 6-8) - trained reader	2331	3.50%				
8	Read-Aloud ELA Reading passages (Grades 6-8) - translator	29	0.04%				
8	Read-Aloud ELA Reading passages (Blind students)	5	0.01%				
8	Scribe - ELA Writing	263	0.40%				
8	Abacus			50	0.09%	17	0.03%
8	Calculator (Grades 4-8)	368	0.55%	3847	7.28%	3056	4.59%
8	Multiplication table (Grades 4-8)			785	1.49%	402	0.60%
8	Non-accommodation special case - paper based assessment	44	0.07%	42	0.08%	45	0.07%

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Figure 4.1: Sample Script from *Test Administration 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."**

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Figure 4.1: Sample Script from *Test Administration 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.**

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Figure 4.1: Sample Script from *Test Administration 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.

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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 2015

DIRECTIONS

A Department of Elementary and Secondary Education (Department) employee or designee (On-Site visit) **OR** District Test Coordinator (District Self-Monitoring) completes this form at an onsite or self-monitoring Quality Assurance (QA) visit during the Spring 2015 assessment window. This QA visit **MUST** occur during the district testing window.

The End-of-Course visit **MUST** be for Algebra I, Biology or English II.

Please complete all questions on this form. In addition to completing the questions on this form, the QA visit will include a classroom observation.

After the visit or self-monitoring has occurred, the Department employee or designee (On-Site Visit) or District Test Coordinator (District Self-Monitoring) will submit the QA form to the Department by accessing the form electronically at https://www.surveymonkey.com/s/GLA2015. The questions on that site mirror those on this form. Forms must be entered electronically by June 12, 2015 at the latest.

Questions: Contact the Assessment Section at 573-751-3545 or email assessment@dese.mo.gov.

Important: District Test Coordinators (DTCs) should continue to report testing irregularities or concerns immediately to the Department. Please contact the Assessment Section at 573-751-3545.

ABOUT THE VISIT

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

The following are components of the self-monitoring and quality assurance processes:

- documentation of assessment trainings;
- interviews with District Test Coordinators, Special Education Director, Test Examiners, Individualized Education Program (IEP) team members, and school administrators;
- review of documents; and
- classroom visit.

DISTRICT INFORMATION

NAME OF PERSON FILLING OUT THIS FORM:	
DATE OF VISIT:	
SCHOOL DISTRICT NAME:	
COUNTY-DISTRICT CODE:	
BUILDING NAME:	
BUILDING CODE:	
DISTRICT TEST COORDINATOR'S NAME:	
TEST EXAMINER'S 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.

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Figure 4.3: Sample Test Book Accountability Form

MAP 2015 GRADE-LEVEL ASSESSMENTS – TEST BOOK ACCOUNTABILITY FORM

District Name: _____ **District #:** _____

School Name: _____ **School #:** _____

This form provides start-to-finish accountability for the Grade-Level test materials assigned to your school.

School Coordinator:

1. Complete the table below, providing any additional information on the back as required. Be sure to sign at the bottom of the page.
2. Retain a copy of this form for your own records, along with a photocopy of the security barcode ranges printed on the test book packages and printed PDF tests.
3. Return the completed form to your District Coordinator.

District Coordinator:

4. Complete a copy of this form for District Overage, providing any additional information on the back as required.
5. Fax the forms for all schools in your district to CTB - **Fax # 866-405-4086.** CTB may contact you to clarify any discrepancies on your schools' forms.

	TEST BOOKS RECEIVED or PRINTED						
		GR 3	GR 4	GR 5	GR 6	GR 7	GR 8
(1)	Number of LP/Braille test books listed on packing list	+	+	+	+	+	+
(2)	LP/Braille test books missing from shipment (Fill out A on back)	–	–	–	–	–	–
(3)	Extra LP/Braille books received in shipment (Fill out B on back)	+	+	+	+	+	+
(4)	Additional LP/Braille books from district office (Fill out C on back)	+	+	+	+	+	+
(5)	Printed PDF tests (Fill out D on back)	+	+	+	+	+	+
(6)	**Total test books received and printed (Add lines 1, 3, 4 and 5; then subtract line 2)**						
	TEST BOOKS and PRINTED PDF TESTS RETURNED						
		GR 3	GR 4	GR 5	GR 6	GR 7	GR 8
(7)	Number of LP/Braille tests administered	+	+	+	+	+	+
(8)	Number of unused LP/Braille test books	+	+	+	+	+	+
(9)	Number of printed PDF tests	+	+	+	+	+	+
(10)	**Total test books returned and printed (Sum of lines 7–9)**						
	TEST BOOKS and PRINTED PDF TESTS NOT RETURNED						
		GR 3	GR 4	GR 5	GR 6	GR 7	GR 8
(11)	LP/ Braille test books securely destroyed (Fill out E on back)	+	+	+	+	+	+
(12)	LP/Braille test books unaccounted for (Fill out E on back)	+	+	+	+	+	+
(13)	Printed PDF tests unaccounted for (Fill out E on back)	+	+	+	+	+	+
(14)	**Total test books and printed PDF tests not returned (Sum of lines 11–13)**						

I confirm that Line 6 = Line 10 + Line 14.

School Test Coordinator: _____ Date Faxed: _____

Print Name: _____

A. Security barcode numbers of LP/Braille test books missing from shipment

B. Security barcode numbers of extra LP/Braille test books (not on packing list) received in shipment

C. Security barcode numbers of additional LP/Braille test books from district office

D. Security barcode numbers of printed PDF tests

E. Security barcode numbers of lost or securely destroyed LP/Braille test books or printed PDF tests	Explanation

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CHAPTER 5: CONSTRUCTED-RESPONSE AND TECHNOLOGY-ENHANCED SCORING

In this chapter, we first describe the scoring process used for the MAP. In particular, we focus on the handscoring process of constructed response items and the automated scoring of technology-enhanced 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 constructed-response 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 constructed-response items and technology-enhanced 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 Constructed-Response Scoring Process

Constructed-response items were scored by human raters who were trained by DRC/CTB.

5.1.1 Selection of Scoring Evaluators

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 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. (92)

Sections 5.1.1 and 5.1.2 explain how scorers 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/CTB strives to develop a highly qualified, experienced core of evaluators so that the integrity of all projects is appropriately maintained.

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Recruitment
The MAP 2015 project was staffed with a large number of returning evaluators and team leaders who had previous experience with the MAP, Smarter Balanced, and other handscoring projects. In addition, DRC/CTB worked with Stafforward (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 evaluators for employment. Recruitment sources included advertisements online and in newspapers in Indianapolis, Indiana, and nearby areas.

DRC/CTB requires that all evaluators and team leaders possess a bachelor's degree or higher. Stafforward carefully screened all new applicants and required them to produce either a transcript or a copy of the degree. Stafforward 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. Stafforward verified that 100% of all potential evaluators met the degree requirement. All experienced evaluators and team leaders had already successfully completed the screening process.

The Interview Process
All potential evaluators 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.

Stafforward interviewed each applicant and determined the applicant's suitability for a specific content area and grade level. Applicants with strong leadership skills were questioned further to determine whether they were qualified to be team leaders.

When Stafforward determined applicants were qualified, the applicants were recommended for employment. All assignments were made according to availability and suitability. Before being hired, all employees were required to read, agree to, and sign a nondisclosure agreement outlining the DRC/CTB business ethics and security procedures.

5.1.2 Handscoring 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)

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Training Material Development
All materials necessary for scoring Science were developed by DRC/CTB. The materials for ELA/ Literacy and Mathematics were developed by Smarter Balanced. These materials included the scoring guides and training papers used to complete the handscoring of constructed-response and extended-response items (writing essays and performance events).

Missouri Science operational items have been previously field tested and the training materials used during the field test were used for training readers to score the operational items. During the previous field testing, handscoring supervisors assembled materials based on the rubrics. Student answer documents were randomly sampled to ensure that a representative sample of possible responses was used. Supervisors selected anchor papers and training papers and recommended clarifications to rubrics. All field test materials were previously presented during a Training Material Review Meeting (TMRM), and scores and annotations were approved by DESE participants. From that point, training and qualifying materials were developed based on the rubric and scoring philosophies discussed during the TMRM.

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

All readers were trained and qualified in a specific Rater Item Block consisting of one item to be scored. Evaluators were trained using the following steps:

- Reviewing constructed-response 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 evaluators were trained and qualified using the same procedures and criteria. Qualification standards for every item were predetermined by DESE. In order to score an item, readers must have met the specific standards for that item. The qualification standards were:

- 4-point item: 80% qualification
- 3-point item: 85% qualification
- 2-point item: 95% qualification
- 1-point item: 100% qualification

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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)

Section 5.1.3 explains the monitoring procedures that DRC/CTB uses to ensure that handscoring evaluators 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. These rubrics will not be presented in this report in order to preserve the integrity of the items for use in future MAP forms.

Daily Accuracy Checks
Throughout the course of handscoring, calibration sets of pre-scored papers (checksets/validity sets) were administered daily to each scorer to monitor scoring accuracy and to maintain a consistent focus on the established rubrics and guidelines. Checksets were executed via imaging software that provided images in such a way that the reader did not know when a checkset was administered.

In addition to the checkset process, DRC/CTB's handscoring protocol included the use of read-behinds. The read-behind was another valuable rater-reliability monitoring technique that allowed a team leader to review a reader's scored documents and provide feedback and counseling as appropriate.

Approximately 10% of all responses were scored by a second reader to establish inter-rater reliability statistics for all constructed-response items. This procedure is called a "double-blind read," because the second reader does not know the first reader's score.

5.1.4 Security

Security guards were on site 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 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 technology-enhanced items. DRC established an adjudication process for technology-enhanced items and any gridded

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responses to verify that correct answers were identified. DRC's technology-enhanced scoring quality process included the following:

- A scoring rubric was created for each technology-enhanced item. It was as simple as describing the one and only correct answer for dichotomously scored items (scored as either right or wrong). If partial credit was possible, the rubric described in detail the type of response that could receive credit for each score point.
- The information from the scoring rubric was entered into the scoring system within the item banking system so that the truth 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 to paper-and-pencil technology enhanced-equivalent items 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 papers in ELA, Mathematics, and Science 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 perfect agreement and adjacent agreement between the two readers was examined.

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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 Tables 5.1 to 5.3. To aid in the interpretation of 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 294 items were scored by human readers across all test forms, grades, and content areas. As shown in Table 5.1, raters demonstrated at least 90% perfect and adjacent agreement for all ELA items, except for the Writing item in the ELA Grade 8, transcribed form where the perfect and adjacent agreement was approximately 70%. The quadratic weighted kappa values indicate that there was good or very good inter-rater agreement for all ELA items except for 16 items (across all grades and in various forms) that showed moderate agreement.

As shown in Table 5.2, raters demonstrated at or above 93% perfect and adjacent agreement for all Mathematics items. The quadratic weighted kappa values indicate that there was good or very good inter-rater agreement for all Mathematics items.

As shown in Table 5.3, raters demonstrated at or above 89% perfect and adjacent agreement for all Science items. The quadratic weighted kappa values indicate that there was good or very good inter-rater agreement for all Science items except for eight items. Two Grade 8 items on the transcribed form showed fair agreement and one Grade 8 item on the same form showed moderate agreement. In addition, two Grade 8 items and three Grade 5 items on regular forms demonstrated moderate inter-rater agreements as measured by quadratic weighted kappa.

5.5 Summary

The information presented in this chapter summarizes the scoring procedures for different types of items and steps taken by DRC/CTB 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 items are scored reliably. These efforts by DRC/CTB address multiple best practices of the testing industry but are particularly related to 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

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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.

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Table 5.1: Inter-rater Reliability, English Language Arts/Literacy

Grade	Session	Form	Item #	Score Range	% Perfect	% Adjacent	% Perfect & Adjacent*	Quadratic Weighted Kappa
3	1	CA1	6	0–2	69.2	28.0	97.2	0.56
	1	CA1, CA2, CA3	12	0–2	79.0	18.4	97.4	0.68
	1	CA2	6	0–2	68.9	28.6	97.5	0.54
	1	CA3	3	0–2	77.7	20.6	98.3	0.66
	1	CT1	15	0–2	95.5	0.0	95.5	1.00
	1	CT1	20	0–2	95.5	4.5	100.0	0.86
	1	CT1	30	0–2	86.4	13.6	100.0	0.80
	2	CA1	44	0–2	74.4	21.9	96.3	0.77
	2	CA2	44	0–2	80.2	17.4	97.6	0.71
	2	CA3	44	0–2	86.2	12.5	98.7	0.79
4	1	CA1, CA2	20, 19	0–2	68.6	29.4	98.0	0.51
	1	CA1, CA2, CA3	10	0–2	77.2	21.4	98.6	0.64
	1	CA3	19	0–2	76.0	21.1	97.1	0.62
	1	CT1	10	0–2	91.3	8.7	100.0	0.80
	1	CT1	16	0–2	85.7	14.3	100.0	0.69
	1	CT1	30	0–2	78.6	14.3	92.9	0.67
	2	CA1	37	0–2	77.4	21.1	98.5	0.72
	2	CA2	37	0–2	72.1	26.2	98.3	0.74
	2	CA3	39	0–2	65.9	30.9	96.8	0.64
5	1	CA1	4	0–2	64.8	31.9	96.7	0.52
	1	CA1, CA2, CA3	12	0–2	69.2	29.9	99.1	0.60
	1	CT1	10	0–2	100.0	0.0	100.0	1.00
	1	CT1	20	0–2	95.7	4.3	100.0	0.92
	1	CT1	30	0–2	91.3	8.7	100.0	0.86
	1	PA1	2	0–2	69.9	26.9	96.8	0.72
	1	PA1	3	0–2	67.8	31.0	98.8	0.67
	1	PA2	1	0–2	64.2	32.9	97.1	0.64
	1	PA2	2	0–2	75.0	23.8	98.8	0.73
	1	PA3	2	0–2	82.5	14.8	97.3	0.83
	1	PA3	3	0–2	61.6	35.2	96.8	0.58
	1	PT1	1	0–2	95.8	4.2	100.0	0.90
	1	PT1	2	0–2	100.0	0.0	100.0	1.00
	2	CA1	44	0–2	62.6	33.5	96.1	0.52
	2	CA2	44	0–2	67.4	30.6	98.0	0.59
	2	CA3	44	0–2	67.3	30.1	97.4	0.72

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Table 5. 1: Inter-rater Reliability, English Language Arts/Literacy (cont.)

Grade	Session	Form	Item #	Score Range	% Perfect	% Adjacent	% Perfect & Adjacent*	Quadratic Weighted Kappa
5	2	PA1	4A	0–4	67.3	28.0	95.3	0.77
	2	PA1	4B	0–4	66.2	28.9	95.1	0.75
	2	PA1	4C	0–2	58.9	34.4	93.3	0.58
	2	PA2	4A	0–4	66.3	26.8	93.1	0.66
	2	PA2	4B	0–4	66.4	26.7	93.1	0.66
	2	PA2	4C	0–2	56.6	34.0	90.6	0.51
	2	PA3	4A	0–4	68.2	28.6	96.8	0.68
	2	PA3	4B	0–4	67.2	29.3	96.5	0.66
	2	PA3	4C	0–2	59.1	36.0	95.1	0.56
	2	PT1	4A	0–4	80.0	16.0	96.0	0.84
	2	PT1	4B	0–4	84.0	8.0	92.0	0.79
	2	PT1	4C	0–2	76.0	20.0	96.0	0.66
6	1	CA1	17	0–2	73.4	24.4	97.8	0.53
	1	CA1, CA2, CA3	8	0–2	65.4	33.0	98.4	0.62
	1	CA2	21	0–2	74.6	22.7	97.3	0.68
	1	CA3	21	0–2	66.1	29.7	95.8	0.53
	1	CT1	5	0–2	90.0	10.0	100.0	0.82
	1	CT1	21	0–2	95.0	5.0	100.0	0.88
	1	CT1	31	0–2	90.0	10.0	100.0	0.86
	2	CA1	40	0–2	65.7	31.7	97.4	0.65
	2	CA2	40	0–2	75.1	23.5	98.6	0.65
	2	CA3	40	0–2	63.7	32.1	95.8	0.51
7	1	CA1	6	0–2	67.5	30.5	98.0	0.65
	1	CA1, CA2, CA3	14	0–2	68.3	29.6	97.9	0.66
	1	CA2	2	0–2	65.0	33.0	98.0	0.58
	1	CA3	6	0–2	66.3	29.5	95.8	0.63
	1	CT1	12	0–2	80.0	10.0	90.0	0.62
	1	CT1	21	0–2	100.0	0.0	100.0	1.00
	1	CT1	31	0–2	75.0	25.0	100.0	0.67
	2	CA1	45	0–2	63.7	32.2	95.9	0.56
	2	CA2	45	0–2	79.6	19.7	99.3	0.76
	2	CA3	44	0–2	68.7	29.3	98.0	0.65

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Table 5. 1: Inter-rater Reliability, English Language Arts/Literacy (cont.)

Grade	Session	Form	Item #	Score Range	% Perfect	% Adjacent	% Perfect & Adjacent*	Quadratic Weighted Kappa
8	1	CA1	21	0–2	72.0	26.7	98.7	0.71
	1	CA1, CA2, CA3	9	0–2	68.3	30.6	98.9	0.66
	1	CA2	20	0–2	73.6	25.0	98.6	0.75
	1	CA3	21	0–2	73.4	24.5	97.9	0.70
	1	CT1	6	0–2	82.6	13.1	95.7	0.71
	1	CT1	16	0–2	87.0	13.0	100.0	0.81
	1	CT1	27	0–2	78.3	21.7	100.0	0.76
	1	PA1	1	0–2	88.9	9.7	98.6	0.78
	1	PA1	3	0–2	77.8	20.9	98.7	0.65
	1	PA2	2	0–2	87.8	11.2	99.0	0.86
	1	PA2	3	0–2	67.1	29.7	96.8	0.68
	1	PA3	1	0–2	72.5	25.7	98.2	0.72
	1	PA3	3	0–2	74.6	24.3	98.9	0.65
	1	PT1	1	0–2	87.0	8.7	95.7	0.85
	1	PT1	2	0–2	100.0	0.0	100.0	1.00
	2	CA1, CA2, CA3	40	0–2	69.9	29.4	99.3	0.65
	2	PA1	4A	0–4	64.9	31.1	96.0	0.69
	2	PA1	4B	0–4	64.6	31.3	95.9	0.68
	2	PA1	4C	0–2	59.0	33.2	92.2	0.53
	2	PA2	4A	0–4	63.1	30.5	93.6	0.77
	2	PA2	4B	0–4	63.0	30.7	93.7	0.77
	2	PA2	4C	0–2	60.5	30.6	91.1	0.48
	2	PA3	4A	0–4	67.3	30.7	98.0	0.69
	2	PA3	4B	0–4	68.6	29.4	98.0	0.70
	2	PA3	4C	0–2	67.1	29.0	96.1	0.50
	2	PT1	4A	0–4	65.2	4.4	69.6	0.76
	2	PT1	4B	0–4	56.5	13.1	69.6	0.69
	2	PT1	4C	0–2	52.2	17.4	69.6	0.69

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Table 5.2: Inter-rater Reliability, Mathematics

Grade	Session	Form	Item #	Score Range	% Perfect	% Adjacent	% Perfect & Adjacent*	Quadratic Weighted Kappa
3	1	CT1	5	0–1	96.2	3.8	100.0	0.92
	1	CT1	6	0–1	100.0	0.0	100.0	1.00
	1	CT1	7	0–1	100.0	0.0	100.0	1.00
	1	CT1	12	0–1	100.0	0.0	100.0	1.00
	1	CT1	13	0–1	100.0	0.0	100.0	1.00
	1	CT1	14	0–1	100.0	0.0	100.0	1.00
	2	CT1	19	0–1	100.0	0.0	100.0	1.00
	2	CT1	20	0–1	100.0	0.0	100.0	1.00
	2	CT1	21	0–1	100.0	0.0	100.0	1.00
	2	CT1	25	0–1	100.0	0.0	100.0	1.00
	2	CT1	26	0–1	100.0	0.0	100.0	1.00
	2	CT1	27	0–1	100.0	0.0	100.0	1.00
	2	CT1	32	0–1	100.0	0.0	100.0	1.00
	2	CT1	33	0–1	100.0	0.0	100.0	1.00
	2	CT1	34	0–2	100.0	0.0	100.0	1.00
	2	CT1	35	0–1	100.0	0.0	100.0	1.00
4	1	CT1	7	0–1	100.0	0.0	100.0	1.00
	1	CT1	8	0–1	100.0	0.0	100.0	1.00
	1	CT1	15	0–1	100.0	0.0	100.0	1.00
	1	CT1	16	0–1	100.0	0.0	100.0	1.00
	2	CT1	23	0–1	100.0	0.0	100.0	1.00
	2	CT1	24	0–1	100.0	0.0	100.0	1.00
	2	CT1	31	0–1	100.0	0.0	100.0	1.00
	2	CT1	32	0–1	100.0	0.0	100.0	1.00
	2	CT1	33	0–1	100.0	0.0	100.0	1.00
	2	CT1	34	0–1	100.0	0.0	100.0	1.00
	2	CT1	35	0–2	100.0	0.0	100.0	1.00
5	1	CT1	6	0–1	100.0	0.0	100.0	1.00
	1	CT1	12	0–1	100.0	0.0	100.0	1.00
	1	CT1	13	0–1	100.0	0.0	100.0	1.00
	1	CT1	16	0–1	100.0	0.0	100.0	1.00
	1	CT1	17	0–1	96.6	3.4	100.0	0.87

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Table 5.2: Inter-rater Reliability, Mathematics (cont.)

Grade	Session	Form	Item #	Score Range	% Perfect	% Adjacent	% Perfect & Adjacent*	Quadratic Weighted Kappa
5	1	PA1	4	0–2	89.2	9.1	98.3	0.87
	1	PA1	5	0–2	92.7	6.0	98.7	0.83
	1	PA1	6	0–3	82.9	12.9	95.8	0.89
	1	PA2	4	0–2	89.9	8.7	98.6	0.90
	1	PA2	5	0–2	93.9	4.8	98.7	0.82
	1	PA2	6	0–3	82.7	12.5	95.2	0.83
	1	PS1	4	0–2	100.0	0.0	100.0	1.00
	1	PS1	5	0–2	100.0	0.0	100.0	1.00
	1	PS1	6	0–3	100.0	0.0	100.0	1.00
	1	PT1	2	0–2	100.0	0.0	100.0	1.00
	1	PT1	3	0–2	96.3	0.0	96.3	1.00
	1	PT1	4	0–2	96.3	3.7	100.0	0.95
	1	PT1	5	0–1	92.6	0.0	92.6	1.00
	1	PT1	6	0–2	92.6	7.4	100.0	0.79
	2	CT1	23	0–1	100.0	0.0	100.0	1.00
	2	CT1	24	0–2	96.6	3.4	100.0	0.95
	2	CT1	33	0–1	100.0	0.0	100.0	1.00
	2	CT1	34	0–1	100.0	0.0	100.0	1.00
	2	CT1	35	0–2	100.0	0.0	100.0	1.00
6	1	CT1	4	0–1	95.5	4.5	100.0	0.86
	1	CT1	5	0–1	100.0	0.0	100.0	1.00
	1	CT1	6	0–1	100.0	0.0	100.0	1.00
	1	CT1	12	0–1	100.0	0.0	100.0	1.00
	1	CT1	13	0–1	100.0	0.0	100.0	1.00
	2	CT1	14	0–1	100.0	0.0	100.0	1.00
	2	CT1	15	0–1	100.0	0.0	100.0	1.00
	2	CT1	16	0–1	100.0	0.0	100.0	1.00
	2	CT1	20	0–1	95.5	4.5	100.0	0.78
	2	CT1	21	0–1	100.0	0.0	100.0	1.00
	2	CT1	22	0–1	100.0	0.0	100.0	1.00
	2	CT1	23	0–1	100.0	0.0	100.0	1.00
	2	CT1	27	0–1	100.0	0.0	100.0	1.00
	2	CT1	28	0–1	100.0	0.0	100.0	1.00
	2	CT1	29	0–1	100.0	0.0	100.0	1.00
	2	CT1	30	0–1	100.0	0.0	100.0	1.00
	2	CT1	31	0–1	95.5	4.5	100.0	0.90
	2	CT1	32	0–1	100.0	0.0	100.0	1.00
	2	CT1	33	0–2	100.0	0.0	100.0	1.00
	2	CT1	34	0–1	100.0	0.0	100.0	1.00

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Table 5.2: Inter-rater Reliability, Mathematics (cont.)

Grade	Session	Form	Item #	Score Range	% Perfect	% Adjacent	% Perfect & Adjacent*	Quadratic Weighted Kappa
7	1	CT1	7	0–1	100.0	0.0	100.0	1.00
	1	CT1	8	0–1	100.0	0.0	100.0	1.00
	1	CT1	9	0–1	100.0	0.0	100.0	1.00
	1	CT1	10	0–1	100.0	0.0	100.0	1.00
	2	CA1, CA2, CA3	18	0–2	92.5	6.7	99.2	0.91
	2	CS1	18	0–2	100.0	0.0	100.0	1.00
	2	CT1	14	0–1	100.0	0.0	100.0	1.00
	2	CT1	15	0–1	100.0	0.0	100.0	1.00
	2	CT1	16	0–1	100.0	0.0	100.0	1.00
	2	CT1	20	0–1	100.0	0.0	100.0	1.00
	2	CT1	21	0–1	100.0	0.0	100.0	1.00
	2	CT1	22	0–1	100.0	0.0	100.0	1.00
	2	CT1	28	0–1	100.0	0.0	100.0	1.00
	2	CT1	29	0–1	100.0	0.0	100.0	1.00
	2	CT1	30	0–1	100.0	0.0	100.0	1.00
	2	CT1	31	0–1	100.0	0.0	100.0	1.00
	2	CT1	32	0–1	100.0	0.0	100.0	1.00
	2	CT1	33	0–1	100.0	0.0	100.0	1.00
	2	CT1	34	0–2	100.0	0.0	100.0	1.00
	2	CT1	35	0–2	100.0	0.0	100.0	1.00

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Table 5.2: Inter-rater Reliability, Mathematics (cont.)

Grade	Session	Form	Item #	Score Range	% Perfect	% Adjacent	% Perfect & Adjacent*	Quadratic Weighted Kappa
8	1	CT1	5	0–1	100.0	0.0	100.0	1.00
	1	CT1	6	0–1	100.0	0.0	100.0	1.00
	1	CT1	11	0–1	96.0	4.0	100.0	0.92
	1	CT1	12	0–1	100.0	0.0	100.0	1.00
	1	PA1	3	0–2	93.1	5.0	98.1	0.80
	1	PA1	5	0–2	92.7	6.6	99.3	0.82
	1	PA1	6	0–2	92.6	6.2	98.8	0.79
	1	PA2	3	0–2	94.3	4.2	98.5	0.82
	1	PA2	5	0–2	93.0	6.7	99.7	0.84
	1	PA2	6	0–2	94.8	4.3	99.1	0.85
	1	PS1	3	0–2	100.0	0.0	100.0	1.00
	1	PS1	5	0–2	100.0	0.0	100.0	1.00
	1	PS1	6	0–2	100.0	0.0	100.0	1.00
	1	PT1	2	0–1	95.8	4.2	100.0	0.65
	1	PT1	3	0–1	100.0	0.0	100.0	1.00
	1	PT1	4	0–2	100.0	0.0	100.0	1.00
	1	PT1	5	0–1	100.0	0.0	100.0	1.00
	1	PT1	6	0–2	100.0	0.0	100.0	1.00
	2	CA1, CA2, CA3	13	0–1	97.3	1.2	98.5	0.87
	2	CS1	13	0–1	100.0	0.0	100.0	1.00
	2	CT1	17	0–1	100.0	0.0	100.0	1.00
	2	CT1	18	0–1	100.0	0.0	100.0	1.00
	2	CT1	19	0–1	100.0	0.0	100.0	1.00
	2	CT1	22	0–1	100.0	0.0	100.0	1.00
	2	CT1	23	0–1	100.0	0.0	100.0	1.00
	2	CT1	24	0–1	100.0	0.0	100.0	1.00
	2	CT1	29	0–1	100.0	0.0	100.0	1.00
	2	CT1	30	0–1	100.0	0.0	100.0	1.00
	2	CT1	34	0–2	100.0	0.0	100.0	1.00
	2	CT1	35	0–2	100.0	0.0	100.0	1.00

* The percent perfect & adjacent may not add up to 100 for 1-point items due to the percent discrepant. The percent discrepant includes the cases where one rater assigned a score and the other rater assigned a condition code. With items worth 2 or more points, percent discrepant also refers to the cases where the assigned score varied by more than 1 point.

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Table 5.3: Inter-rater Reliability, Science

Grade	Session	Form	Item #	Score Range	% Perfect	% Adjacent	% Perfect & Adjacent*	Quadratic Weighted Kappa
5	1	CA2	1	0–2	73.2	24.3	97.5	0.75
	1	CA2	3	0–2	78.2	18.6	96.8	0.73
	1	CA2	4	0–2	77.6	20.8	98.4	0.78
	1	CA2	7	0–2	84.1	15.5	99.6	0.80
	1	CA2	8	0–2	63.0	30.7	93.7	0.60
	1	CA2	10	0–2	81.2	17.8	99.0	0.82
	1	CA2	11	0–2	86.1	12.5	98.6	0.88
	1	CA2	12	0–2	82.9	16.9	99.8	0.80
	1	CA2	13	0–2	89.6	9.9	99.5	0.87
	1	CA2	14	0–2	91.6	8.0	99.6	0.90
	1	CA2, CA3	2	0–2	85.2	14.2	99.4	0.85
	1	CA2, CA3	5	0–2	93.0	6.2	99.2	0.92
	1	CA2, CA3	6	0–2	81.2	17.8	99.0	0.81
	1	CA2, CA3	9	0–2	79.2	19.3	98.5	0.76
	1	CA3	1	0–2	82.5	17.0	99.5	0.84
	1	CA3	3	0–2	90.5	8.9	99.4	0.86
	1	CA3	4	0–2	97.2	2.3	99.5	0.97
	1	CA3	7	0–2	98.5	1.5	100.0	0.97
	1	CA3	8	0–2	82.6	17.1	99.7	0.82
	1	CA3	10	0–2	83.8	15.4	99.2	0.79
	1	CA3	11	0–2	91.6	8.1	99.7	0.91
	1	CA3	12	0–2	92.2	7.4	99.6	0.92
	1	CA3	13	0–2	85.0	14.4	99.4	0.83
	1	CA3	14	0–2	88.5	11.4	99.9	0.88
	3	CA2, CA3	33	0–2	98.8	0.5	99.3	0.97
	3	CA2, CA3	34	0–4	82.9	11.9	94.8	0.91
	3	CA2, CA3	35	0–1	90.5	9.1	99.6	0.82
	3	CA2, CA3	36	0–1	96.7	3.1	99.8	0.94
	3	CA2, CA3	37	0–2	72.5	24.9	97.4	0.72
	3	CA2, CA3	38	0–1	84.8	14.7	99.5	0.65
	3	CA2, CA3	39	0–1	78.4	20.8	99.2	0.50
	3	CA2, CA3	40	0–1	75.1	24.3	99.4	0.51
	3	CA2, CA3	41	0–1	99.2	0.8	100.0	0.99
8	1	CA2, CA3	5	0–2	88.6	11.2	99.8	0.90
	1	CA2, CA3, CT2	10	0–2	95.2	4.4	99.6	0.96
	1	CA2, CT2	1	0–2	77.2	18.4	95.6	0.76
	1	CA2, CT2	2	0–2	74.3	22.9	97.2	0.75
	1	CA2, CT2	3	0–2	88.9	10.3	99.2	0.89

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Table 5.3: Inter-rater Reliability, Science (cont.)

Grade	Session	Form	Item #	Score Range	% Perfect	% Adjacent	% Perfect & Adjacent*	Quadratic Weighted Kappa
	1	CA2, CT2	4	0–2	94.5	4.7	99.2	0.94
	1	CA2, CT2	6	0–2	83.4	14.1	97.5	0.83
	1	CA2, CT2	7	0–2	79.8	16.4	96.2	0.82
	1	CA2, CT2	8	0–2	80.4	18.4	98.8	0.81
	1	CA2, CT2	9	0–2	85.8	13.3	99.1	0.89
	1	CA2, CT2	11	0–2	91.8	7.7	99.5	0.93
	1	CA2, CT2	12	0–2	85.0	14.4	99.4	0.81
	1	CA2, CT2	13	0–2	86.9	11.8	98.7	0.87
	1	CA2, CT2	14	0–2	87.4	12.4	99.8	0.85
	1	CA3	1	0–2	80.3	18.6	98.9	0.80
	1	CA3	2	0–2	77.6	20.4	98.0	0.76
	1	CA3	3	0–2	77.9	20.8	98.7	0.75
	1	CA3	4	0–2	87.0	12.5	99.5	0.89
	1	CA3	5	0–2	94.4	4.7	99.1	0.95
	1	CA3	6	0–2	77.6	19.4	97.0	0.80
8	1	CA3	7	0–2	79.8	19.3	99.1	0.80
	1	CA3	8	0–2	92.8	7.2	100.0	0.60
	1	CA3	9	0–2	77.7	20.9	98.6	0.81
	1	CA3	11	0–2	79.2	19.2	98.4	0.80
	1	CA3	12	0–2	76.2	22.3	98.5	0.78
	1	CA3	13	0–2	76.6	21.9	98.5	0.74
	1	CA3	14	0–2	80.2	18.3	98.5	0.78
	3	CA2, CA3	31, 30	0–2	92.7	6.6	99.3	0.94
	3	CA2, CA3	32, 31	0–2	95.0	4.1	99.1	0.97
	3	CA2, CA3	33, 32	0–1	73.4	26.3	99.7	0.47
	3	CA2, CA3	34, 33	0–1	99.7	0.3	100.0	0.99
	3	CA2, CA3	35, 34	0–4	77.8	19.6	97.4	0.92
	3	CA2, CA3	36, 35	0–1	88.8	10.8	99.6	0.78
	3	CA2, CA3	37, 36	0–2	80.5	16.0	96.5	0.82
	3	CA2, CA3	38, 37	0–3	63.8	25.3	89.1	0.71
	3	CA2, CA3	39, 38	0–1	86.2	13.3	99.5	0.72

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Table 5.3: Inter-rater Reliability, Science (cont.)

Grade	Session	Form	Item #	Score Range	% Perfect	% Adjacent	% Perfect & Adjacent*	Quadratic Weighted Kappa
	3	CT2	31	0–2	88.9	3.7	92.6	0.98
	3	CT2	32	0–2	64.0	36.0	100.0	0.63
	3	CT2	33	0–1	83.3	16.7	100.0	0.28
	3	CT2	34	0–1	88.5	11.5	100.0	0.77
8	3	CT2	35	0–1	96.2	0.0	96.2	1.00
	3	CT2	36	0–4	80.0	20.0	100.0	0.83
	3	CT2	37	0–1	88.0	12.0	100.0	0.36
	3	CT2	38	0–2	81.5	14.8	96.3	0.83
	3	CT2	39	0–2	65.4	26.9	92.3	0.55

* The percent perfect & adjacent may not add up to 100 for 1-point items due to the percent discrepant. The percent discrepant includes the cases where one rater assigned a score and the other rater assigned a condition code. With items worth 2 or more points, percent discrepant also refers to the cases where the assigned score varied by more than 1 point.

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CHAPTER 6: OPERATIONAL DATA ANALYSES

This chapter of the MAP Technical Report describes the analyses that occurred on the operational data. These analyses include a classical item analysis and examination of the raw scores and an item response theory (IRT) analysis involving calibrating, scaling, and linking. All of these analyses were conducted using the calibration sample and some were replicated using census data for reporting purposes.

In this section, we 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 for which we want to make generalizations (i.e., Missouri students), 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, 5.13, 5.15, 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 each form/grade/content area MAP. This is followed by item-level statistics for each grade/content area MAP. These statistics were produced using census data.

6.1.1. Test-Level Statistics

Tables 6.1 through 6.3 present the number of items and score points on each test, as well as the mean and standard deviation of the raw scores, *p*-values, and item-total correlations (also known as item discrimination values) for each test form at each grade level of ELA, Mathematics, and Science, respectively.

The mean *p*-value is the average of all item *p*-values of a specific grade/content area. The mean item-total correlation (R_{it}) is the average of all item biserial correlations of a

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specific grade/content area. The *p*-value and item-total correlation are explained in the next section.

6.1.2. Item-Level Statistics

Tables 6.4 through 6.9 present the item statistics for each item included in regular test forms by grade for ELA. Tables 6.10 through 6.15 show the item statistics for each item included in regular test forms by grade for Mathematics. Tables 6.16 and 6.17 present the item statistics for each item included in regular test forms by grade for Science. The tables include test form, test session, item number, *p*-value, item-total correlation (R_{it}), omit rates and adjusted N count for each item by grade and content area. The tables with items statistics included in transcribed forms and Spanish version test forms (which included different items than items on regular forms) are presented in Appendix B.

p-value: The *p*-value is a measure of item difficulty. For a multiple-choice 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 through 6.3, the average *p*-values associated with the ELA regular forms range from 0.49 (Grade 5, CA1PA3 form combination, and Grade 8, CA1PA1 form combination) to 0.57 (Grade 3, form CA3, and Grade 4, form CA2). The average *p*-values for transcribed (CT) ELA forms range from 0.33 for Grades 5 and 7 to 0.37 for Grade 6. The average *p*-values associated with the Mathematics regular forms range from 0.31 (Grade 8, CA1PA1 form combination) to 0.55 (Grade 3, form CA3, and Grade 4, form CA3). The average *p*-values for transcribed (CT) Mathematics forms range from 0.15 for Grade 8 to 0.45 for Grade 3. The average *p*-values for the Spanish (CS) version of the Mathematics forms range from 0.22 (Grade 7) to 0.39 (Grade 3). A trend of higher mean *p*-values for lower grade level and lower mean *p*-values for higher grade levels was observed for Mathematics. The average *p*-values associated with the Science regular forms range from 0.53 (Grade 8, form CA2) to 0.69 (Grade 5, form CA3). The average *p*-values for the Science Grade 8 transcribed (CT) form is 0.36.

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 regular ELA forms have items with *p*-values ranging from 0.04 to 0.95 (see Tables 6.4 through 6.9) across all grade levels. The *p*-values on the Mathematics regular forms range from 0.03 to 0.97 (see

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Tables 6.10 through 6.15). The Science forms have items with *p*-values ranging from 0.30 to 0.92 (see Tables 6.16 and 6.17). Such a broad range of *p*-values, which indicates the items measure well throughout the range of skills at a given grade, supports the accuracy of the MAP test scores.

Item-Total Correlations: An item-total correlation is the correlation between an item and the total test score, where the item score is included in 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. The majority of the 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*. This standard is concerned with 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 in this section will show that, overall, student test scores are not adversely affected by the rate at which students complete the test. In general, students have ample time to complete all sections of the test.

Again, the results presented in Tables 6.4 through 6.17 show that the omit rates for the majority of items on any of the MAP regular forms were less than 5% suggesting that the majority of students were able to complete the test in the prescribed amount of time. Very few items displayed omit rates higher than 5%.

6.2. Item Response Theory

Item parameter for items contained in ELA and Mathematics tests were estimated using a marginal maximum-likelihood procedure and the 2-parameter logistic (2PL) model for MC items and the generalized partial credit model (GPC) (Muraki, 1992) for technology-enhanced (TE) and constructed response (CR) items after 2013–14 Smarter Balanced Assessment Consortium (SBAC) field test administration. For details on item calibration for ELA and Mathematics, please refer to Chapter 9 of the *Smarter Balanced Technical Report* (2015) published on the Smarter Balanced website at http://www.smarterbalanced.org/wordpress/wp-content/uploads/2015/06/chapter-9.pdf.

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Under the 2PL model, the probability that a student with trait or scale score θ will respond correctly to multiple-choice item *j* is

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

In the equation, a_j is the item discrimination and b_j is the item difficulty. Under the GPC model, the probability that a student with trait or scale score θ will respond in category *x* to partial-credit item *j* is

$$P_{jx}(\theta) = \exp\left[\sum_{k=0}^{x}(Z_{jk}(\theta))\right] / \sum_{h=0}^{m_i}\exp\left[\sum_{k=0}^{x}(Z_{jk}(\theta))\right],$$

$$\text{where } z_{jk}(\theta) = Da_j(\theta - b_j + d_{jx}),$$

and where d_{jx} is the relative difficulty of score category *x* of item *j*.

SBAC's ELA and Mathematics field test item parameters were used to score Missouri students who took ELA and Mathematics assessments resulting in the student scores on the ELA and Mathematics tests developed by SBAC.

Different IRT models were used to estimate Science tests item parameters after the 2014–15 Science test administration. A marginal maximum-likelihood procedure was used to simultaneously estimate the item parameters using the 3PL/2PPC IRT models (Bock & Aitkin, 1981; Thissen, 1982). 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

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

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

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

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(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 Science items parameters was consistent with the past methodology implemented for this content area. Item parameters estimated after the 2014–15 Science test administration and equated to the existing Missouri Science scales were used to score Missouri students who took these tests.

6.3. 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)

As mentioned in the previous section, the SBAC's field test item parameters were used to score students who were administered ELA and Mathematics MAP tests. However, DRC/CTB conducted an item evaluation study and examined the item level performance to verify that the items which were field tested in several different states were performing as expected when administered to Missouri students. These analyses were limited to the regular test forms administered in Grade 3 through 8 ELA and Mathematics. The results of this study are presented in Appendix C.

Science test data were analyzed using a calibration samples. In order to accommodate the reporting schedule and necessity to conduct the cut point validation for Science, samples of Grades 5 and 8 data were acquired shortly after the test scoring started. The Science calibration samples were representative of the Missouri student population in a given grade in regard to gender and race/ethnicity distribution. Table 6.18 shows the representativeness of the Science calibration samples compared to the census data. This table demonstrates that the Science calibration sample was representative of the state.

6.4. Calibration and Scaling

6.4.1. Data Calibration

The 3PL/2PPC IRT models were used to estimate item parameters for Science Grades 5 and 8. The test forms in each grade level shared common items and were calibrated

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concurrently at that grade level. In a process of item calibration, the number of estimation cycles was set to 80 with the convergence criterion of 0.001 for all content areas. The maximum value of *a*-parameter was set to 3.0, and the range for *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 were a number of items with the default value for the *c*-parameter on the Science tests. When the PARDUX (Burket, 2002) program used to calibrate the items encounters difficulty estimating the *c*-parameter, it assigns a default *c*-parameter value of 0.20.

6.4.2. 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 ten percent 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 x 4) for a given test, where *N* is the sample size.

No Science items were flagged for poor fit in Grade 5 and four Science operational items were flagged for poor fit in Grade 8. Table 6.19 shows the chi-square statistic and the *Z*-statistic for each flagged item. 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. The item characteristic curves for these items are presented in Figures 6.1 through 6.4. The smooth line in each of these figures represents the predicted relationship between examinee performance on

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the item and examinee ability, and the jagged line represents the observed relationship.[2] Large differences between the two lines indicate poor fit. Each figure also shows the distribution of theta scores, so that the fit between observed and predicted performance at different ability levels can be interpreted in light of the overall distribution of examinees.

Each of the flagged items 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 these scale score ranges which are 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.

The purpose of scaling a test is to enhance its validity 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 three-parameter logistic, two-parameter partial credit (3PL/2PPC) IRT model (explained previously) that assumes 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).

Scaling and linking of Science assessment data were performed using PARDUX (Burket, 2002), which is proprietary software developed by CTB/McGraw-Hill. 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. PARDUX is also used to link the scales developed by two calibrations through the common-item procedure developed by Stocking & Lord (1983).

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[2] For constructed-response items, there will be one graph for overall items fit and one graph for each score level. For example, a 2-point item will have four graphs: overall fit and fit for 0, 1, and 2 score points.

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6.4.3. Linking Methods

DRC/CTB used a common-item, non-equivalent groups design to link the current year's assessment to the established MAP Science scales. The constructed-response items administered to Missouri students in the past served as the anchor set, and the non-equivalent groups are comprised of approximately 5,000 student records in Grade 5 data and approximately 4,400 student records in Grade 8 data. After the initial IRT item calibration, item parameters were linked to the MAP Science scales using the Stocking & Lord (1983) equating procedure.

Standard 5.13 of the AERA, APA, & NCME (2014) *Standards* states the following:

> When claims of form-to-form score equivalence are based on equating procedures, detailed technical information should be provided on the method by which equating functions were established and on the accuracy of the equating functions. (105)

The Stocking & Lord (1983) procedure minimizes the mean squared difference between the two test characteristics curves (TCCs), one based on estimates from the previous calibration and the other on transformed estimates from the current calibration. Let $\hat{\psi}_j$ be the test characteristic curve based on estimates from a previous calibration and $\hat{\psi}_j^*$ be the TCC based on transformed estimates from the current calibration.

$$\hat{\psi}_j = \hat{\psi}(\theta_j) = \sum_{i=1}^{n} P_i(\theta_j; a_i, b_i, c_i),$$

$$\hat{\psi}_j^* = \hat{\psi}(\theta_j) = \sum_{i=1}^{n} P_i(\theta_j; \frac{a_i}{M_1}, M_1 b_i + M_2, c_i)$$

The TCC method determines the scaling constants (M_1 and M_2) by minimizing the following quadratic loss function (F):

$$F = \frac{1}{N}\sum_{a=1}^{N}(\hat{\psi}_j - \hat{\psi}_j^*)^2.$$

The standard error of the equating (SEE) is difficult and cumbersome to estimate for IRT equating procedures like the Stocking and Lord procedure (Kolen & Brennan, 1995; Michaelides & Haertel, 2004). The estimation of the SEE is beyond the scope of this report.

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6.4.4. Anchor Items

AERA, APA, & NCME (2014) Standard 5.15 requires information about the anchors, stating the following:

> In equating studies that employ an anchor test design, the characteristics of the anchor test and its similarity to the forms being equated should be presented, including both content specifications and empirically determined relationship among test scores. If anchor items are used in the equating study, the representativeness and psychometric characteristics of the anchor items should be presented. (105)

Two statistical methods are used to evaluate anchor items: (1) iterative linking (Candell & Drasgow, 1988) using Stocking and Lord's (1983) test characteristic curve method, and (2) differences between the item-ability regression curves.

Test Characteristic Curve Method

The Stocking and Lord (1983) procedure, also called the test characteristic curve (TCC) method for which the mathematical equation was provided in Section 6.4.3 (Linking Methods), minimizes the mean squared difference between the two TCCs, one based on estimates from the previous calibration and the other on transformed estimates from the current calibration.

Differential item functioning was evaluated by examining previous (input) and transformed (estimated) item parameters. Items with an absolute difference of parameters greater than two times the root mean square deviation were flagged. These differences were also monitored by plotting input and estimated item parameters.

Item Response Theory (IRT) Item-Ability Regression Curves

Differences between the item-ability regression curves of the anchor items in 2014–15 Science test administration were compared to previous calibrations. The differences between the curves are evaluated using the following statistics:

- UnWtd Mean = Average signed difference in estimated probability.
- UnWtd Mean Abs Dif = Average Absolute (unsigned) difference in estimated probability.
- UnWtd RMSD = Root mean squared difference.
- Wtd Mean = Weighted average signed difference in estimated probability.
- Wtd Mean Abs = Weighted average Absolute (unsigned) difference in estimated probability.
- WtdRMSD = Weighted Root mean squared difference.

Both unweighted and weighted versions of these statistics were calculated. Unweighted differences give equal weight to differences across the ability spectrum. Weighted

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differences assign weights according to the number of test-takers that are impacted, that is, the frequency distribution of estimated student abilities during the calibration.

For the six statistics listed above, differences greater than +.10 are considered large, and differences between +.07 and +.10 are considered moderate.

Additionally, the Maximum Absolute difference (MaxAbsDifPC) was identified. For MaxAbsDIFPC, large differences are those greater than +.15, and moderate differences are all differences between +.125 and +.15.

Removal of Anchor Items

One of the key requirements of anchor items in deriving valid reliable linking results is that the anchor items form a miniature of the test, in terms of content coverage or test blueprint. While dropping an anchor item flagged based solely on statistical criteria has its simplicity, this option may change the content coverage and invalidate results. Before an anchor item may be dropped from an anchor set, the item characteristics, adequacy of the content coverage, and impact to the size of the anchor set must be evaluated.

As stated above, an item is removed from the anchor set only if it adversely affects the quality of scaling, not the desirability of the results. As such, DRC/CTB will not consider how the removal of an item affects the overall mean scale score or the impact data (percentage of students in each achievement level) when recommending items for removal.

Items removed from the anchor set are still scored as part of the whole test. Anchor items are considered for exclusion from the MAP under the following conditions:

1. An item may be a candidate for removal when it is flagged for large differences on four of the seven statistics (listed above) considered when examining the differences between the IRT regression curves.
2. Removal of the item will only be considered after alternative explanations have been considered that may explain shifts in performance. For example, performance on the anchor item may improve because of a statewide initiative emphasizing instruction on a particular set of skills. In this case, improved performance on the item represents true growth in that area. Removing the anchor item may artificially lower test scores.
3. Removal of the item may not significantly alter the content distribution of the anchor set. The distribution of the anchor items across the content standards must remain within 10% of the MAP test blueprint, though within 5% is preferred.
4. The number of remaining items will remain at an acceptable level of anchor set reliability. Operationally, this means the anchor set will still be representative of the total test blueprint and that the anchor set may not be less than 20% of the total test length.

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Results of Anchor Evaluation

Two items on the Grade 5 Science test were flagged using four or more of the statistics used to examine ICC differences using the IRT Anchor Regression Curve. One of those items, (item #2 in Session 3 on both CA2 and CA3 forms) was recommended for removal due to content concerns (the stimulus and graphing were presented in a different way in the online format than in the paper-and-pencil format). The second flagged item (item #7 in session 3 on both CA2 and CA3 forms) was not recommended for removal because the student experience between the online and paper and pencil presentation was not determined to be practically different. None of the remaining anchor items had content concerns nor were any anchors flagged on more than four of the statistical criterion. The item-ability regression statistics for Grade 5 anchor items are presented in Table 6.20. The item characteristic curves for the flagged items are displayed in Figures 6.5 and 6.6. In these figures the dashed red line is the ICC curve before equating (based on input parameters) and the solid blue line is the ICC curve after equating (based on new parameter estimates).

In Grade 8, three items were flagged using four or more of the statistics examined with the IRT Regression Curves (item #9 in Session 1, Form CA2; item #3 in Session 3 on both CA2 and CA3 forms; and item #6 in Session 1 on Form CA3). All three items were determined to have no content issues or to be affected by the administration mode (online versus paper and pencil); therefore, those items remained part of the anchor set. The item-ability regression statistics for Grade 8 anchor items are presented in Table 6.21. The item characteristic curves for the flagged items are displayed in Figures 6.7 through 6.9.

Table 6.22 provides results for the TCC method. This table summarizes the following information for each grade content area: grade level, number of iterations, scaling constants (M1 and M2), and quadratic loss function (F).

Please note that the actual TCCs are used to assess the quality of the linking results. The TCCs for Science Grade 5 are presented in Figure 6.10 (with all anchor items) and in Figure 6.11 (with one anchor item removed). The TCCs for Science Grade 8 are presented in Figures 6.12. The red dashed TCC lines in the plots are the TCCs for the input anchor items. The blue lines are the TCCs from the 2015 MAP parameter estimates transformed to the 2014 MAP scale. The closer the two TCCs are to each other at all ability levels, the more confidence we have in the equating result. In all three cases, the input and estimate TCCs overlay each other, making the two curves indistinguishable.

6.4.5. Vertical Scale

The ELA and Mathematics scales on which the MAP ELA and Mathematics scale scores are reported were established by SBAC after the 2014 field test. These scales are not unique to Missouri but have been adapted by several states that were members of the SBAC.

The ELA and Mathematics scores are reported on vertical scales, sometimes referred to as a growth scales, showing student progress from grade to grade. For details on ELA and

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Mathematics vertical scale development refer to Chapter 9 of the *Smarter Balanced Technical Report* (2014) posted on the Smarter Balanced website at http://www.smarterbalanced.org/wordpress/wp-content/uploads/2015/06/chapter-9.pdf

The Science scale is unique to Missouri and was developed after the first Science operational test administration in 2008. This scale has been developed by utilizing the vertical scale properties of the standardized achievement test *TerraNova* (CTB/McGraw-Hill, 2003). Although the Science tests do not include *TerraNova* items, the Missouri Science item pool is on the *TerraNova* scale customized for Missouri.

Evidence of the validity of the MAP growth scales is provided by the increase of the scale score at selected percentiles as grade level increases. Figures 6.13 through 6.15 display the scale scores for several points on the score distributions for each grade of the ELA, Mathematics, and Science MAP, respectively. These scale scores indicate the growth, or change, in score by grade at the 10th, 25th, 50th, 75th, and 90th, percentiles. Ideally, the scale score associated with each percentile will increase from grade to grade. Figure 6.13 shows the selected percentiles for the ELA MAP. The scale scores increase as the percentile and grade level increase showing continuous progress upward from Grades 3 through 8 at all selected percentiles.

Figure 6.14 shows the selected percentiles for the Mathematics MAP. There is an upward progression of scale scores across Grades 3 through 7 and all percentiles, although less growth is observed between Grades 6 and 7 at 10th, 25th, and 50th percentiles than at the 75th or 90th percentiles. There is also less growth, in general, observed between Grades 6 and 7 than between each of Grades 3 through 6. No growth was observed at any of the selected percentiles between Grades 7 and 8 (the mean scale score for these grades at all selected percentiles did not differ by more than 1 scale score point in either direction).

Figure 6.15 shows the selected percentiles for the Science MAP. There is an upward progression of scale scores across the two Science grades.

Figures 6.16 to 6.18 show the TCCs by grade for the MAP ELA, Mathematics, and Science assessments, respectively. The ELA and Mathematics TCCs were generated using the SBAC field test parameters (which were also used to score students). The Science TCCs were generated using equated item parameters from the 2015 test administration. The TCCs for all three content areas are based on combined parameters across all test forms in a given grade.

Figure 6.16 shows that the TCCs for ELA are generally ordinal across grade levels indicating that the test difficulty increases with grade level. The only slight crossover of the Grades 5 and 6 TCCs is seen at the low end of scale and a slight overlap of the Grades 6 and 7 TCCs is observed at the upper end of the scale.

For Mathematics (Figure 6.17), the TCCs, again, generally indicate that test difficulty increases with grade level. The exceptions can be seen for Grades 5 and 6 TCCs, which

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overlap and cross at the low to mid-part of the scale. Additionally, for Science (Figure 6.18), the TCCs show that test difficulty increases with grade level.

6.4.6. 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). Table 6.23 shows the LOSS and HOSS values used for each grade of the ELA, Mathematics, and Science 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.

6.5.1. Claim-Level Scores

In addition to a total test scale scores, the Claim-Level scale scores were also computed using the item pattern scoring for ELA and Mathematics. Although such scores are not reported in MAP, they are used to classify student in one of the three achievement levels on a Claim: *Below Standard*, *At/Near Standard*, or *Above Standard* for ELA and Mathematics.

For additional information on the technical details of the item-pattern scoring, readers can also refer to Yen & Candell (1991). SBAC's scoring specifications followed by DRC in scoring of ELA and Mathematics and described in detail in *Smarter Balanced Scoring Specifications, 2014-2015 Administration Summative and Interim Assessments: ELA Grades 3–8, 11 and Mathematics Grades 3–8, 11, V.7* are included in Appendix D.

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6.6. Summary

In summary, the overall purpose of the operational data analysis 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/CTB address multiple best practices of the testing industry but, in particular, are related to the following *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 2014):

- 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 5.13—When claims of form-to-form score equivalence are based on equating procedures, detailed technical information should be provided on the method by which equating functions were established and on the accuracy of the equating functions.
- Standard 5.15—In equating studies that employ an anchor test design, the characteristics of the anchor test and its similarity to the forms being equated should be presented, including both content specifications and empirically determined relationship among test scores. If anchor items are used in the equating study, the representativeness and psychometric characteristics of the anchor items should be presented.
- 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.

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Table 6.1: MAP Means, Standard Deviations for Raw Scores, *p*-values, Item-Total Correlation (R_{it}): English Language Arts/Literacy 2015

Grade	Form	Total Items	Total Points	Mean Raw Score (SD)	Mean *p*-value (SD)	Mean R_{it} (SD)
3	CA1	44	47	24.35 (9.72)	0.54 (0.18)	0.41 (0.09)
	CA2	44	47	25.45 (8.99)	0.56 (0.19)	0.39 (0.07)
	CA3	44	47	25.85 (8.89)	0.57 (0.19)	0.39 (0.08)
	CT1	46	49	16.65 (8.84)	0.36 (0.13)	0.36 (0.10)
4	CA1	44	47	24.14 (9.15)	0.53 (0.19)	0.39 (0.07)
	CA2	44	47	26.11 (8.76)	0.57 (0.21)	0.38 (0.08)
	CA3	44	47	25.12 (8.47)	0.56 (0.21)	0.37 (0.07)
	CT1	46	49	16.33 (7.99)	0.36 (0.15)	0.30 (0.15)
5	CA1PA1	48	58	29.59 (11.29)	0.53 (0.19)	0.41 (0.09)
	CA1PA2	48	58	29.56 (10.63)	0.53 (0.20)	0.39 (0.09)
	CA1PA3	48	58	27.19 (10.94)	0.49 (0.20)	0.41 (0.10)
	CA2PA1	48	57	27.89 (10.46)	0.50 (0.20)	0.38 (0.10)
	CA2PA2	48	57	30.77 (9.66)	0.55 (0.22)	0.36 (0.10)
	CA2PA3	48	57	28.93 (10.05)	0.52 (0.21)	0.37 (0.11)
	CA3PA1	48	57	28.77 (10.34)	0.52 (0.19)	0.37 (0.11)
	CA3PA2	48	57	27.81 (10.53)	0.50 (0.20)	0.38 (0.12)
	CA3PA3	48	57	30.45 (9.71)	0.55 (0.20)	0.35 (0.10)
	CT1PT1	50	60	17.80 (10.27)	0.33 (0.17)	0.37 (0.13)

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Table 6.1: MAP Means, Standard Deviations for Raw Scores, *p*-values, Item-Total Correlation (R_{it}): English Language Arts/Literacy 2015 (cont.)

Grade	Form	Total Items	Total Points	Mean Raw Score (SD)	Mean *p*-value (SD)	Mean R_{it} (SD)
6	CA1	45	48	24.00 (8.44)	0.51 (0.17)	0.33 (0.10)
	CA2	45	48	24.78 (8.57)	0.53 (0.19)	0.35 (0.09)
	CA3	45	48	25.92 (8.61)	0.56 (0.17)	0.35 (0.10)
	CT1	47	50	17.45 (8.86)	0.37 (0.15)	0.35 (0.12)
7	CA1	45	48	23.64 (9.71)	0.50 (0.16)	0.40 (0.09)
	CA2	45	48	26.20 (9.09)	0.56 (0.17)	0.37 (0.08)
	CA3	45	48	26.26 (8.76)	0.56 (0.19)	0.35 (0.09)
	CT1	47	50	15.97 (8.86)	0.33 (0.15)	0.36 (0.13)
8	CA1PA1	49	59	28.18 (11.16)	0.49 (0.19)	0.40 (0.10)
	CA1PA2	49	59	29.62 (11.47)	0.51 (0.20)	0.40 (0.10)
	CA1PA3	49	58	29.92 (10.58)	0.52 (0.19)	0.38 (0.09)
	CA2PA1	49	59	29.29 (10.57)	0.51 (0.18)	0.37 (0.10)
	CA2PA2	49	59	31.11 (10.58)	0.53 (0.18)	0.36 (0.10)
	CA2PA3	49	58	29.82 (10.87)	0.52 (0.17)	0.38 (0.10)
	CA3PA1	49	59	29.71 (10.65)	0.52 (0.20)	0.38 (0.09)
	CA3PA2	49	59	29.60 (11.03)	0.51 (0.20)	0.39 (0.09)
	CA3PA3	49	58	31.45 (10.45)	0.55 (0.19)	0.37 (0.09)
	CT1PT1	51	60	19.28 (10.41)	0.35 (0.16)	0.37 (0.12)

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Table 6.2: MAP Means, Standard Deviations for Raw Scores, *p*-values, Item-Total Correlation (R_{it}): Mathematics 2015

Grade	Form	Total Items	Total Points	Mean Raw Score (SD)	Mean *p*-value (SD)	Mean R_{it} (SD)
3	CA1	31	33	16.24 (7.53)	0.50 (0.24)	0.46 (0.09)
	CA2	31	33	17.84 (7.00)	0.54 (0.24)	0.42 (0.10)
	CA3	31	33	18.04 (7.11)	0.55 (0.22)	0.42 (0.10)
	CS1	31	33	12.55 (6.33)	0.39 (0.25)	0.40 (0.19)
	CT1	35	36	15.29 (7.20)	0.45 (0.21)	0.37 (0.15)
4	CA1	31	33	15.36 (7.63)	0.48 (0.21)	0.47 (0.07)
	CA2	31	33	16.67 (7.02)	0.52 (0.25)	0.43 (0.10)
	CA3	31	33	17.36 (6.74)	0.55 (0.24)	0.42 (0.08)
	CS1	31	33	10.48 (6.74)	0.33 (0.20)	0.44 (0.16)
	CT1	35	36	13.68 (6.85)	0.38 (0.17)	0.37 (0.14)
5	CA1PA1	37	45	15.58 (8.90)	0.37 (0.19)	0.42 (0.11)
	CA1PA2	37	45	18.86 (8.72)	0.45 (0.22)	0.40 (0.10)
	CA2PA1	37	45	19.60 (8.86)	0.46 (0.22)	0.40 (0.12)
	CA2PA2	37	45	19.43 (8.84)	0.46 (0.22)	0.41 (0.12)
	CA3PA1	37	45	19.19 (8.90)	0.46 (0.20)	0.40 (0.11)
	CA3PA2	37	45	19.31 (8.80)	0.46 (0.21)	0.40 (0.11)
	CS1PS1	37	45	12.09 (6.84)	0.29 (0.19)	0.31 (0.22)
	CT1PT1	41	47	12.69 (7.58)	0.29 (0.15)	0.35 (0.12)

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Table 6.2: MAP Means, Standard Deviations for Raw Scores, *p*-values, Item-Total Correlation (R_{it}): Mathematics 2015 (cont.)

Grade	Form	Total Items	Total Points	Mean Raw Score (SD)	Mean *p*-value (SD)	Mean R_{it} (SD)
6	CA1	30	31	12.46 (6.29)	0.41 (0.24)	0.43 (0.10)
	CA2	30	31	13.94 (6.32)	0.46 (0.25)	0.42 (0.12)
	CA3	30	31	14.23 (6.40)	0.47 (0.23)	0.41 (0.10)
	CS1	30	31	7.85 (5.13)	0.26 (0.21)	0.36 (0.19)
	CT1	34	35	6.33 (5.84)	0.19 (0.12)	0.40 (0.16)
7	CA1	31	32	11.93 (7.02)	0.38 (0.20)	0.45 (0.10)
	CA2	31	32	14.03 (6.66)	0.45 (0.21)	0.40 (0.14)
	CA3	31	32	14.24 (6.81)	0.45 (0.20)	0.41 (0.15)
	CS1	31	32	6.19 (4.40)	0.22 (0.18)	0.37 (0.25)
	CT1	35	37	6.33 (5.24)	0.18 (0.16)	0.37 (0.17)
8	CA1PA1	37	45	12.80 (6.94)	0.31 (0.21)	0.38 (0.10)
	CA1PA2	37	45	15.69 (7.24)	0.38 (0.24)	0.37 (0.10)
	CA2PA1	37	45	15.03 (7.64)	0.35 (0.21)	0.39 (0.12)
	CA2PA2	37	45	15.30 (7.60)	0.36 (0.21)	0.38 (0.12)
	CA3PA1	37	45	15.03 (7.58)	0.34 (0.18)	0.39 (0.12)
	CA3PA2	37	45	15.36 (7.45)	0.35 (0.18)	0.38 (0.12)
	CS1PS1	37	45	8.29 (3.40)	0.24 (0.20)	0.17 (0.22)
	CT1PT1	39	43	6.04 (4.31)	0.15 (0.13)	0.25 (0.14)

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Table 6.3: MAP Means, Standard Deviations for Raw Scores, *p*-values, Item-Total Correlation (R_{it}): Science 2015

Grade	Form	Total Items	Total Points	Mean Raw Score (SD)	Mean *p*-value (SD)	Mean R_{it} (SD)
5	CA2	41	60	35.38 (10.51)	0.61 (0.18)	0.38 (0.08)
	CA3	41	60	40.34 (9.29)	0.69 (0.16)	0.35 (0.07)
8	CA2	39	61	30.87 (12.59)	0.53 (0.12)	0.42 (0.11)
	CA3	38	60	32.14 (11.12)	0.56 (0.12)	0.38 (0.12)
	CT2	39	60	19.39 (10.90)	0.36 (0.14)	0.40 (0.13)

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Table 6.4: Item Statistics English Language Arts/Literacy Grade 3

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA1	1	1	0.68	0.52	0.56	30169
CA1	1	2	0.67	0.39	0.34	30322
CA1	1	3	0.85	0.44	0.37	30313
CA1	1	4	0.77	0.30	0.36	30314
CA1	1	5	0.54	0.55	0.04	30327
CA1	1	6	0.25	0.43	0.40	29758
CA1,CA2,CA3	1,1,1	7,7,7	0.68	0.33	0.20	67510
CA1,CA2,CA3	1,1,1	8,8,8	0.65	0.19	0.21	67505
CA1,CA2,CA3	1,1,1	9,9,9	0.30	0.44	0.13	67466
CA1,CA2,CA3	1,1,1	10,10,10	0.80	0.44	0.20	67513
CA1,CA2,CA3	1,1,1	11,11,11	0.79	0.47	0.23	67493
CA1,CA2,CA3	1,1,1	12,12,12	0.20	0.42	0.65	65930
CA1	1	13	0.47	0.37	0.42	30298
CA1	1	14	0.67	0.31	0.39	30307
CA1	1	15	0.48	0.51	0.09	30312
CA1	1	16	0.53	0.44	0.44	30292
CA1	1	17	0.38	0.32	0.41	30300
CA1	1	18	0.55	0.33	0.42	30297
CA1	1	19	0.46	0.58	0.14	30296
CA1	1	20	0.64	0.45	0.42	30296
CA1	1	21	0.35	0.46	0.14	30295
CA1,CA2,CA3	1,1,1	22,22,22	0.39	0.28	0.28	67458
CA1	1	23	0.67	0.45	0.46	30285
CA1,CA2,CA3	1,1,1	24,24,24	0.78	0.50	0.28	67457
CA1	1	25	0.67	0.46	0.18	30284
CA1	2	1	0.52	0.52	0.01	30329
CA1	2	2	0.24	0.30	0.04	30319
CA1	2	3	0.45	0.32	0.35	30317
CA1,CA2,CA3	2,2,2	4,4,4	0.46	0.34	0.22	67494
CA1,CA2,CA3	2,2,2	5,5,5	0.52	0.43	0.22	67499
CA1,CA2,CA3	2,2,2	6,6,6	0.41	0.50	0.03	67524
CA1	2	7	0.21	0.35	0.06	30315
CA1	2	8	0.45	0.56	0.03	30322
CA1	2	9	0.71	0.43	0.36	30315
CA1	2	10	0.51	0.39	0.28	30246

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Tables 6.4: Item Statistics English Language Arts/Literacy Grade 3 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA1,CA2,CA3	2,2,2	11,11,11	0.51	0.37	0.25	67476
CA1,CA2,CA3	2,2,2	12,12,12	0.55	0.37	0.24	67482
CA1	2	13	0.63	0.35	0.43	30295
CA1	2	14	0.37	0.32	0.44	30291
CA1,CA2,CA3	2,2,2	15,15,15	0.83	0.45	0.27	67461
CA1	2	16	0.47	0.43	0.08	30309
CA1,CA2,CA3	2,2,2	17,17,17	0.86	0.41	0.27	67461
CA1	2	18	0.69	0.48	0.42	30298
CA1	2	19	0.34	0.51	0.44	29107
CA2	1	1	0.73	0.40	0.06	18622
CA2	1	2	0.83	0.33	0.06	18623
CA2	1	3	0.29	0.40	0.04	18626
CA2	1	4	0.62	0.47	0.10	18616
CA2	1	5	0.60	0.45	0.10	18616
CA2	1	6	0.25	0.38	0.28	18384
CA2	1	13	0.75	0.35	0.11	18613
CA2	1	14	0.54	0.26	0.33	18572
CA2	1	15	0.51	0.35	0.14	18607
CA2	1	16	0.30	0.39	0.16	18604
CA2	1	17	0.53	0.36	0.10	18615
CA2	1	18	0.38	0.33	0.12	18611
CA2	1	19	0.36	0.52	0.08	18619
CA2	1	20	0.74	0.48	0.11	18613
CA2	1	21	0.51	0.40	0.11	18613
CA2	1	23	0.60	0.36	0.17	18602
CA2	1	25	0.56	0.38	0.16	18605
CA2	2	1	0.42	0.52	0.01	18624
CA2	2	2	0.72	0.27	0.10	18616
CA2	2	3	0.21	0.35	0.04	18618
CA2	2	7	0.68	0.32	0.13	18610
CA2	2	8	0.28	0.33	0.05	18616
CA2	2	9	0.63	0.40	0.09	18617
CA2	2	10	0.56	0.48	0.16	18604
CA2,CA3	2,2	13,14	0.81	0.38	0.13	37174
CA2	2	14	0.72	0.42	0.25	18580

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Tables 6.4: Item Statistics English Language Arts/Literacy Grade 3 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA2	2	16	0.66	0.35	0.17	18602
CA2	2	18	0.79	0.45	0.16	18604
CA2	2	19	0.27	0.43	0.60	18055
CA3	1	1	0.53	0.39	0.03	18582
CA3	1	2	0.68	0.51	0.50	18493
CA3	1	3	0.20	0.32	0.38	18305
CA3	1	4	0.66	0.22	0.08	18572
CA3	1	5	0.52	0.26	0.40	18512
CA3	1	6	0.49	0.49	0.04	18579
CA3	1	13	0.65	0.45	0.09	18570
CA3	1	14	0.61	0.34	0.17	18555
CA3	1	15	0.58	0.37	0.09	18570
CA3	1	16	0.58	0.34	0.09	18570
CA3	1	17	0.66	0.41	0.13	18562
CA3	1	18	0.79	0.50	0.12	18564
CA3	1	19	0.71	0.46	0.13	18562
CA3	1	20	0.44	0.35	0.15	18560
CA3	1	21	0.65	0.30	0.17	18556
CA3	1	23	0.75	0.49	0.17	18556
CA3	1	25	0.68	0.42	0.17	18556
CA3	2	1	0.52	0.40	0.01	18582
CA3	2	2	0.15	0.25	0.04	18576
CA3	2	3	0.37	0.31	0.07	18574
CA3	2	7	0.26	0.25	0.04	18576
CA3	2	8	0.65	0.37	0.11	18567
CA3	2	9	0.70	0.40	0.09	18571
CA3	2	10	0.65	0.37	0.10	18569
CA3	2	13	0.63	0.43	0.12	18565
CA3	2	16	0.71	0.43	0.12	18564
CA3	2	18	0.41	0.37	0.16	18554
CA3	2	19	0.27	0.45	0.64	17996

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Table 6.5: Item Statistics English Language Arts/Literacy Grade 4

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA1	1	1	0.61	0.38	0.33	29528
CA1	1	2	0.61	0.42	0.34	29525
CA1	1	3	0.34	0.26	0.37	29516
CA1	1	4	0.54	0.46	0.29	29453
CA1,CA2,CA3	1,1,1	5,5,5	0.44	0.28	0.19	66423
CA1,CA2,CA3	1,1,1	6,6,6	0.71	0.43	0.19	66509
CA1,CA2,CA3	1,1,1	7,7,7	0.34	0.36	0.05	66515
CA1,CA2,CA3	1,1,1	8,8,8	0.51	0.43	0.05	66520
CA1,CA2,CA3	1,1,1	9,9,9	0.88	0.38	0.20	66505
CA1,CA2,CA3	1,1,1	10,10,10	0.19	0.40	0.30	65942
CA1	1	11	0.37	0.42	0.07	29518
CA1	1	12	0.81	0.47	0.39	29510
CA1	1	13	0.81	0.49	0.39	29510
CA1	1	14	0.52	0.31	0.37	29516
CA1,CA2	1,1	15,15	0.41	0.30	0.32	47973
CA1,CA2	1,1	16,16	0.42	0.35	0.25	47920
CA1,CA2	1,1	17,17	0.65	0.49	0.30	47981
CA1	1	18	0.65	0.47	0.10	29508
CA1,CA2	1,1	19,18	0.35	0.46	0.11	47983
CA1,CA2	1,1	20,19	0.25	0.40	0.62	47139
CA1	1	21	0.70	0.44	0.39	29511
CA1	1	22	0.62	0.46	0.44	29496
CA1,CA2,CA3	1,1,1	23,23,23	0.67	0.42	0.29	66444
CA1,CA2,CA3	1,1,1	24,24,24	0.54	0.39	0.15	66453
CA1	1	25	0.48	0.17	0.42	29502
CA1	2	1	0.71	0.32	0.31	29534
CA1	2	2	0.55	0.36	0.30	29537
CA1	2	3	0.33	0.33	0.02	29546
CA1,CA2,CA3	2,2,2	4,4,4	0.58	0.47	0.03	66532
CA1,CA2,CA3	2,2,2	5,5,5	0.93	0.36	0.17	66528
CA1,CA2,CA3	2,2,2	6,6,6	0.49	0.46	0.02	66540
CA1	2	7	0.60	0.42	0.31	29533
CA1	2	8	0.67	0.37	0.05	29535
CA1	2	9	0.27	0.37	0.03	29542
CA1	2	10	0.78	0.40	0.31	29534

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Table 6.5: Item Statistics English Language Arts/Literacy Grade 4 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA1,CA2,CA3	2,2,2	11,11,11	0.34	0.39	0.23	66397
CA1	2	12	0.33	0.47	0.74	28830
CA1,CA2,CA3	2,2,2	13,13,13	0.52	0.34	0.23	66483
CA1	2	14	0.60	0.53	0.38	29513
CA1,CA2,CA3	2,2,2	15,15,15	0.76	0.35	0.24	66477
CA1	2	16	0.88	0.31	0.35	29523
CA1	2	17	0.29	0.30	0.31	29459
CA1,CA2,CA3	2,2,2	18,18,18	0.35	0.37	0.09	66494
CA1	2	19	0.44	0.26	0.26	29474
CA2	1	1	0.78	0.48	0.23	18457
CA2	1	2	0.42	0.26	0.04	18491
CA2	1	3	0.46	0.15	0.04	18492
CA2	1	4	0.88	0.34	0.08	18484
CA2	1	11	0.63	0.36	0.12	18477
CA2	1	12	0.27	0.31	0.08	18484
CA2	1	13	0.44	0.36	0.09	18482
CA2	1	14	0.33	0.42	0.10	18481
CA2	1	20	0.19	0.23	0.22	18459
CA2	1	21	0.74	0.41	0.17	18468
CA2	1	22	0.58	0.41	0.21	18461
CA2	1	25	0.36	0.47	0.17	18467
CA2	2	1	0.52	0.43	0.08	18484
CA2	2	2	0.69	0.45	0.04	18485
CA2	2	3	0.77	0.35	0.02	18488
CA2	2	7	0.72	0.45	0.09	18482
CA2	2	8	0.41	0.26	0.03	18487
CA2	2	9	0.88	0.45	0.10	18480
CA2	2	10	0.59	0.43	0.04	18484
CA2	2	12	0.53	0.53	0.40	18124
CA2	2	14	0.72	0.51	0.15	18472
CA2	2	16	0.77	0.48	0.17	18468
CA2	2	17	0.91	0.37	0.15	18471
CA2	2	19	0.87	0.35	0.13	18475
CA3	1	1	0.49	0.21	0.22	18473
CA3	1	2	0.53	0.33	0.09	18496

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Table 6.5: Item Statistics English Language Arts/Literacy Grade 4 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA3	1	3	0.57	0.46	0.01	18511
CA3	1	4	0.76	0.41	0.05	18503
CA3	1	11	0.29	0.41	0.04	18505
CA3	1	12	0.42	0.29	0.09	18496
CA3	1	13	0.25	0.32	0.05	18503
CA3	1	14	0.47	0.52	0.05	18504
CA3	1	15	0.55	0.35	0.09	18497
CA3	1	16	0.67	0.39	0.11	18493
CA3	1	17	0.55	0.26	0.09	18496
CA3	1	18	0.17	0.32	0.08	18499
CA3	1	19	0.18	0.39	0.49	18073
CA3	1	20	0.48	0.40	0.10	18495
CA3	1	21	0.76	0.40	0.12	18491
CA3	1	22	0.34	0.36	0.45	18429
CA3	1	25	0.45	0.29	0.52	18417
CA3	2	1	0.71	0.23	0.02	18509
CA3	2	2	0.70	0.44	0.04	18505
CA3	2	3	0.36	0.29	0.02	18506
CA3	2	7	0.74	0.34	0.06	18501
CA3	2	8	0.76	0.38	0.06	18502
CA3	2	9	0.39	0.40	0.03	18505
CA3	2	10	0.62	0.29	0.09	18496
CA3	2	12	0.88	0.45	0.09	18496
CA3	2	14	0.37	0.45	0.54	17947
CA3	2	16	0.85	0.45	0.12	18490
CA3	2	17	0.89	0.22	0.11	18493
CA3	2	19	0.84	0.46	0.14	18485

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Table 6.6: Item Statistics English Language Arts/Literacy Grade 5

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA1	1	1	0.24	0.19	0.02	29047
CA1	1	2	0.77	0.33	0.29	29042
CA1	1	3	0.40	0.49	0.05	29037
CA1	1	4	0.27	0.42	0.59	28701
CA1	1	5	0.36	0.37	0.04	29040
CA1	1	6	0.61	0.45	0.31	29035
CA1,CA2,CA3	1,1,1	7,7,7	0.86	0.42	0.18	65924
CA1,CA2,CA3	1,1,1	8,8,8	0.91	0.40	0.19	65916
CA1,CA2,CA3	1,1,1	9,9,9	0.79	0.44	0.19	65920
CA1,CA2,CA3	1,1,1	10,10,10	0.47	0.42	0.15	65866
CA1,CA2,CA3	1,1,1	11,11,11	0.23	0.37	0.09	65904
CA1,CA2,CA3	1,1,1	12,12,12	0.37	0.42	0.30	65442
CA1	1	13	0.47	0.51	0.11	29019
CA1	1	14	0.65	0.49	0.16	29005
CA1	1	15	0.56	0.57	0.09	29026
CA1	1	16	0.46	0.36	0.36	29021
CA1	1	17	0.39	0.29	0.39	29012
CA1	1	18	0.71	0.38	0.39	29012
CA1	1	19	0.37	0.51	0.09	29024
CA1	1	20	0.57	0.45	0.38	29014
CA1	1	21	0.80	0.41	0.39	29011
CA1	1	22	0.82	0.44	0.42	29005
CA1,CA2,CA3	1,1,1	23,23,23	0.39	0.32	0.26	65870
CA1,CA2,CA3	1,1,1	24,24,24	0.45	0.49	0.12	65885
CA1,CA2,CA3	1,1,1	25,25,25	0.61	0.52	0.21	65829
CA1	2	1	0.75	0.31	0.31	29037
CA1	2	2	0.77	0.40	0.33	29030
CA1	2	3	0.56	0.46	0.06	29032
CA1	2	4	0.65	0.41	0.33	29029
CA1	2	5	0.47	0.48	0.03	29039
CA1	2	6	0.45	0.38	0.33	29029
CA1,CA2,CA3	2,2,2	7,7,7	0.45	0.35	0.18	65924
CA1,CA2,CA3	2,2,2	8,8,8	0.23	0.23	0.04	65934
CA1,CA2,CA3	2,2,2	9,9,9	0.61	0.40	0.18	65922
CA1	2	10	0.64	0.39	0.07	29030

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Table 6.6: Item Statistics English Language Arts/Literacy Grade 5 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA1	2	11	0.43	0.17	0.35	29023
CA1,CA2,CA3	2,2,2	12,12,12	0.90	0.37	0.20	65911
CA1	2	13	0.68	0.52	0.28	28967
CA1,CA2,CA3	2,2,2	14,14,14	0.34	0.23	0.23	65892
CA1,CA2,CA3	2,2,2	15,15,15	0.51	0.42	0.26	65870
CA1	2	16	0.47	0.28	0.37	29018
CA1,CA2,CA3	2,2,2	17,17,17	0.49	0.41	0.17	65849
CA1	2	18	0.91	0.38	0.36	29021
CA1	2	19	0.31	0.42	0.70	28311
CA2	1	1	0.51	0.13	0.23	18372
CA2	1	2	0.74	0.41	0.05	18405
CA2	1	3	0.61	0.25	0.08	18401
CA2	1	4	0.25	0.36	0.05	18403
CA2	1	5	0.17	0.33	0.04	18405
CA2	1	6	0.46	0.20	0.10	18397
CA2	1	13	0.59	0.25	0.09	18398
CA2	1	14	0.76	0.45	0.10	18397
CA2	1	15	0.57	0.26	0.05	18405
CA2	1	16	0.53	0.33	0.11	18395
CA2	1	17	0.77	0.40	0.07	18403
CA2	1	18	0.21	0.33	0.07	18400
CA2	1	19	0.33	0.38	0.08	18399
CA2	1	20	0.71	0.57	0.08	18398
CA2	1	21	0.69	0.31	0.13	18391
CA2	1	22	0.79	0.45	0.12	18393
CA2	2	1	0.47	0.39	0.04	18403
CA2	2	2	0.71	0.27	0.09	18399
CA2	2	3	0.73	0.32	0.03	18404
CA2	2	4	0.17	0.29	0.04	18402
CA2	2	5	0.63	0.34	0.09	18399
CA2	2	6	0.36	0.17	0.08	18400
CA2	2	10	0.71	0.46	0.11	18395
CA2	2	11	0.76	0.53	0.17	18379
CA2	2	13	0.86	0.39	0.10	18397
CA2	2	16	0.85	0.28	0.11	18394

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Table 6.6: Item Statistics English Language Arts/Literacy Grade 5 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA2	2	18	0.67	0.46	0.14	18384
CA2	2	19	0.53	0.45	0.36	18144
CA3	1	1	0.64	0.37	0.02	18499
CA3	1	2	0.37	0.13	0.02	18498
CA3	1	3	0.86	0.45	0.06	18490
CA3	1	4	0.42	0.26	0.02	18498
CA3	1	5	0.66	0.30	0.05	18493
CA3	1	6	0.16	0.24	0.02	18498
CA3	1	13	0.60	0.33	0.08	18488
CA3	1	14	0.56	0.57	0.07	18489
CA3	1	15	0.56	0.22	0.08	18488
CA3	1	16	0.39	0.20	0.09	18486
CA3	1	17	0.29	0.29	0.09	18486
CA3	1	18	0.90	0.47	0.14	18476
CA3	1	19	0.43	0.42	0.16	18472
CA3	1	20	0.52	0.22	0.13	18478
CA3	1	21	0.78	0.43	0.18	18468
CA3	1	22	0.30	0.29	0.17	18470
CA3	2	1	0.56	0.31	0.05	18493
CA3	2	2	0.55	0.37	0.02	18495
CA3	2	3	0.32	0.30	0.04	18492
CA3	2	4	0.68	0.39	0.08	18488
CA3	2	5	0.67	0.32	0.06	18490
CA3	2	6	0.40	0.31	0.04	18492
CA3	2	10	0.71	0.14	0.09	18485
CA3	2	11	0.74	0.47	0.07	18489
CA3	2	13	0.81	0.48	0.10	18480
CA3	2	16	0.64	0.20	0.12	18479
CA3	2	18	0.67	0.28	0.10	18483
CA3	2	19	0.58	0.50	0.57	18101
PA1	1	1	0.42	0.40	0.02	29078
PA1	1	2	0.35	0.50	0.20	28842
PA1	1	3	0.42	0.53	0.17	28898
PA1	2	1	0.52	0.63	0.12	27781
PA2	1	1	0.53	0.46	0.14	18313

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Table 6.6: Item Statistics English Language Arts/Literacy Grade 5 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
PA2	1	2	0.38	0.41	0.10	18309
PA2	1	3	0.04	0.18	0.04	18382
PA2	2	1	0.53	0.57	0.08	17066
PA3	1	1	0.28	0.32	0.06	18443
PA3	1	2	0.29	0.35	0.20	18331
PA3	1	3	0.34	0.47	0.21	18340
PA3	2	1	0.52	0.55	0.09	17961

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Table 6.7: Item Statistics English Language Arts/Literacy Grade 6

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA1	1	1	0.57	0.22	0.06	29460
CA1	1	2	0.47	0.21	0.08	29453
CA1	1	3	0.21	0.25	0.05	29462
CA1,CA2,CA3	1,1,1	4,4,4	0.53	0.40	0.09	65653
CA1,CA2,CA3	1,1,1	5,5,5	0.48	0.50	0.13	65625
CA1,CA2,CA3	1,1,1	6,6,6	0.67	0.50	0.08	65658
CA1,CA2,CA3	1,1,1	7,7,7	0.56	0.27	0.08	65660
CA1,CA2,CA3	1,1,1	8,8,8	0.36	0.47	0.43	65149
CA1	1	9	0.78	0.48	0.11	29446
CA1	1	10	0.27	0.37	0.09	29448
CA1	1	11	0.33	0.41	0.08	29453
CA1	1	12	0.46	0.26	0.29	29390
CA1	1	13	0.57	0.31	0.14	29436
CA1	1	14	0.29	0.24	0.32	29382
CA1	1	15	0.57	0.40	0.16	29432
CA1	1	16	0.44	0.18	0.14	29438
CA1	1	17	0.19	0.34	1.42	28766
CA1	1	18	0.18	0.23	0.16	29429
CA1	1	19	0.79	0.48	0.31	29385
CA1	1	20	0.64	0.36	0.20	29419
CA1	1	21	0.49	0.40	0.24	29404
CA1	1	22	0.52	0.30	0.23	29410
CA1,CA2,CA3	1,1,1	23,23,23	0.64	0.24	0.14	65621
CA1	1	24	0.44	0.26	0.24	29407
CA1,CA2,CA3	1,1,1	25,25,25	0.31	0.35	0.13	65624
CA1	1	26	0.57	0.28	0.33	29378
CA1	2	1	0.71	0.46	0.10	29449
CA1	2	2	0.67	0.25	0.05	29453
CA1	2	3	0.40	0.39	0.04	29456
CA1,CA2,CA3	2,2,2	4,4,4	0.64	0.24	0.08	65659
CA1,CA2,CA3	2,2,2	5,5,5	0.55	0.34	0.05	65664
CA1,CA2,CA3	2,2,2	6,6,6	0.66	0.25	0.10	65645
CA1,CA3	2,2	7,7	0.64	0.17	0.10	47566
CA1,CA3	2,2	8,8	0.80	0.39	0.11	47560
CA1,CA3	2,2	9,9	0.35	0.15	0.05	47577

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Table 6.7: Item Statistics English Language Arts/Literacy Grade 6 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA1	2	10	0.54	0.49	0.06	29451
CA1,CA2,CA3	2,2,2	11,11,11	0.72	0.36	0.12	65636
CA1,CA2,CA3	2,2,2	12,12,12	0.66	0.39	0.10	65645
CA1	2	13	0.50	0.19	0.17	29429
CA1	2	14	0.53	0.50	0.93	28708
CA1,CA2,CA3	2,2,2	15,15,15	0.86	0.34	0.15	65612
CA1,CA2,CA3	2,2,2	16,16,16	0.40	0.28	0.16	65607
CA1	2	17	0.61	0.37	0.23	29411
CA1,CA2,CA3	2,2,2	18,18,18	0.25	0.30	0.12	65617
CA1	2	19	0.64	0.25	0.21	29417
CA2	1	1	0.70	0.25	0.01	18096
CA2	1	2	0.42	0.40	0.45	18016
CA2	1	3	0.24	0.30	0.02	18095
CA2	1	9	0.81	0.46	0.03	18092
CA2	1	10	0.71	0.35	0.08	18084
CA2	1	11	0.51	0.33	0.02	18094
CA2	1	12	0.63	0.23	0.04	18091
CA2	1	13	0.11	0.25	0.31	18042
CA2	1	14	0.52	0.24	0.03	18093
CA2	1	15	0.28	0.30	0.02	18094
CA2	1	16	0.52	0.34	0.08	18084
CA2	1	17	0.63	0.44	0.17	18068
CA2	1	18	0.73	0.39	0.06	18088
CA2	1	19	0.52	0.45	0.08	18084
CA2	1	20	0.16	0.24	0.06	18087
CA2	1	21	0.27	0.51	1.15	17645
CA2	1	22	0.65	0.22	0.06	18088
CA2	1	24	0.64	0.42	0.13	18074
CA2	1	26	0.35	0.35	0.07	18086
CA2	2	1	0.56	0.19	0.03	18092
CA2	2	2	0.37	0.30	0.05	18089
CA2	2	3	0.47	0.33	0.04	18090
CA2	2	7	0.38	0.47	0.08	18083
CA2	2	8	0.53	0.34	0.08	18084
CA2	2	9	0.47	0.53	0.05	18088

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Table 6.7: Item Statistics English Language Arts/Literacy Grade 6 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA2	2	10	0.68	0.32	0.09	18082
CA2	2	13	0.88	0.36	0.07	18085
CA2	2	14	0.38	0.47	1.95	17468
CA2	2	17	0.77	0.44	0.22	18058
CA2	2	19	0.43	0.33	0.23	18055
CA3	1	1	0.38	0.28	0.02	18132
CA3	1	2	0.30	0.25	0.06	18126
CA3	1	3	0.48	0.18	0.05	18127
CA3	1	9	0.84	0.36	0.05	18127
CA3	1	10	0.68	0.38	0.07	18124
CA3	1	11	0.74	0.26	0.04	18129
CA3	1	12	0.66	0.39	0.05	18127
CA3	1	13	0.37	0.41	0.18	18104
CA3	1	14	0.38	0.15	0.13	18113
CA3	1	15	0.26	0.36	0.08	18122
CA3	1	16	0.57	0.39	0.10	18117
CA3	1	17	0.34	0.35	0.09	18119
CA3	1	18	0.68	0.40	0.24	18092
CA3	1	19	0.55	0.27	0.09	18119
CA3	1	20	0.34	0.42	0.10	18117
CA3	1	21	0.28	0.45	1.14	17839
CA3	1	22	0.75	0.44	0.11	18116
CA3	1	24	0.65	0.38	0.15	18108
CA3	1	26	0.52	0.52	0.29	18084
CA3	2	1	0.67	0.35	0.07	18124
CA3	2	2	0.43	0.45	0.04	18124
CA3	2	3	0.63	0.45	0.02	18129
CA3	2	10	0.65	0.41	0.03	18126
CA3	2	13	0.61	0.37	0.18	18099
CA3	2	14	0.28	0.43	1.94	17561
CA3	2	17	0.74	0.36	0.08	18121
CA3	2	19	0.69	0.36	0.09	18119

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Table 6.8: Item Statistics English Language Arts/Literacy Grade 7

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA1	1	1	0.75	0.36	0.06	28590
CA1	1	2	0.62	0.31	0.31	28514
CA1	1	3	0.40	0.30	0.19	28549
CA1	1	4	0.45	0.40	0.02	28596
CA1	1	5	0.69	0.39	0.07	28586
CA1	1	6	0.38	0.50	0.76	28300
CA1	1	7	0.46	0.43	0.04	28592
CA1	1	8	0.72	0.44	0.10	28578
CA1	1	9	0.46	0.41	0.49	28463
CA1,CA2,CA3	1,1,1	10,10,10	0.29	0.42	0.16	65524
CA1,CA2,CA3	1,1,1	11,11,11	0.62	0.48	0.09	65576
CA1,CA2,CA3	1,1,1	12,12,12	0.72	0.36	0.10	65571
CA1,CA2,CA3	1,1,1	13,13,13	0.38	0.31	0.25	65462
CA1,CA2,CA3	1,1,1	14,14,14	0.35	0.52	1.12	64451
CA1	1	15	0.67	0.43	0.11	28576
CA1	1	16	0.63	0.48	0.12	28573
CA1	1	17	0.23	0.23	0.13	28567
CA1	1	18	0.48	0.33	0.14	28567
CA1	1	19	0.78	0.52	0.25	28531
CA1	1	20	0.50	0.17	0.14	28566
CA1	1	21	0.25	0.46	0.12	28568
CA1	1	22	0.78	0.49	0.20	28551
CA1	1	23	0.62	0.38	0.67	28410
CA1,CA2,CA3	1,1,1	24,24,24	0.38	0.42	0.66	65193
CA1,CA2,CA3	1,1,1	25,25,25	0.38	0.30	0.21	65499
CA1,CA2,CA3	1,1,1	26,26,26	0.61	0.37	0.23	65481
CA1	2	1	0.58	0.47	0.05	28581
CA1	2	2	0.76	0.48	0.17	28558
CA1	2	3	0.39	0.37	0.06	28576
CA1,CA2,CA3	2,2,2	4,4,4	0.74	0.42	0.13	65548
CA1,CA2,CA3	2,2,2	5,5,5	0.82	0.39	0.11	65560
CA1,CA2,CA3	2,2,2	6,6,6	0.48	0.50	0.06	65569
CA1	2	7	0.52	0.46	0.06	28576
CA1	2	8	0.69	0.40	0.15	28565
CA1	2	9	0.34	0.29	0.13	28557

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Table 6.8: Item Statistics English Language Arts/Literacy Grade 7 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA1	2	10	0.25	0.38	0.28	28513
CA1	2	11	0.31	0.33	0.15	28565
CA1	2	12	0.38	0.48	0.20	28537
CA1	2	13	0.51	0.38	0.15	28564
CA1,CA2,CA3	2,2,2	14,11,11	0.42	0.46	0.09	65549
CA1,CA2,CA3	2,2,2	15,12,12	0.44	0.28	0.10	65542
CA1,CA2,CA3	2,2,2	16,13,13	0.43	0.49	0.15	65511
CA1,CA2,CA3	2,2,2	17,14,14	0.46	0.18	0.20	65504
CA1,CA2,CA3	2,2,2	18,15,15	0.66	0.25	0.19	65510
CA1	2	19	0.36	0.47	2.07	27472
CA2	1	1	0.83	0.46	0.46	18454
CA2	1	2	0.37	0.31	0.44	18431
CA2	1	3	0.86	0.31	0.09	18525
CA2	1	4	0.77	0.38	0.08	18527
CA2	1	5	0.39	0.29	0.04	18531
CA2	1	6	0.67	0.41	0.11	18520
CA2	1	7	0.36	0.42	0.08	18525
CA2	1	8	0.85	0.30	0.10	18523
CA2	1	9	0.46	0.37	0.10	18523
CA2	1	15	0.38	0.23	0.10	18523
CA2	1	16	0.85	0.39	0.35	18475
CA2	1	17	0.55	0.36	0.08	18524
CA2	1	18	0.69	0.37	0.09	18523
CA2	1	19	0.84	0.45	0.13	18516
CA2	1	20	0.38	0.38	0.12	18517
CA2	1	21	0.50	0.45	0.23	18496
CA2	1	22	0.48	0.51	0.43	18459
CA2	1	23	0.54	0.44	0.17	18509
CA2	2	1	0.70	0.25	0.11	18520
CA2	2	2	0.46	0.33	0.05	18524
CA2	2	3	0.62	0.32	0.12	18519
CA2	2	7	0.66	0.41	0.05	18524
CA2	2	8	0.64	0.27	0.11	18521
CA2	2	9	0.73	0.46	0.09	18517
CA2	2	10	0.60	0.32	0.13	18517

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Table 6.8: Item Statistics English Language Arts/Literacy Grade 7 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA2	2	16	0.48	0.41	0.16	18512
CA2	2	17	0.35	0.37	0.25	18487
CA2	2	18	0.29	0.40	0.24	18489
CA2	2	19	0.32	0.48	1.18	18169
CA3	1	1	0.90	0.22	0.35	18422
CA3	1	2	0.75	0.32	0.03	18481
CA3	1	3	0.58	0.35	0.04	18479
CA3	1	4	0.29	0.33	0.04	18480
CA3	1	5	0.57	0.45	0.04	18479
CA3	1	6	0.43	0.41	0.48	18311
CA3	1	7	0.44	0.30	0.03	18481
CA3	1	8	0.75	0.32	0.09	18470
CA3	1	9	0.60	0.31	0.15	18459
CA3	1	15	0.29	0.27	0.22	18447
CA3	1	16	0.79	0.45	0.08	18473
CA3	1	17	0.64	0.44	0.08	18473
CA3	1	18	0.95	0.21	0.07	18474
CA3	1	19	0.35	0.53	0.15	18459
CA3	1	20	0.72	0.36	0.18	18454
CA3	1	21	0.23	0.42	0.11	18466
CA3	1	22	0.69	0.31	0.15	18459
CA3	1	23	0.45	0.28	0.72	18354
CA3	2	1	0.89	0.36	0.14	18462
CA3	2	2	0.74	0.46	0.08	18466
CA3	2	3	0.27	0.17	0.07	18468
CA3	2	7	0.68	0.33	0.14	18462
CA3	2	8	0.46	0.41	0.09	18465
CA3	2	9	0.72	0.22	0.16	18452
CA3	2	10	0.39	0.37	0.15	18459
CA3	2	16	0.58	0.36	0.14	18456
CA3	2	17	0.48	0.30	0.22	18446
CA3	2	18	0.38	0.44	1.52	18046
CA3	2	19	0.57	0.33	0.38	18411

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Table 6.9: Item Statistics English Language Arts/Literacy Grade 8

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA1	1	1	0.60	0.39	0.68	28630
CA1	1	2	0.70	0.44	0.08	28807
CA1	1	3	0.53	0.43	0.03	28816
CA1,CA2,CA3	1,1,1	4,4,4	0.89	0.39	0.10	66060
CA1,CA2,CA3	1,1,1	5,5,5	0.57	0.42	0.08	66072
CA1,CA2,CA3	1,1,1	6,6,6	0.60	0.47	0.18	65991
CA1,CA2,CA3	1,1,1	7,7,7	0.81	0.43	0.09	66063
CA1,CA2,CA3	1,1,1	8,8,8	0.21	0.44	0.15	66012
CA1,CA2,CA3	1,1,1	9,9,9	0.41	0.47	0.97	65140
CA1	1	10	0.68	0.35	0.13	28792
CA1	1	11	0.30	0.44	0.12	28790
CA1	1	12	0.46	0.40	0.24	28757
CA1	1	13	0.59	0.26	0.18	28777
CA1	1	14	0.83	0.48	0.28	28744
CA1	1	15	0.74	0.40	0.16	28783
CA1	1	16	0.68	0.26	0.16	28785
CA1	1	17	0.47	0.30	0.10	28796
CA1	1	18	0.34	0.40	0.13	28788
CA1	1	19	0.73	0.51	0.32	28732
CA1	1	20	0.57	0.42	0.19	28774
CA1	1	21	0.34	0.53	1.28	28283
CA1,CA3	1,1	22,22	0.56	0.31	0.19	47474
CA1,CA2,CA3	1,1,1	23,23,23	0.49	0.42	0.49	65787
CA1,CA2,CA3	1,1,1	24,24,24	0.56	0.50	0.20	65983
CA1,CA2,CA3	1,1,1	25,25,25	0.24	0.40	0.48	65795
CA1	1	26	0.41	0.42	0.85	28579
CA1	2	1	0.87	0.34	0.10	28800
CA1	2	2	0.19	0.35	0.06	28800
CA1	2	3	0.58	0.35	0.11	28797
CA1,CA2,CA3	2,2,2	4,3,4	0.76	0.26	0.14	66033
CA1,CA2,CA3	2,2,2	5,4,5	0.47	0.24	0.14	66034
CA1,CA2,CA3	2,2,2	6,5,6	0.35	0.26	0.14	66030
CA1	2	7	0.55	0.39	0.05	28801
CA1	2	8	0.63	0.30	0.13	28792
CA1	2	9	0.19	0.20	0.09	28789

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Table 6.9: Item Statistics English Language Arts/Literacy Grade 8 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA1	2	10	0.39	0.53	0.12	28781
CA1,CA2,CA3	2,2,2	11,11,11	0.42	0.49	0.31	65884
CA1	2	12	0.26	0.37	0.10	28787
CA1,CA2,CA3	2,2,2	13,13,13	0.51	0.45	0.26	65914
CA1,CA2,CA3	2,2,2	14,14,14	0.62	0.47	1.79	64470
CA1	2	15	0.70	0.41	0.24	28760
CA1,CA2,CA3	2,2,2	16,16,16	0.43	0.46	0.35	65854
CA1	2	17	0.27	0.41	0.18	28765
CA1	2	18	0.34	0.44	0.45	28685
CA1	2	19	0.40	0.33	0.26	28756
CA2	1	1	0.82	0.37	0.05	18551
CA2	1	2	0.55	0.32	0.11	18537
CA2	1	3	0.37	0.19	0.05	18547
CA2	1	10	0.42	0.35	0.06	18546
CA2	1	11	0.75	0.34	0.11	18540
CA2	1	12	0.42	0.42	0.07	18544
CA2	1	13	0.42	0.38	0.09	18541
CA2	1	14	0.56	0.22	0.11	18540
CA2	1	15	0.31	0.40	0.12	18535
CA2	1	16	0.50	0.27	0.12	18537
CA2	1	17	0.46	0.27	0.18	18524
CA2	1	18	0.62	0.46	0.13	18535
CA2	1	19	0.30	0.29	0.13	18533
CA2	1	20	0.43	0.55	1.35	18216
CA2	1	21	0.68	0.31	0.14	18534
CA2	1	22	0.31	0.43	0.96	18378
CA2	1	26	0.68	0.30	0.20	18523
CA2	2	1	0.78	0.32	0.12	18538
CA2	2	2	0.74	0.29	0.12	18538
CA2	2	6	0.57	0.23	0.14	18534
CA2	2	7	0.70	0.36	0.12	18538
CA2	2	8	0.57	0.24	0.16	18531
CA2	2	9	0.71	0.29	0.12	18537
CA2	2	10	0.63	0.38	0.09	18534
CA2	2	12	0.56	0.39	0.15	18533

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Table 6.9: Item Statistics English Language Arts/Literacy Grade 8 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA2	2	15	0.71	0.40	0.19	18524
CA2	2	17	0.19	0.33	0.22	18510
CA2	2	18	0.59	0.32	0.25	18514
CA2	2	19	0.52	0.24	0.23	18518
CA3	1	1	0.80	0.39	0.03	18729
CA3	1	2	0.41	0.38	0.02	18728
CA3	1	3	0.22	0.21	0.09	18715
CA3	1	10	0.73	0.45	0.08	18719
CA3	1	11	0.61	0.49	0.21	18691
CA3	1	12	0.93	0.32	0.07	18720
CA3	1	13	0.56	0.38	0.07	18717
CA3	1	14	0.54	0.41	0.17	18700
CA3	1	15	0.15	0.30	0.11	18710
CA3	1	16	0.55	0.48	0.07	18717
CA3	1	17	0.84	0.38	0.13	18710
CA3	1	18	0.33	0.43	0.09	18714
CA3	1	19	0.70	0.46	0.15	18705
CA3	1	20	0.56	0.37	0.17	18702
CA3	1	21	0.29	0.52	1.81	18285
CA3	1	26	0.52	0.30	0.19	18699
CA3	2	1	0.90	0.26	0.12	18711
CA3	2	2	0.37	0.33	0.04	18713
CA3	2	3	0.56	0.29	0.15	18706
CA3	2	7	0.68	0.37	0.19	18698
CA3	2	8	0.76	0.29	0.20	18696
CA3	2	9	0.56	0.26	0.19	18698
CA3	2	10	0.65	0.36	0.17	18702
CA3	2	12	0.45	0.27	0.19	18698
CA3	2	15	0.49	0.25	0.26	18686
CA3	2	17	0.64	0.39	0.25	18688
CA3	2	18	0.40	0.32	0.16	18690
CA3	2	19	0.32	0.36	0.28	18667
PA1	1	1	0.13	0.40	0.68	28382
PA1	1	2	0.42	0.13	0.30	28765
PA1	1	3	0.19	0.51	0.62	28457

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Table 6.9: Item Statistics English Language Arts/Literacy Grade 8 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
PA1	2	1	0.56	0.61	0.41	27901
PA2	1	1	0.17	0.24	0.23	18512
PA2	1	2	0.20	0.36	0.33	18443
PA2	1	3	0.43	0.55	0.83	18305
PA2	2	1	0.62	0.62	0.47	17654
PA3	1	1	0.29	0.50	0.56	18478
PA3	1	2	0.60	0.21	0.27	18643
PA3	1	3	0.29	0.50	0.48	18519
PA3	2	1	0.73	0.56	0.38	18346

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Table 6.10: Item Statistics Mathematics Grade 3

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA1	1	1	0.89	0.36	0.06	32608
CA1	1	2	0.76	0.49	0.06	32608
CA1	1	3	0.51	0.46	0.15	32578
CA1,CA2,CA3	1,1,1	4,4,4	0.35	0.61	0.16	67421
CA1,CA2,CA3	1,1,1	5,5,5	0.85	0.39	0.05	67491
CA1,CA3	1,1	6,6	0.24	0.40	0.14	50054
CA1	1	7	0.67	0.52	0.15	32576
CA1	1	8	0.60	0.50	0.09	32598
CA1,CA2,CA3	1,1,1	9,9,9	0.32	0.41	0.07	67481
CA1,CA2,CA3	1,1,1	10,10,10	0.48	0.53	0.31	67481
CA1	1	11	0.86	0.44	0.10	32593
CA1	1	12	0.06	0.31	0.13	32584
CA1	1	13	0.10	0.34	0.18	32568
CA1,CA2,CA3	1,1,1	14,14,14	0.57	0.56	0.09	67467
CA1,CA2,CA3	1,1,1	15,15,15	0.45	0.49	0.07	67482
CA1	2	1	0.59	0.54	0.02	32613
CA1	2	2	0.80	0.40	0.06	32601
CA1	2	3	0.36	0.57	0.20	32557
CA1,CA2,CA3	2,2,2	4,4,4	0.24	0.53	0.05	67483
CA1,CA2,CA3	2,2,2	5,5,5	0.93	0.35	0.04	67489
CA1,CA2	2,1	6,6	0.39	0.38	0.36	50000
CA1	2	7	0.66	0.49	0.06	32603
CA1	2	8	0.43	0.53	0.08	32594
CA1,CA2,CA3	2,2,2	9,9,9	0.68	0.52	0.10	67449
CA1,CA2,CA3	2,2,2	10,10,10	0.27	0.40	0.12	67437
CA1	2	11	0.40	0.45	0.13	32577
CA1	2	12	0.29	0.21	0.55	32586
CA1,CA3	2,2	13,13	0.33	0.41	0.10	50068
CA1,CA2,CA3	2,2,2	14,14,14	0.54	0.55	0.12	67436
CA1,CA2,CA3	2,2,2	15,15,15	0.85	0.31	0.35	67455
CA1	2	16	0.51	0.60	0.12	32583
CA2	1	1	0.84	0.42	0.05	17397
CA2	1	2	0.58	0.48	0.08	17391
CA2	1	3	0.07	0.32	0.06	17394
CA2	1	7	0.51	0.44	0.07	17392

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Table 6.10: Item Statistics Mathematics Grade 3 (cont.)

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA2	1	8	0.81	0.33	0.09	17399
CA2	1	11	0.97	0.23	0.05	17397
CA2	1	12	0.25	0.41	0.09	17389
CA2	1	13	0.43	0.51	0.06	17395
CA2	2	1	0.84	0.47	0.05	17393
CA2	2	2	0.61	0.39	0.08	17388
CA2	2	3	0.52	0.20	0.09	17386
CA2	2	6	0.46	0.42	0.11	17394
CA2	2	7	0.66	0.50	0.05	17394
CA2,CA3	2,2	8,8	0.30	0.41	0.05	34878
CA2	2	11	0.41	0.47	0.05	17393
CA2	2	12	0.24	0.47	0.11	17383
CA2	2	13	0.73	0.48	0.14	17389
CA2	2	16	0.29	0.50	0.08	17388
CA3	1	1	0.86	0.36	0.03	17491
CA3	1	2	0.64	0.47	0.07	17484
CA3	1	3	0.58	0.50	0.09	17481
CA3	1	7	0.80	0.41	0.08	17483
CA3	1	8	0.55	0.39	0.17	17480
CA3	1	11	0.66	0.20	0.07	17485
CA3	1	12	0.33	0.29	0.07	17484
CA3	1	13	0.39	0.33	0.17	17480
CA3	2	1	0.75	0.46	0.04	17488
CA3	2	2	0.85	0.26	0.02	17491
CA3	2	3	0.38	0.49	0.13	17473
CA3	2	6	0.76	0.48	0.13	17486
CA3	2	7	0.68	0.31	0.13	17486
CA3	2	11	0.37	0.48	0.07	17482
CA3	2	12	0.28	0.47	0.03	17489
CA3	2	16	0.39	0.55	0.14	17470

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Table 6.11: Item Statistics Mathematics Grade 4

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA1	1	1	0.74	0.47	0.05	31864
CA1,CA3	1,1	2,11	0.57	0.46	0.05	49276
CA1	1	3	0.19	0.53	0.12	31840
CA1,CA2,CA3	1,1,1	4,4,4	0.26	0.41	0.04	66651
CA1,CA2,CA3	1,1,1	5,5,5	0.71	0.47	0.06	66638
CA1	1	6	0.13	0.25	0.16	31828
CA1	1	7	0.56	0.45	0.05	31864
CA1	1	8	0.54	0.59	0.07	31857
CA1,CA2,CA3	1,1,1	9,9,9	0.49	0.47	0.13	66594
CA1,CA2,CA3	1,1,1	10,10,10	0.20	0.50	0.14	66586
CA1	1	11	0.53	0.40	0.08	31854
CA1	1	12	0.45	0.50	0.30	31782
CA1	1	13	0.34	0.56	0.18	31823
CA1,CA2,CA3	1,1,1	14,14,14	0.89	0.37	0.07	66634
CA1,CA2,CA3	1,1,1	15,15,15	0.56	0.55	0.11	66606
CA1	2	1	0.72	0.42	0.06	31856
CA1	2	2	0.54	0.50	0.04	31864
CA1	2	3	0.40	0.41	0.14	31835
CA1,CA2,CA3	2,2,2	4,4,4	0.53	0.49	0.08	66630
CA1,CA2,CA3	2,2,2	5,5,5	0.87	0.42	0.04	66646
CA1	2	6	0.19	0.36	0.09	31847
CA1	2	7	0.58	0.46	0.09	31848
CA1	2	8	0.37	0.51	0.09	31846
CA1,CA2,CA3	2,2,2	9,9,9	0.69	0.57	0.03	66652
CA1,CA2,CA3	2,2,2	10,10,10	0.16	0.44	0.16	66567
CA1	2	11	0.35	0.37	0.11	31843
CA1	2	12	0.78	0.44	0.14	31830
CA1	2	13	0.48	0.46	0.12	31839
CA1,CA2,CA3	2,2,2	14,14,14	0.33	0.47	0.06	66632
CA1,CA2,CA3	2,2,2	15,15,15	0.79	0.44	0.06	66632
CA1	2	16	0.44	0.54	0.15	31832
CA2	1	1	0.93	0.15	0.01	17377
CA2	1	2	0.79	0.44	0.05	17370
CA2	1	3	0.39	0.30	0.02	17374
CA2	1	6	0.57	0.48	0.07	17367

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Table 6.11: Item Statistics Mathematics Grade 4 (cont.)

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA2	1	7	0.26	0.50	0.12	17357
CA2	1	8	0.66	0.43	0.04	17372
CA2	1	11	0.23	0.41	0.20	17343
CA2	1	12	0.42	0.56	0.06	17368
CA2	1	13	0.28	0.57	0.25	17334
CA2	2	1	0.73	0.40	0.01	17378
CA2	2	2	0.77	0.39	0.03	17374
CA2	2	3	0.36	0.32	0.02	17376
CA2	2	6	0.40	0.45	0.02	17375
CA2	2	7	0.45	0.51	0.16	17352
CA2	2	8	0.29	0.49	0.05	17371
CA2	2	11	0.94	0.19	0.35	17319
CA2,CA3	2,1	12,3	0.17	0.37	0.11	34764
CA2	2	13	0.41	0.53	0.05	17371
CA2	2	16	0.30	0.52	0.13	17357
CA3	1	1	0.90	0.23	0.05	17415
CA3	1	2	0.61	0.47	0.04	17416
CA3	1	6	0.70	0.35	0.06	17413
CA3	1	7	0.55	0.46	0.03	17417
CA3	1	8	0.79	0.39	0.05	17414
CA3	1	12	0.35	0.44	0.06	17412
CA3	1	13	0.22	0.49	0.12	17402
CA3	2	1	0.93	0.28	0.03	17417
CA3	2	2	0.62	0.47	0.02	17416
CA3	2	3	0.23	0.47	0.13	17396
CA3	2	6	0.40	0.57	0.05	17411
CA3	2	7	0.69	0.36	0.01	17417
CA3	2	8	0.36	0.33	0.06	17409
CA3	2	11	0.52	0.41	0.12	17398
CA3	2	12	0.26	0.46	0.06	17408
CA3	2	13	0.40	0.38	0.04	17412
CA3	2	16	0.75	0.45	0.10	17406

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Table 6.12: Item Statistics Mathematics Grade 5

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA1	1	1	0.69	0.39	0.06	31176
CA1	1	2	0.72	0.37	0.04	31185
CA1	1	3	0.20	0.36	0.10	31164
CA1,CA2,CA3	1,1,1	4,4,4	0.08	0.41	0.03	66053
CA1,CA2,CA3	1,1,1	5,5,5	0.48	0.25	0.05	66046
CA1	1	6	0.20	0.59	0.18	31137
CA1	1	7	0.43	0.43	0.08	31172
CA1	1	8	0.56	0.53	0.07	31175
CA1,CA2,CA3	1,1,1	9,9,9	0.37	0.47	0.03	66049
CA1,CA2,CA3	1,1,1	10,10,10	0.27	0.41	0.04	66043
CA1	1	11	0.64	0.40	0.08	31170
CA1	1	12	0.53	0.37	0.12	31160
CA1	1	13	0.10	0.36	0.05	31177
CA1,CA2,CA3	1,1,1	14,14,14	0.68	0.27	0.06	66036
CA1,CA2,CA3	1,1,1	15,15,15	0.27	0.21	0.03	66047
CA1	2	1	0.57	0.34	0.09	31167
CA1	2	2	0.56	0.55	0.08	31160
CA1	2	3	0.06	0.41	0.18	31131
CA1,CA2,CA3	2,2,2	4,4,4	0.66	0.44	0.09	66018
CA1,CA2,CA3	2,2,2	5,5,5	0.52	0.49	0.07	66012
CA1	2	6	0.42	0.51	0.15	31139
CA1	2	7	0.30	0.22	0.11	31162
CA1	2	8	0.33	0.59	0.17	31133
CA1,CA2,CA3	2,2,2	9,9,9	0.56	0.45	0.09	66014
CA1,CA2,CA3	2,2,2	10,10,10	0.57	0.48	0.11	66001
CA1	2	11	0.49	0.35	0.07	31163
CA1	2	12	0.51	0.30	0.15	31148
CA1	2	13	0.43	0.17	0.14	31151
CA1,CA2,CA3	2,2,2	14,14,14	0.42	0.40	0.12	65981
CA1,CA2,CA3	2,2,2	15,15,15	0.66	0.49	0.11	66006
CA1	2	16	0.09	0.40	0.19	31128
CA2	1	1	0.85	0.35	0.04	17495
CA2	1	2	0.67	0.41	0.03	17497
CA2	1	3	0.42	0.50	0.12	17481
CA2	1	6	0.48	0.45	0.06	17488

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Table 6.12: Item Statistics Mathematics Grade 5 (cont.)

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA2	1	7	0.36	0.16	0.07	17490
CA2	1	8	0.76	0.29	0.06	17493
CA2	1	11	0.53	0.47	0.05	17494
CA2	1	12	0.16	0.22	0.09	17483
CA2	1	13	0.42	0.57	0.10	17481
CA2	2	1	0.69	0.44	0.05	17495
CA2	2	2	0.67	0.40	0.05	17489
CA2	2	3	0.46	0.49	0.07	17486
CA2	2	6	0.41	0.53	0.16	17470
CA2	2	7	0.90	0.24	0.06	17492
CA2	2	8	0.15	0.53	0.10	17480
CA2	2	11	0.46	0.21	0.03	17493
CA2	2	12	0.25	0.22	0.07	17485
CA2	2	13	0.54	0.51	0.05	17489
CA2	2	16	0.12	0.48	0.13	17476
CA3	1	1	0.81	0.42	0.05	17369
CA3	1	2	0.67	0.35	0.05	17368
CA3	1	3	0.37	0.37	0.03	17371
CA3	1	6	0.45	0.47	0.03	17372
CA3	1	7	0.48	0.55	0.08	17363
CA3	1	8	0.42	0.42	0.06	17367
CA3	1	11	0.72	0.35	0.04	17370
CA3	1	12	0.03	0.23	0.18	17346
CA3	1	13	0.43	0.36	0.07	17365
CA3	2	1	0.69	0.41	0.03	17371
CA3	2	2	0.49	0.31	0.03	17371
CA3	2	3	0.60	0.38	0.05	17369
CA3	2	6	0.26	0.13	0.02	17371
CA3	2	7	0.61	0.47	0.06	17367
CA3	2	8	0.46	0.53	0.06	17364
CA3	2	11	0.54	0.22	0.05	17369
CA3	2	12	0.72	0.27	0.07	17364
CA3	2	13	0.09	0.45	0.09	17360
CA3	2	16	0.48	0.53	0.07	17362
PA1	1	1	0.21	0.40	0.05	39848

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Table 6.12: Item Statistics Mathematics Grade 5 (cont.)

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
PA1	1	2	0.19	0.53	0.16	39805
PA1	1	3	0.59	0.52	0.05	39847
PA1	1	4	0.25	0.54	0.24	39630
PA1	1	5	0.10	0.47	0.51	39355
PA1	1	6	0.25	0.59	0.76	39149
PA2	1	1	0.25	0.39	0.05	26140
PA2	1	2	0.20	0.51	0.11	26125
PA2	1	3	0.67	0.46	0.03	26146
PA2	1	4	0.35	0.56	0.15	26091
PA2	1	5	0.09	0.43	0.41	25961
PA2	1	6	0.22	0.56	0.68	25841

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Table 6.13: Item Statistics Mathematics Grade 6

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA1	1	1	0.82	0.36	0.06	30199
CA1	1	2	0.37	0.40	0.22	30150
CA1	1	3	0.50	0.28	0.09	30188
CA1,CA2,CA3	1,1,1	4,4,4	0.32	0.54	0.21	65556
CA1,CA2,CA3	1,1,1	5,5,5	0.25	0.39	0.04	65672
CA1,CA2,CA3	1,1,1	6,6,6	0.70	0.49	0.10	65632
CA1	1	7	0.68	0.34	0.14	30172
CA1	1	8	0.86	0.35	0.16	30168
CA1	1	9	0.58	0.40	0.57	30043
CA1	1	10	0.38	0.51	0.45	30078
CA1,CA2,CA3	1,1,1	11,11,11	0.86	0.37	0.14	65606
CA1,CA2,CA3	1,1,1	12,12,12	0.36	0.45	0.08	65645
CA1,CA2,CA3	1,1,1	13,13,13	0.46	0.40	0.11	65626
CA1	2	1	0.06	0.34	0.25	30133
CA1	2	2	0.13	0.44	0.19	30153
CA1,CA2,CA3	2,2,2	3,3,3	0.21	0.58	0.52	65340
CA1,CA2,CA3	2,2,2	4,4,4	0.60	0.58	0.09	65628
CA1,CA2,CA3	2,2,2	5,5,5	0.48	0.58	0.04	65658
CA1	2	6	0.10	0.36	0.10	30180
CA1	2	7	0.48	0.36	0.14	30173
CA1	2	8	0.45	0.50	0.28	30124
CA1	2	9	0.13	0.44	0.25	30132
CA1	2	10	0.34	0.23	0.12	30181
CA1	2	11	0.31	0.27	0.18	30161
CA1,CA2,CA3	2,2,2	12,12,12	0.33	0.58	0.30	65484
CA1,CA2,CA3	2,2,2	13,13,13	0.54	0.38	0.14	65608
CA1,CA2,CA3	2,2,2	14,14,14	0.15	0.49	0.12	65607
CA1	2	15	0.19	0.48	0.18	30155
CA1	2	16	0.93	0.27	0.14	30168
CA1	2	17	0.22	0.48	0.14	30174
CA2	1	1	0.59	0.31	0.02	17734
CA2	1	2	0.47	0.54	0.24	17695
CA2	1	3	0.58	0.47	0.01	17735
CA2	1	7	0.18	0.33	0.38	17669
CA2	1	8	0.83	0.41	0.01	17735

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Table 6.13: Item Statistics Mathematics Grade 6 (cont.)

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA2	1	9	0.50	0.54	0.19	17704
CA2	1	10	0.35	0.57	0.19	17703
CA2	2	1	0.51	0.42	0.03	17731
CA2	2	2	0.85	0.42	0.03	17728
CA2	2	6	0.38	0.47	0.12	17712
CA2	2	7	0.06	0.37	0.17	17703
CA2	2	8	0.12	0.32	0.15	17706
CA2	2	9	0.56	0.51	0.09	17717
CA2	2	10	0.28	0.44	0.30	17680
CA2	2	11	0.89	0.33	0.06	17723
CA2	2	15	0.09	0.23	0.21	17696
CA2	2	16	0.79	0.09	0.10	17719
CA2	2	17	0.05	0.27	0.24	17690
CA3	1	1	0.79	0.45	0.02	17741
CA3	1	2	0.37	0.30	0.07	17732
CA3	1	3	0.19	0.38	0.05	17735
CA3	1	7	0.10	0.31	0.02	17740
CA3	1	8	0.79	0.39	0.02	17740
CA3	1	9	0.59	0.41	0.02	17740
CA3	1	10	0.46	0.22	0.02	17740
CA3	2	1	0.47	0.50	0.06	17732
CA3	2	2	0.30	0.42	0.13	17719
CA3	2	6	0.07	0.29	0.21	17704
CA3	2	7	0.75	0.18	0.05	17736
CA3	2	8	0.31	0.43	0.09	17726
CA3	2	9	0.41	0.38	0.07	17730
CA3	2	10	0.28	0.31	0.03	17736
CA3	2	11	0.79	0.42	0.08	17728
CA3	2	15	0.83	0.35	0.10	17726
CA3	2	16	0.45	0.49	0.56	17643
CA3	2	17	0.38	0.53	0.16	17714

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Table 6.14: Item Statistics Mathematics Grade 7

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA1	1	1	0.23	0.52	0.03	28960
CA1	1	2	0.33	0.30	0.10	28942
CA1,CA2,CA3	1,1,1	3,3,3	0.55	0.57	0.12	64612
CA1,CA2,CA3	1,1,1	4,4,4	0.42	0.51	0.13	64608
CA1	1	5	0.21	0.48	0.60	28797
CA1	1	6	0.24	0.42	0.07	28951
CA1,CA2,CA3	1,1,1	7,7,7	0.64	0.41	0.34	64472
CA1,CA2,CA3	1,1,1	8,8,8	0.40	0.58	0.26	64521
CA1	1	9	0.17	0.42	0.53	28817
CA1,CA2	2,2	1,1	0.72	0.26	0.10	46773
CA1	2	2	0.24	0.49	0.06	28935
CA1	2	3	0.33	0.34	0.10	28921
CA1,CA2,CA3	2,2,2	4,4,4	0.33	0.60	0.28	64474
CA1,CA2,CA3	2,2,2	5,5,5	0.22	0.41	0.15	64564
CA1,CA3	2,2	6,16	0.50	0.57	0.23	46710
CA1,CA3	2,2	7,17	0.51	0.31	0.19	46756
CA1,CA2	2,2	8,16	0.69	0.37	0.16	46745
CA1,CA2,CA3	2,2,2	9,9,9	0.16	0.56	1.22	63651
CA1,CA2,CA3	2,2,2	10,10,10	0.82	0.40	0.12	64582
CA1	2	11	0.30	0.48	0.23	28884
CA1	2	12	0.14	0.53	0.68	28754
CA1	2	13	0.39	0.35	0.17	28901
CA1,CA2,CA3	2,2,2	14,14,14	0.25	0.42	0.21	64520
CA1,CA2,CA3	2,2,2	15,15,15	0.68	0.40	0.09	64602
CA1	2	16	0.39	0.59	0.29	28867
CA1	2	17	0.26	0.50	0.16	28906
CA1	2	18	0.80	0.33	0.22	28909
CA1,CA2,CA3	2,2,2	19,19,19	0.36	0.61	0.48	64350
CA1,CA2,CA3	2,2,2	20,20,20	0.68	0.22	0.17	64548
CA1,CA3	2,2	21,11	0.12	0.47	0.71	46485
CA1	2	22	0.18	0.48	0.25	28878
CA2	1	1	0.80	0.32	0.01	17847
CA2	1	2	0.43	0.44	0.31	17792
CA2,CA3	1,1	5,5	0.47	0.56	0.16	35663
CA2	1	6	0.26	0.18	0.08	17834

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Table 6.14: Item Statistics Mathematics Grade 7 (cont.)

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA2	1	9	0.51	0.54	0.10	17830
CA2	2	2	0.11	0.43	0.41	17768
CA2	2	3	0.56	0.43	0.14	17816
CA2	2	6	0.61	0.26	0.09	17825
CA2	2	7	0.49	0.33	0.15	17822
CA2	2	8	0.44	0.58	0.64	17727
CA2	2	11	0.14	0.41	0.11	17821
CA2	2	12	0.22	0.53	0.54	17744
CA2	2	13	0.40	0.21	0.15	17822
CA2,CA3	2,2	17,7	0.47	0.11	0.35	35583
CA2	2	18	0.21	0.55	0.22	17801
CA2	2	21	0.48	0.25	0.19	17814
CA2	2	22	0.09	0.26	0.15	17814
CA3	1	1	0.20	0.50	0.43	17796
CA3	1	2	0.44	0.39	0.15	17845
CA3	1	6	0.38	0.10	0.04	17864
CA3	1	9	0.27	0.55	0.45	17792
CA3	2	1	0.44	0.60	0.14	17841
CA3	2	2	0.38	0.16	0.12	17853
CA3	2	3	0.41	0.21	0.12	17852
CA3	2	6	0.63	0.56	0.24	17824
CA3	2	8	0.84	0.29	0.08	17859
CA3	2	12	0.23	0.47	0.09	17850
CA3	2	13	0.50	0.25	0.15	17848
CA3	2	18	0.38	0.38	0.13	17842
CA3	2	21	0.15	0.41	0.54	17770
CA3	2	22	0.82	0.39	0.16	17838

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Table 6.15: Item Statistics Mathematics Grade 8

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA1	1	1	0.64	0.26	0.05	23879
CA1	1	2	0.42	0.43	0.10	23866
CA1,CA2,CA3	1,1,1	3,3,3	0.67	0.37	0.07	52445
CA1	1	4	0.30	0.38	0.61	23744
CA1,CA2	1,1	5,1	0.58	0.32	0.34	38026
CA1,CA2,CA3	1,1,1	6,6,6	0.62	0.39	0.10	52429
CA1	1	7	0.64	0.36	0.15	23854
CA1	2	1	0.18	0.58	1.73	23470
CA1,CA3	2,2	2,18	0.78	0.29	0.11	38157
CA1,CA2,CA3	2,2,2	3,3,3	0.17	0.54	0.58	52145
CA1	2	4	0.28	0.23	0.20	23842
CA1,CA2,CA3	2,2,2	5,5,5	0.59	0.42	0.66	52107
CA1,CA2,CA3	2,2,2	6,6,6	0.06	0.41	10.56	46077
CA1,CA2	2,2	7,1	0.80	0.38	0.18	38070
CA1	2	8	0.34	0.32	0.20	23843
CA1	2	9	0.13	0.32	0.14	23845
CA1,CA2,CA3	2,2,2	10,10,10	0.24	0.52	1.07	51890
CA1,CA2,CA3	2,2,2	11,11,11	0.26	0.57	0.46	52210
CA1	2	12	0.07	0.41	0.70	23712
CA1	2	13	0.34	0.39	0.35	23796
CA1,CA2,CA3	2,2,2	14,14,14	0.19	0.30	0.16	52366
CA1	2	15	0.34	0.15	1.22	23588
CA1,CA2,CA3	2,2,2	16,16,16	0.38	0.53	1.24	51799
CA1,CA2,CA3	2,2,2	17,17,17	0.27	0.54	0.31	52288
CA1	2	18	0.28	0.18	0.28	23824
CA1	2	19	0.63	0.41	0.65	23724
CA1,CA2	2,2	20,20	0.09	0.39	0.67	37880
CA1,CA2,CA3	2,2,2	21,21,21	0.14	0.43	0.29	52301
CA1,CA2,CA3	2,2,2	22,22,22	0.59	0.34	0.29	52327
CA1	2	23	0.45	0.41	0.36	23805
CA1	2	24	0.17	0.30	0.56	23746
CA2	1	2	0.34	0.28	0.08	14256
CA2	1	4	0.45	0.31	0.32	14221
CA2	1	5	0.27	0.55	1.13	14105
CA2	1	7	0.23	0.19	0.13	14249

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Table 6.15: Item Statistics Mathematics Grade 8 (cont.)

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA2	2	2	0.66	0.26	0.25	14221
CA2,CA3	2,2	4,9	0.50	0.45	0.35	28471
CA2	2	7	0.31	0.59	0.36	14205
CA2	2	8	0.36	0.55	1.54	14037
CA2	2	9	0.12	0.25	0.25	14222
CA2	2	12	0.03	0.18	0.23	14224
CA2	2	13	0.50	0.44	1.09	14101
CA2	2	15	0.28	0.20	0.32	14221
CA2	2	18	0.55	0.14	0.25	14232
CA2	2	19	0.45	0.45	0.22	14235
CA2	2	23	0.62	0.39	0.23	14224
CA2	2	24	0.28	0.45	0.96	14120
CA3	1	1	0.48	0.45	0.09	14311
CA3	1	2	0.36	0.24	0.10	14309
CA3	1	4	0.47	0.26	0.24	14289
CA3	1	5	0.16	0.51	0.80	14209
CA3	1	7	0.32	0.36	0.10	14309
CA3	2	1	0.36	0.53	1.25	14136
CA3	2	2	0.39	0.34	0.16	14301
CA3	2	4	0.20	0.39	0.08	14303
CA3	2	7	0.23	0.40	0.34	14267
CA3	2	8	0.51	0.10	0.19	14297
CA3	2	12	0.26	0.51	1.11	14156
CA3	2	13	0.26	0.22	0.27	14285
CA3	2	15	0.27	0.11	0.27	14285
CA3	2	19	0.58	0.32	0.22	14292
CA3	2	20	0.39	0.32	1.79	14059
CA3	2	23	0.31	0.11	0.27	14285
CA3	2	24	0.49	0.51	0.57	14234
PA1	1	1	0.22	0.34	0.31	30859
PA1	1	2	0.14	0.41	0.27	30869
PA1	1	3	0.06	0.38	7.63	28092
PA1	1	4	0.22	0.49	0.42	30825
PA1	1	5	0.11	0.40	2.39	30098
PA1	1	6	0.09	0.32	1.69	30250

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Table 6.15: Item Statistics Mathematics Grade 8 (cont.)

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
PA2	1	1	0.26	0.31	0.34	21342
PA2	1	2	0.17	0.39	0.22	21366
PA2	1	3	0.07	0.35	7.36	19576
PA2	1	4	0.56	0.42	0.38	21333
PA2	1	5	0.13	0.41	2.20	20888
PA2	1	6	0.09	0.31	1.34	21034

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Table 6.16: Item Statistics Science Grade 5

Science						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA2	1	1	0.50	0.49	0.31	39855
CA2,CA3	1,1	2,2	0.60	0.34	0.14	66222
CA2	1	3	0.31	0.41	0.81	39551
CA2	1	4	0.54	0.42	0.31	39814
CA2,CA3	1,1	5,5	0.66	0.34	0.11	66253
CA2,CA3	1,1	6,6	0.46	0.32	0.15	66162
CA2	1	7	0.54	0.52	0.16	39971
CA2	1	8	0.56	0.42	0.54	39612
CA2,CA3	1,1	9,9	0.53	0.38	0.52	65714
CA2	1	10	0.54	0.47	0.37	39813
CA2	1	11	0.54	0.36	0.53	39630
CA2	1	12	0.74	0.45	0.36	39831
CA2	1	13	0.75	0.41	0.40	39753
CA2	1	14	0.64	0.39	0.34	39823
CA2	2	1	0.92	0.35	0.05	40087
CA2	2	2	0.46	0.10	0.08	40077
CA2	2	3	0.66	0.37	0.08	40077
CA2,CA3	2,2	4,4	0.82	0.31	0.06	66338
CA2,CA3	2,2	5,5	0.89	0.33	0.07	66336
CA2,CA3	2,2	6,6	0.46	0.28	0.06	66338
CA2,CA3	2,2	7,7	0.85	0.45	0.07	66335
CA2	2	8	0.45	0.27	0.08	40076
CA2,CA3	2,2	9,9	0.52	0.35	0.07	66332
CA2	2	10	0.78	0.31	0.09	40072
CA2	2	11	0.91	0.40	0.08	40075
CA2,CA3	2,2	12,8	0.82	0.34	0.06	66339
CA2	2	13	0.86	0.30	0.10	40068
CA2	2	14	0.64	0.49	0.09	40071
CA2	2	15	0.86	0.34	0.11	40066
CA2,CA3	2,2	16,16	0.85	0.36	0.07	66336
CA2	2	17	0.54	0.39	0.13	40058
CA2,CA3	2,2	18,18	0.43	0.23	0.09	66323
CA2,CA3	3,3	1,1	0.91	0.29	0.06	66160
CA2,CA3	3,3	2,2	0.36	0.50	0.16	66247
CA2,CA3	3,3	3,3	0.44	0.40	0.54	65658

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Table 6.16: Item Statistics Science Grade 5 (cont.)

Science						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA2,CA3	3,3	4,4	0.60	0.54	0.16	66103
CA2,CA3	3,3	5,5	0.64	0.42	0.47	65570
CA2,CA3	3,3	6,6	0.70	0.33	0.40	65873
CA2,CA3	3,3	7,7	0.30	0.35	0.45	65664
CA2,CA3	3,3	8,8	0.54	0.41	0.61	65532
CA2,CA3	3,3	9,9	0.43	0.43	0.39	66096
CA3	1	1	0.62	0.29	0.05	26244
CA3	1	3	0.62	0.38	0.07	26239
CA3	1	4	0.67	0.35	0.03	26249
CA3	1	7	0.77	0.28	0.06	26253
CA3	1	8	0.64	0.45	0.08	26230
CA3	1	10	0.76	0.44	0.06	26240
CA3	1	11	0.62	0.42	0.21	26140
CA3	1	12	0.65	0.46	0.26	26124
CA3	1	13	0.79	0.36	0.13	26179
CA3	1	14	0.76	0.47	0.07	26239
CA3	2	1	0.73	0.18	0.04	26262
CA3	2	2	0.79	0.36	0.06	26256
CA3	2	3	0.80	0.24	0.05	26258
CA3	2	10	0.91	0.33	0.05	26260
CA3	2	11	0.92	0.30	0.04	26261
CA3	2	12	0.81	0.38	0.05	26260
CA3	2	13	0.83	0.34	0.06	26257
CA3	2	14	0.74	0.36	0.07	26253
CA3	2	15	0.76	0.36	0.05	26259
CA3	2	17	0.81	0.32	0.09	26249

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Table 6.17: Item Statistics Science Grade 8

Science						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA2	1	1	0.69	0.38	1.05	38182
CA2	1	2	0.47	0.41	0.61	38319
CA2	1	3	0.43	0.43	0.39	38460
CA2	1	4	0.74	0.44	1.10	38142
CA2	1	5	0.45	0.56	0.19	38613
CA2	1	6	0.48	0.45	0.58	38387
CA2	1	7	0.46	0.52	0.94	38193
CA2	1	8	0.37	0.49	1.92	37729
CA2	1	9	0.46	0.54	1.27	38081
CA2,CA3	1,1	10,10	0.45	0.51	2.06	64381
CA2	1	11	0.37	0.56	0.64	38347
CA2	1	12	0.37	0.37	0.81	38220
CA2	1	13	0.74	0.51	1.13	38075
CA2	1	14	0.60	0.48	0.53	38413
CA2,CA3	2,2	1,1	0.41	0.30	0.07	66129
CA2,CA3	2,2	2,2	0.47	0.09	0.08	66121
CA2	2	3	0.60	0.57	0.12	38666
CA2,CA3	2,2	4,4	0.73	0.40	0.11	66104
CA2	2	5	0.73	0.42	0.14	38658
CA2	2	6	0.62	0.33	0.13	38661
CA2	2	7	0.66	0.40	0.11	38670
CA2	2	8	0.60	0.36	0.11	38669
CA2	2	9	0.77	0.33	0.11	38668
CA2	2	10	0.54	0.39	0.12	38665
CA2	2	11	0.51	0.39	0.16	38650
CA2	2	12	0.65	0.38	0.12	38664
CA2	2	13	0.58	0.26	0.11	38667
CA2	2	14	0.54	0.25	0.15	38654
CA2,CA3	2,2	15,14	0.59	0.32	0.13	66091
CA2,CA3	2,2	16,15	0.52	0.34	0.14	66087
CA2,CA3	3,3	1,1	0.47	0.42	0.70	65398
CA2,CA3	3,3	2,2	0.49	0.57	0.74	65266
CA2,CA3	3,3	3,3	0.52	0.42	0.56	65484
CA2,CA3	3,3	4,4	0.79	0.39	0.38	65816
CA2,CA3	3,3	5,5	0.43	0.58	0.69	65633

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Table 6.17: Item Statistics Science Grade 8 (cont.)

Science						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CA2,CA3	3,3	6,6	0.58	0.52	0.68	65318
CA2,CA3	3,3	7,7	0.41	0.43	3.99	62628
CA2,CA3	3,3	8,8	0.40	0.52	1.07	65019
CA2,CA3	3,3	9,9	0.42	0.40	1.32	64748
CA3	1	1	0.60	0.49	0.47	27300
CA3	1	2	0.66	0.49	0.78	27205
CA3	1	3	0.49	0.53	0.44	27302
CA3	1	4	0.48	0.57	0.64	27269
CA3	1	5	0.69	0.40	0.75	27204
CA3	1	6	0.44	0.57	3.27	26431
CA3	1	7	0.43	0.46	0.89	27175
CA3	1	8	0.50	0.29	0.19	27394
CA3	1	9	0.46	0.49	2.33	26745
CA3	1	11	0.42	0.36	0.63	27240
CA3	1	12	0.59	0.47	1.51	26935
CA3	1	13	0.68	0.34	1.03	27109
CA3	1	14	0.59	0.35	0.89	27150
CA3	2	3	0.62	0.33	0.09	27441
CA3	2	5	0.41	0.16	0.07	27446
CA3	2	6	0.79	0.35	0.08	27444
CA3	2	7	0.73	0.27	0.08	27444
CA3	2	8	0.59	0.22	0.09	27442
CA3	2	9	0.61	0.26	0.08	27445
CA3	2	10	0.57	0.21	0.09	27441
CA3	2	11	0.80	0.32	0.09	27442
CA3	2	12	0.53	0.24	0.10	27438
CA3	2	13	0.39	0.13	0.09	27442

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Table 6.18: Summary of Calibration and Census Data: Science

	Calibration Sample		Census Data		Difference
	N	%	N	%	(Calib. % − Census %)
Science, Grade 5					
All Students	4929		66412		
Gender					
Male	2524	51.21%	33965	51.14%	0.07%
Female	2405	48.79%	32447	48.86%	−0.07%
Race/Ethnicity					
White	3657	74.19%	48288	72.71%	1.48%
Black	788	15.99%	10688	16.09%	−0.10%
Hispanic	260	5.27%	3874	5.83%	−0.56%
Asian/Pacific Islander	92	1.86%	1490	2.24%	−0.38%
American Indian/Alaska Native	21	0.43%	296	0.45%	−0.02%
Other	111	2.25%	1776	2.67%	−0.42%
Science, Grade 8					
All Students	4397		66526		
Gender					
Male	2328	52.95%	33726	50.70%	2.25%
Female	2069	47.05%	32800	49.30%	−2.25%
Race/Ethnicity					
White	3220	73.23%	49009	73.67%	−0.44%
Black	744	16.92%	10684	16.06%	0.86%
Hispanic	214	4.87%	3618	5.44%	−0.57%
Asian/Pacific Islander	102	2.32%	1418	2.13%	0.19%
American Indian/Alaska Native	20	0.45%	286	0.43%	0.02%
Other	97	2.21%	1511	2.27%	−0.06%

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Table 6.19: Item Fit Statistics for Misfitting Items: Science

Content	Grade	Form	Item (Session)	Chi-Square	DF	Total N	Z	Ob-served	Pre-dicted	Obs.-Pred.
SC	8	CA2	3 (1)	87.57	17	2630	12.10	0.4002	0.3991	0.0011
SC	8	CA2, CA3	7 (3)	128.85	17	4397	19.18	0.3734	0.3757	−0.0022
SC	8	CA3	3 (1)	46.27	17	1767	5.02	0.4802	0.4830	−0.0028
SC	8	CA3	5 (1)	97.49	17	1767	13.80	0.6590	0.6587	0.0003

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Table 6.20: Statistics Comparing IRT Item-Ability Regression Curves, Science, Grade 5

Anchor Item Position	ItemId	UnWtd RMSD	UnWtd Mean Abs Difference	UnWtd Max	UnWtd Mean	Wtd RMSD	Wtd Mean Abs Difference	Wtd Mean
1	711808	0.0274	0.0207	0.0543	0.0207	0.0425	0.0400	0.0400
2	711847	0.0194	0.0169	0.0285	0.0119	0.0176	0.0155	0.0149
3	711863	0.0791	0.0649	0.1390	−0.0586	0.1123	0.1071	−0.1069
4	711817	0.0274	0.0242	0.0449	−0.0108	0.0216	0.0174	−0.0086
5	711880	0.0366	0.0325	0.0576	−0.0270	0.0499	0.0483	−0.0477
7	711870	0.0406	0.0337	0.0745	0.0043	0.0466	0.0424	−0.0120
8	711812	0.0189	0.0153	0.0340	0.0109	0.0176	0.0137	0.0117
9	711891	0.0363	0.0319	0.0533	−0.0317	0.0468	0.0457	−0.0457
10	711893	0.0348	0.0303	0.0562	0.0303	0.0484	0.0473	0.0473
11	711886	0.0630	0.0517	0.1002	−0.0439	0.0605	0.0523	−0.0516
12	711859	0.0989	0.0695	0.1798	−0.0651	0.0662	0.0451	−0.0437
13	711881	0.0265	0.0234	0.0429	−0.0179	0.0367	0.0356	−0.0351
14	711820	0.0210	0.0174	0.0377	−0.0127	0.0308	0.0293	−0.0287
33	711936	0.0823	0.0533	0.1896	0.0269	0.0437	0.0345	−0.0215
34	**711918**	**0.1351**	**0.1021**	**0.2647**	**0.1021**	**0.1862**	**0.1676**	**0.1676**
35	711920	0.0446	0.0346	0.0848	−0.0346	0.0678	0.0647	−0.0647
36	711921	0.0058	0.0035	0.0138	−0.0035	0.0083	0.0068	−0.0068
37	711924	0.0151	0.0126	0.0257	0.0126	0.0215	0.0209	0.0209
38	711939	0.0626	0.0559	0.1041	−0.0170	0.0816	0.0768	−0.0664
39	**711926**	**0.1032**	**0.0764**	**0.2016**	**−0.0764**	**0.1466**	**0.1326**	**−0.1326**
40	711927	0.0487	0.0369	0.0985	0.0296	0.0719	0.0640	0.0617
41	711896	0.0296	0.0215	0.0626	−0.0174	0.0411	0.0345	−0.0323
42	711890	0.0378	0.0316	0.0609	0.0203	0.0280	0.0220	0.0189
43	711809	0.0982	0.0928	0.1429	0.0928	0.1140	0.1121	0.1121
44	711867	0.0173	0.0147	0.0291	0.0147	0.0241	0.0234	0.0234
45	711841	0.0930	0.0678	0.2004	0.0491	0.0502	0.0345	0.0234
46	711858	0.0408	0.0356	0.0661	0.0356	0.0573	0.0560	0.0560
47	711836	0.0387	0.0310	0.0695	0.0307	0.0554	0.0533	0.0532
48	711810	0.0843	0.0730	0.1378	−0.0730	0.1148	0.1117	−0.1117
49	711776	0.0227	0.0170	0.0444	−0.0170	0.0351	0.0332	−0.0332
50	711822	0.0423	0.0350	0.0711	−0.0350	0.0435	0.0398	−0.0398
51	711873	0.0193	0.0167	0.0357	−0.0082	0.0274	0.0258	−0.0242

Note: flagged items are indicated in **bold** print.

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Table 6.21: Statistics Comparing IRT Item-Ability Regression Curves, Science, Grade 8

Anchor Item Position	ItemId	UnWtd RMSD	UnWtd Mean Abs Difference	UnWtd Max	UnWtd Mean	Wtd RMSD	Wtd Mean Abs Difference	Wtd Mean
1	711892	0.0371	0.0297	0.0685	−0.0297	0.0512	0.0483	−0.0483
2	711894	0.0663	0.0546	0.1199	−0.0405	0.0832	0.0725	−0.0677
3	711897	0.0319	0.0253	0.0577	0.0253	0.0467	0.0447	0.0447
4	711866	0.0238	0.0182	0.0459	−0.0122	0.0184	0.0134	−0.0068
5	711916	0.0261	0.0191	0.0526	0.0191	0.0388	0.0354	0.0354
6	711869	0.0604	0.0451	0.1229	−0.0393	0.0892	0.0794	−0.0778
7	711901	0.0237	0.0168	0.0509	−0.0154	0.0354	0.0314	−0.0312
8	711857	0.0200	0.0162	0.0389	−0.0108	0.0278	0.0249	−0.0237
9	**711878**	**0.0857**	**0.0625**	**0.1735**	**0.0625**	**0.1217**	**0.1083**	**0.1083**
10	711900	0.0529	0.0426	0.0882	0.0426	0.0658	0.0611	0.0611
11	711902	0.0317	0.0203	0.0742	0.0203	0.0472	0.0396	0.0396
12	711862	0.0386	0.0358	0.0523	−0.0094	0.0313	0.0268	−0.0214
13	711834	0.0098	0.0083	0.0173	0.0013	0.0128	0.0119	0.0087
14	711889	0.0580	0.0466	0.1145	−0.0304	0.0837	0.0759	−0.0713
31	711917	0.0280	0.0231	0.0475	0.0228	0.0388	0.0369	0.0369
32	711923	0.0388	0.0248	0.0935	0.0248	0.0633	0.0557	0.0557
33	**711919**	**0.0814**	**0.0620**	**0.1557**	**0.0620**	**0.1199**	**0.1116**	**0.1116**
34	711933	0.0190	0.0151	0.0377	0.0106	0.0287	0.0268	0.0260
35	711944	0.0706	0.0536	0.1408	0.0536	0.1065	0.0996	0.0996
36	711940	0.0206	0.0133	0.0491	−0.0115	0.0297	0.0240	−0.0228
37	711945	0.0523	0.0382	0.1044	−0.0382	0.0768	0.0697	−0.0697
38	711942	0.0302	0.0204	0.0734	−0.0122	0.0467	0.0393	−0.0352
39	711941	0.0342	0.0257	0.0673	−0.0257	0.0512	0.0476	−0.0476
40	711899	0.0203	0.0143	0.0422	0.0133	0.0266	0.0222	0.0219
41	711914	0.0605	0.0426	0.1320	0.0364	0.0802	0.0651	0.0620
42	711844	0.0193	0.0147	0.0380	−0.0121	0.0247	0.0213	−0.0203
43	711831	0.0468	0.0327	0.1048	−0.0265	0.0673	0.0558	−0.0518
44	711872	0.0108	0.0099	0.0159	0.001	0.0119	0.0109	0.0062
45	**711846**	**0.0733**	**0.0462**	**0.1755**	**−0.0451**	**0.1197**	**0.1055**	**−0.1054**
46	711885	0.0242	0.0221	0.0353	0.0010	0.0240	0.0214	0.0101
47	711895	0.0891	0.0770	0.1607	0.0770	0.0487	0.0388	0.0388
48	711904	0.0489	0.0382	0.0919	0.0382	0.0697	0.0647	0.0647
49	711882	0.0332	0.0287	0.0560	−0.0211	0.0425	0.0391	−0.0385
50	711839	0.0330	0.0267	0.0663	−0.0168	0.0467	0.0413	−0.0370
51	711898	0.0379	0.0350	0.0592	−0.0115	0.0452	0.0418	−0.0341
52	711845	0.0735	0.0635	0.1161	−0.0383	0.0622	0.0509	−0.0439

Note: flagged items are indicated in **bold** print.

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Table 6.22: Anchor Evaluation Results: TCC Method: Science

Grade	Equating Run	Number of Anchors	Number of Iterations	F Value	M1	M2	Number of Anchors Removed
5	1	32	13	0.427748	31.2721	669.3987	0
5	2	31	16	0.192101	29.9942	666.9863	1
8	1	36	5	0.226833	31.3381	696.7150	0

Table 6.23: LOSS and HOSS Values by Grade and Content Area

Grade	English Language Arts/ Literacy		Mathematics		Science	
	LOSS	HOSS	LOSS	HOSS	LOSS	HOSS
3	2114	2623	2189	2621		
4	2131	2663	2204	2659		
5	2201	2701	2219	2700	470	855
6	2210	2723	2235	2748		
7	2258	2745	2250	2778		
8	2288	2769	2265	2802	540	895

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Figure 6.1: Item Characteristic Curve for Grade 8 Science, Form CA2, Item 3, Session 1

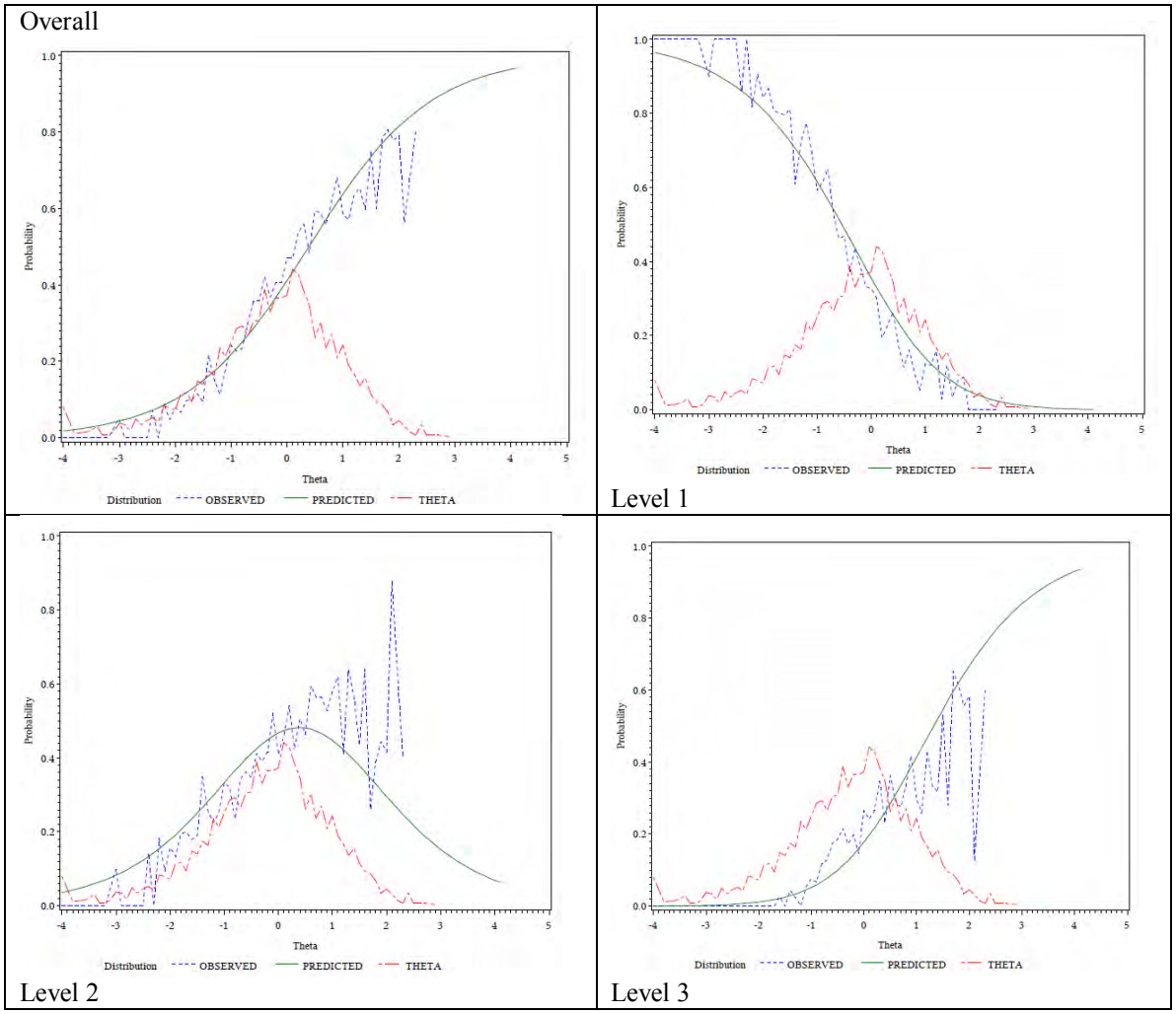

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Figure 6.2: Item Characteristic Curve for Grade 8 Science, Form CA2 and CA3, Item 7, Session 3

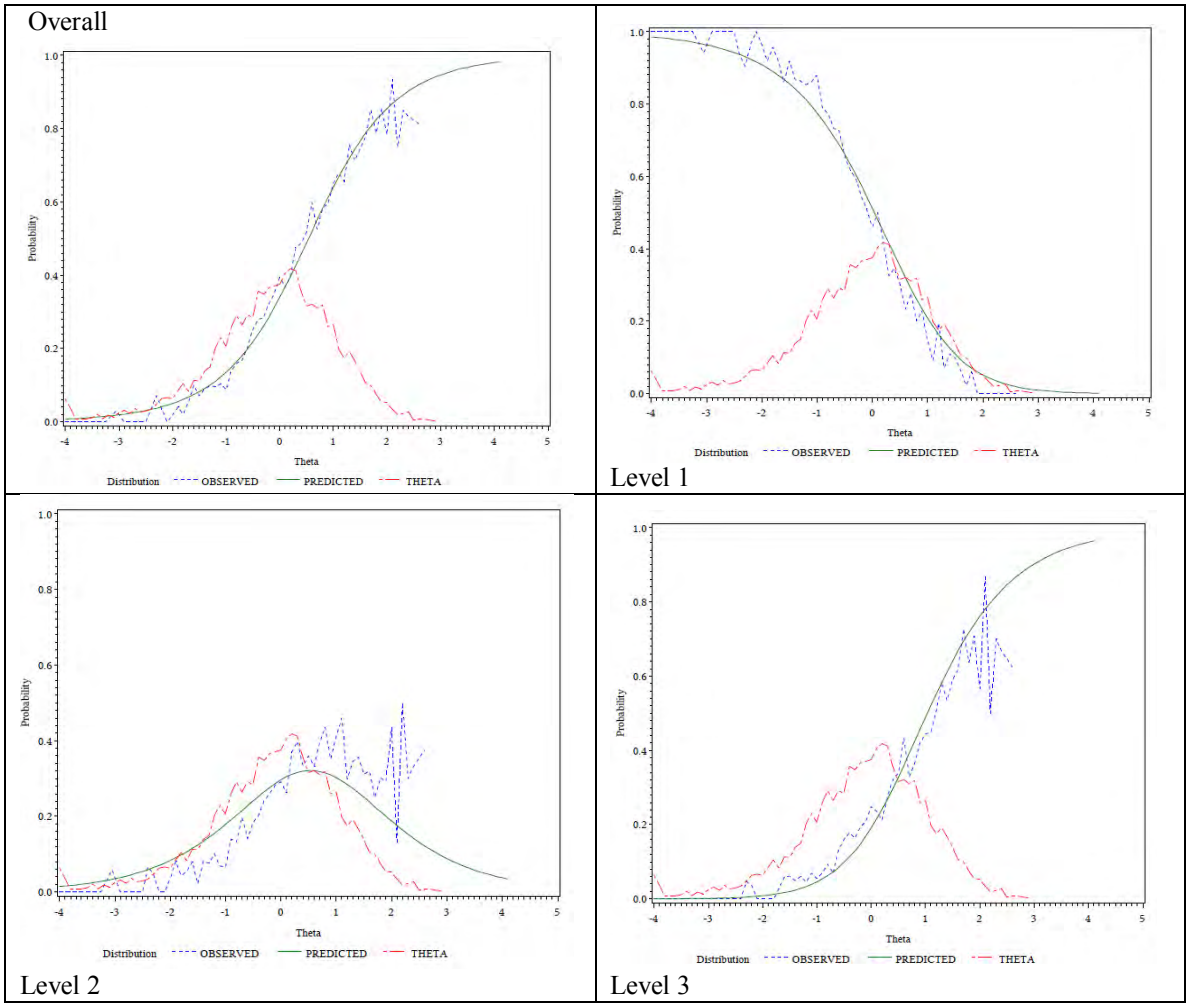

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Figure 6.3: Item Characteristic Curve for Grade 8 Science, Form CA3, Item 3, Session 1

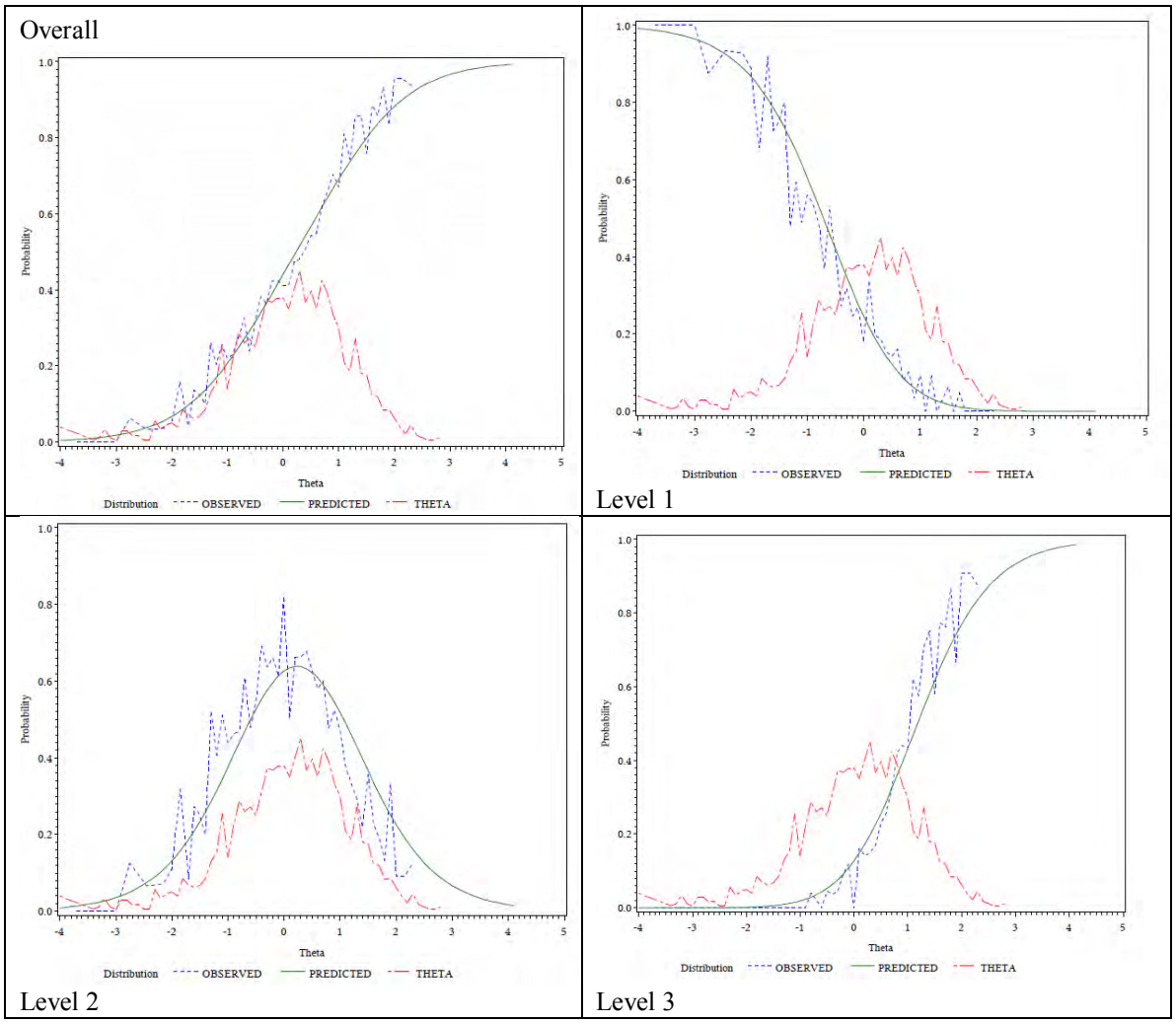

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Figure 6.4: Item Characteristic Curve for Grade 8 Science, Form CA3, Item 5, Session 1

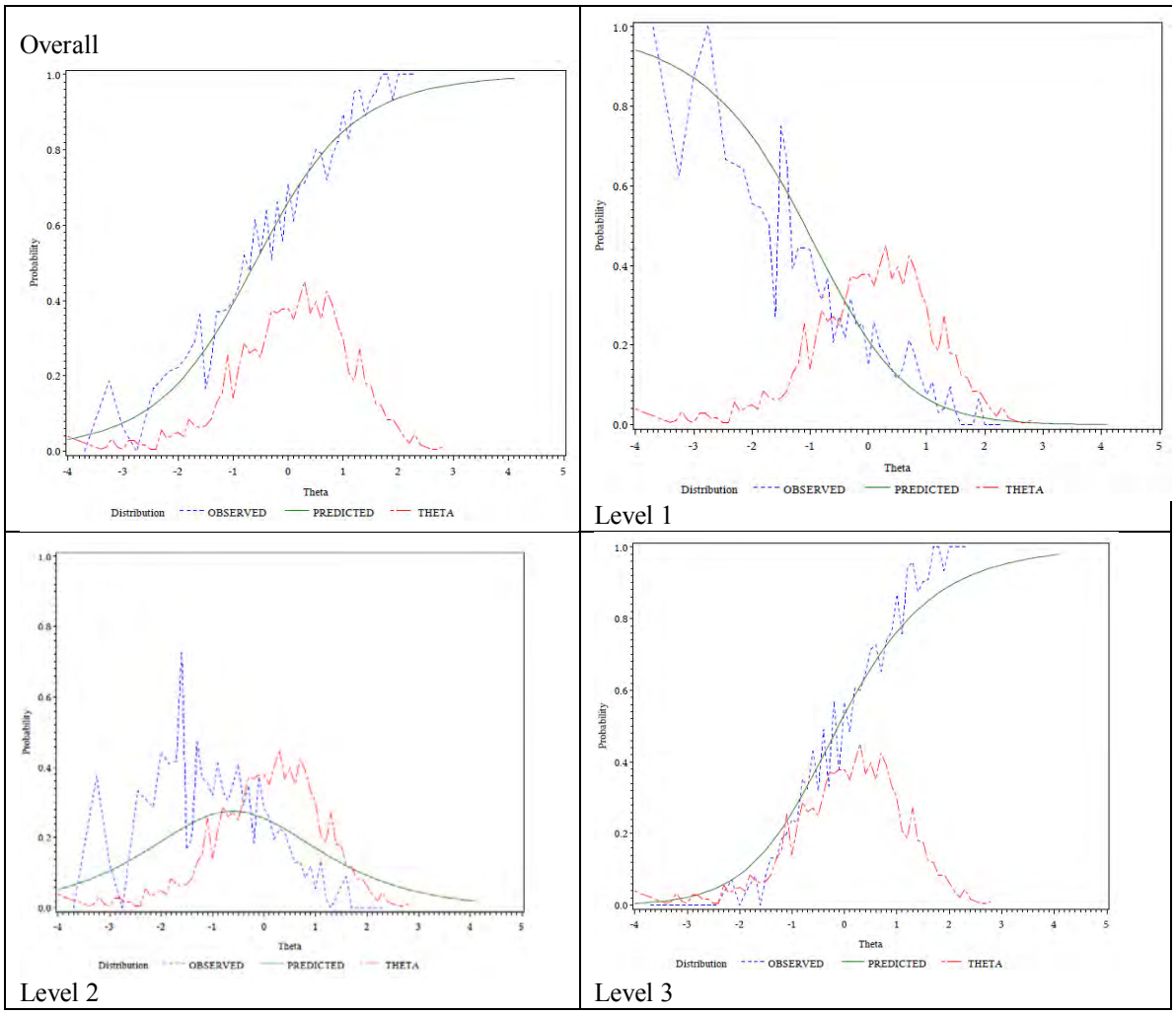

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Figure 6.5: Before and after Equating Item Characteristic Curve for Grade 5 Mathematics, Forms CA2 and CA3, item 2, Session 3 (Removed from Equating)

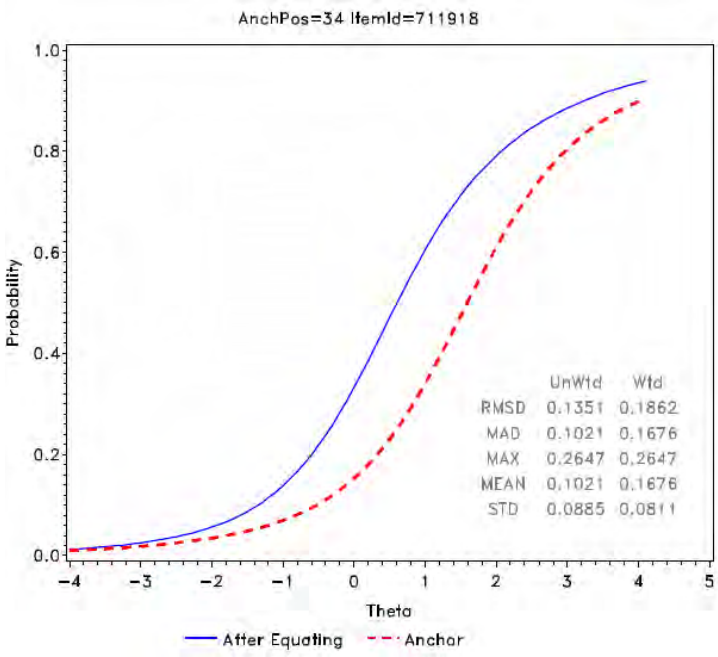

Figure 6.6: Before and after Equating Item Characteristic Curve for Grade 5 Mathematics, Forms CA2 and CA3, item 7, Session 3.

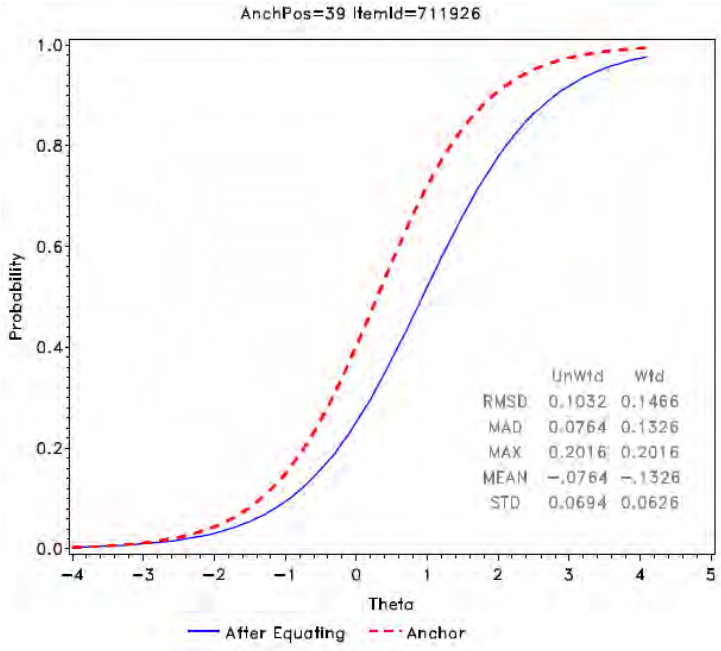

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Figure 6.7: Before and after Equating Item Characteristic Curve for Grade 8 Mathematics, Form CA2, Item 9, Session 1

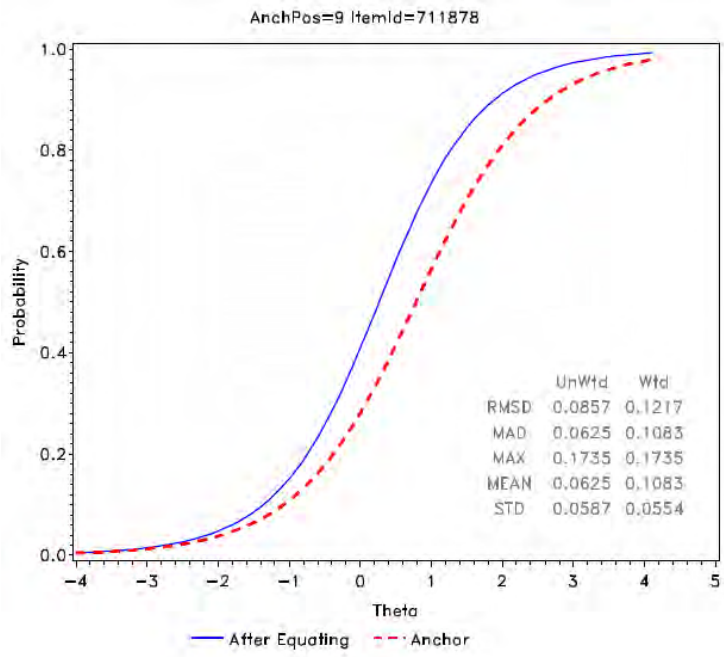

Figure 6.8: Before and after Equating Item Characteristic Curve for Grade 8 Mathematics, Forms CA2 and CA3, Item 3, Session 3

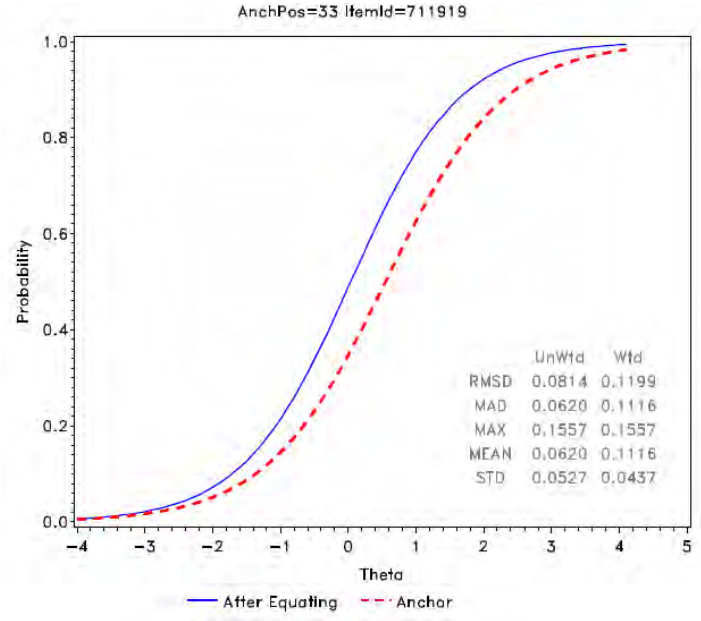

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Figure 6.9: Before and after Equating Item Characteristic Curve for Grade 8 Mathematics, From CA3, Item 6, Session 1

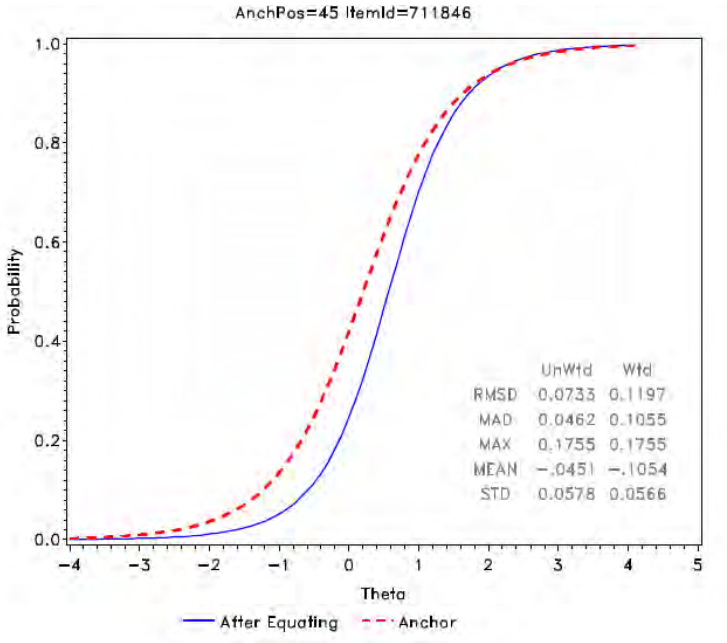

Figure 6.10: Science Grade 5 Anchor TCCs (with all Anchors Included)

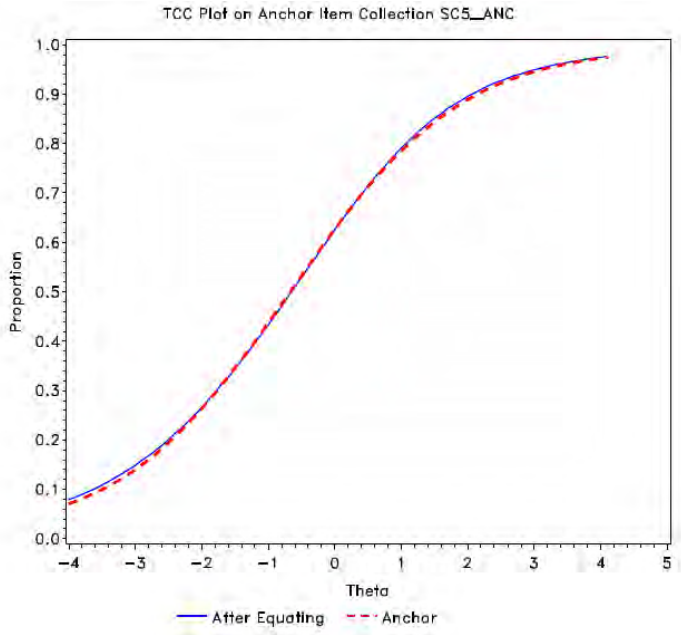

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Figure 6.11: Science Grade 5 Anchor TCCs (with One Anchor Removed)

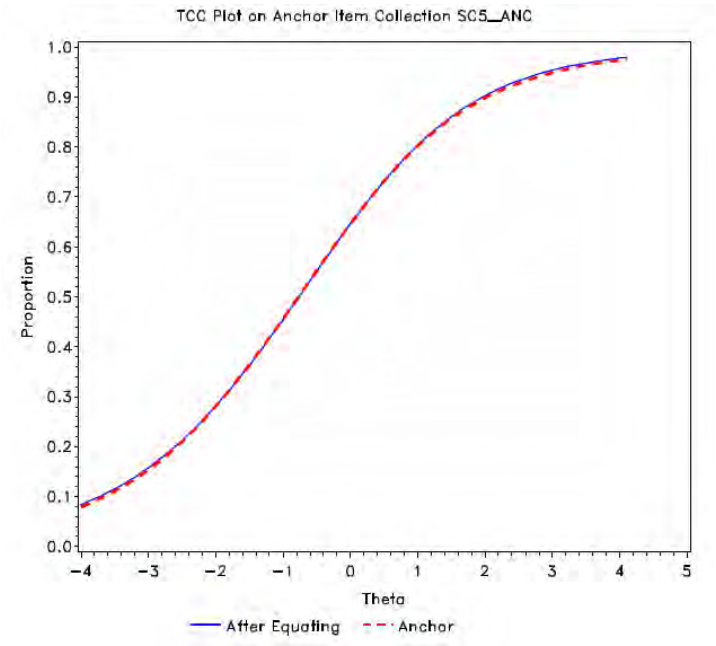

Figure 6.12: Science Grade 8 Anchor TCCs

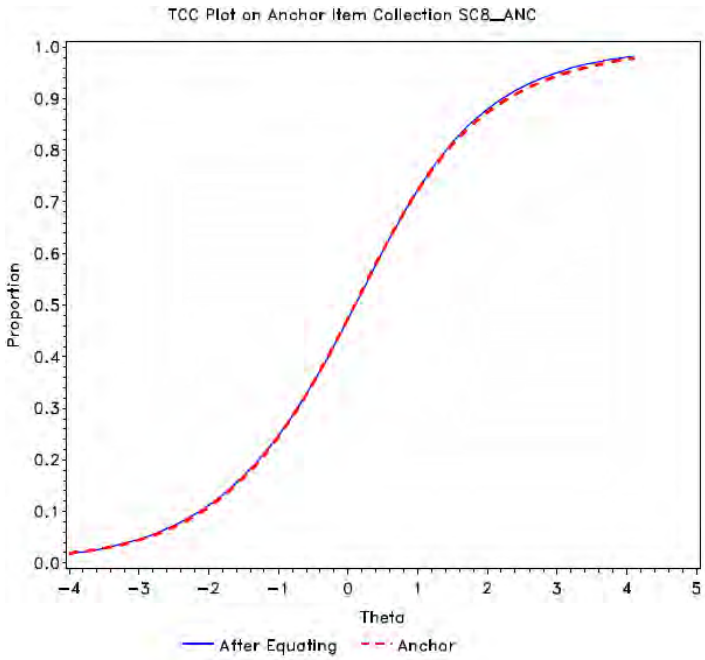

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Figure 6.13: Cross-Grade Articulation of Scale Scores at Selected Percentiles, ELA MAP

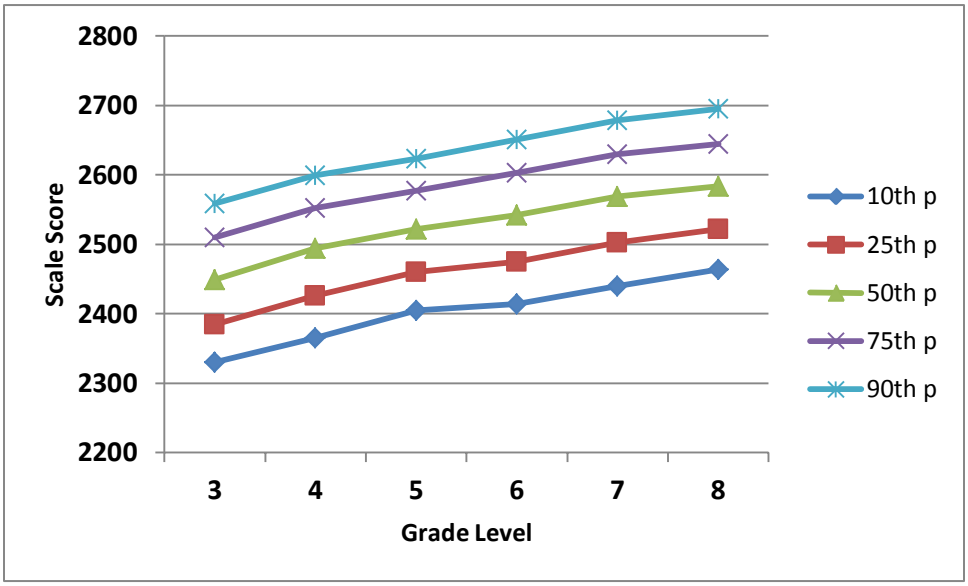

Figure 6.14: Cross-Grade Articulation of Scale Scores at Selected Percentiles, Mathematics MAP

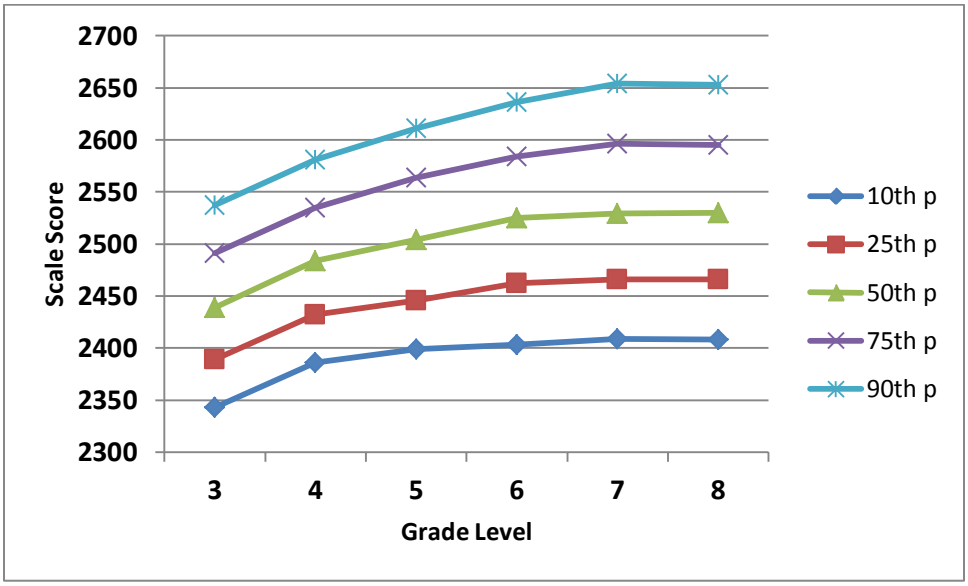

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Figure 6.15: Cross-Grade Articulation of Scale Scores at Selected Percentiles, Science MAP

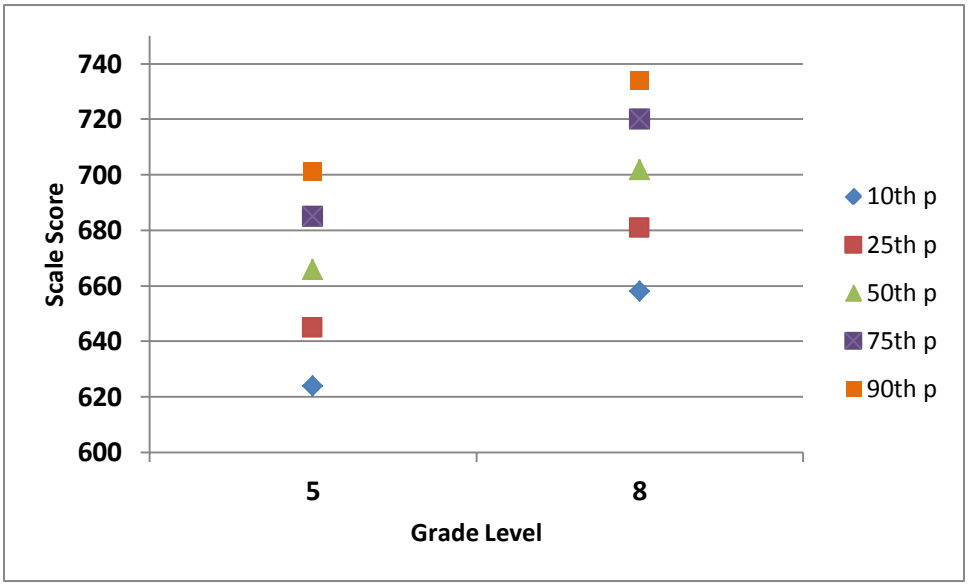

Figure 6.16: English Language Arts/Literacy Test Characteristic Curves by Grade, 2015

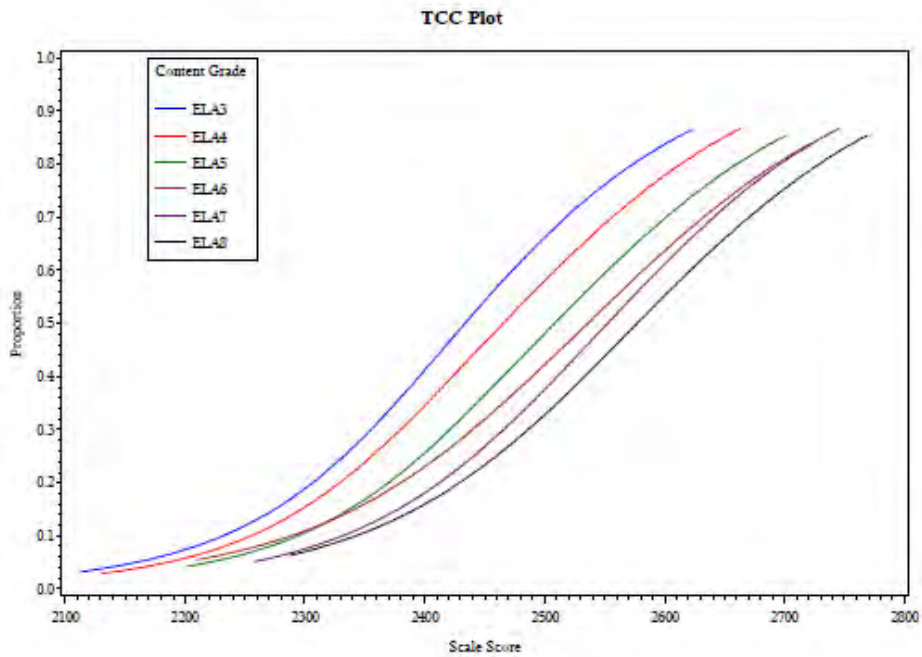

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Figure 6.17: Mathematics Test Characteristic Curves by Grade, 2015

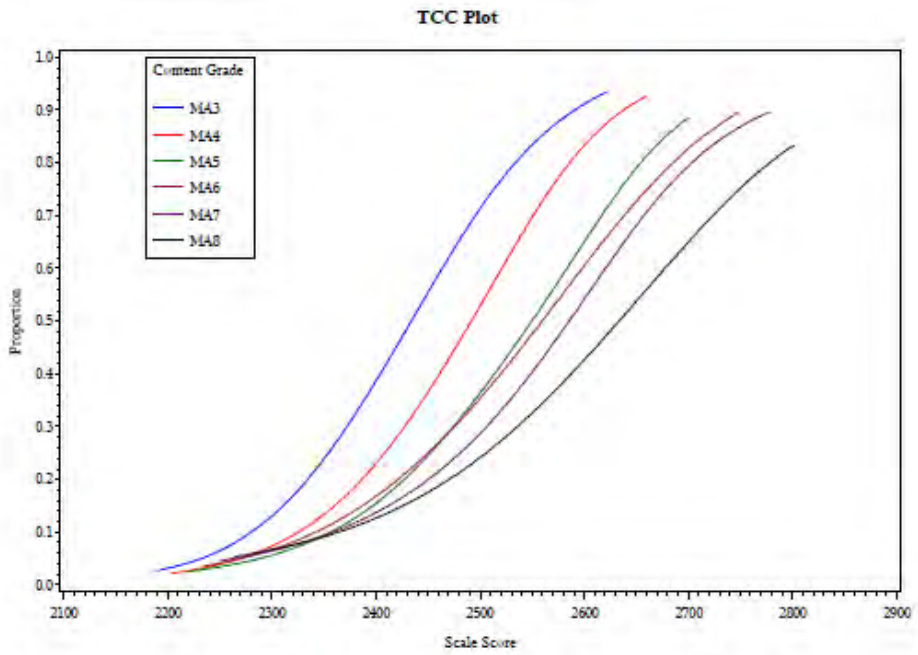
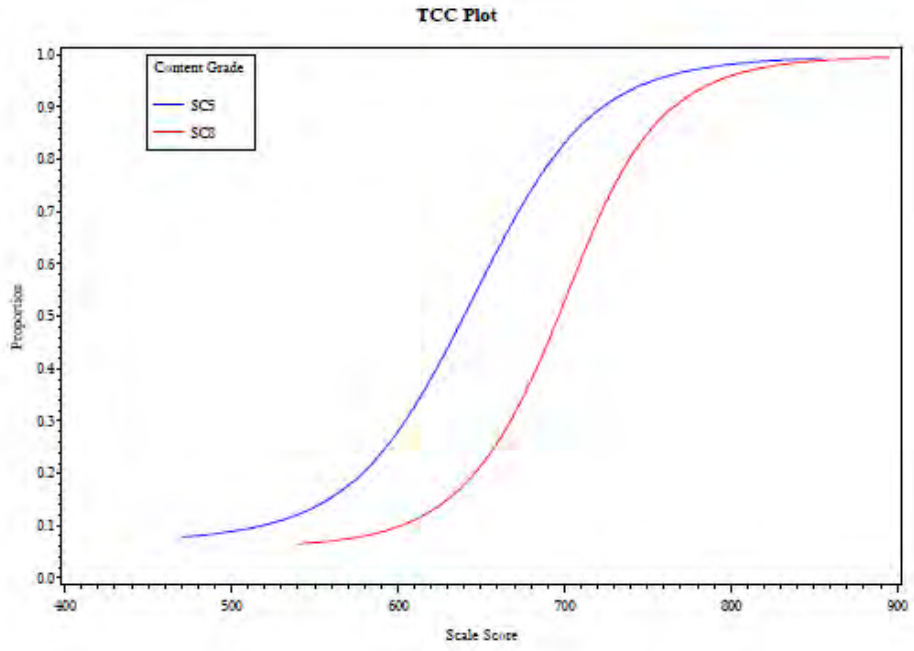


Figure 6.18: Science Test Characteristic Curves by Grade, 2015



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CHAPTER 7: TEST RESULTS

This chapter of the Technical Report contains information on the results of the spring 2015 administration of the 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 below 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 presented as evidence of reliability and validity of the scores from the MAP assessments and should not be used for state accountability purposes.

7.1 Student Participation

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/CTB sends DESE the General Research File):

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

For the purposes of this report, participation rate is defined as the percentage of students who received a valid scale score given the total number of students who attempted to take the online test or received a test book. These participation 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 student are excluded). The Accountable column shows the total number of students who attempted to take online test or received 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.

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7.2 Current Administration Data

The ELA and Mathematics MAP assessments were administered to students in Grades 3 through 8. The Science MAP assessments were administered to students in Grades 5 and 8. Tables 7.11 and 7.12 provide a summary of the scale scores based on the state population for the 2015 administration of the ELA and Mathematics assessments, respectively. Table 7.13 contains a summary of the scale scores based on the state population of the Science assessments.

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 2014–15 ELA and Mathematics assessments.
The 2014–15 ELA and Mathematics assessments are not comparable content- and construct-wise to the assessments administered in prior years. 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 ELA and Mathematics tests consisted of items fully aligned to the Smarter Balanced Common Core Claims and Targets. The regular and Spanish (for Mathematics) versions of the 2014–15 assessments were administered in the online mode as opposed the 2013–14 administration, in which all MAP tests were administered in the paper-and-pencil mode. In addition, technology-enhanced item types were introduced in the 2014–15 online test administration. The 2014–15 test scores were reported on new scales (developed by SBAC) and students were classified into achievement levels on the basis of the cut scores established by Smarter Balanced on their item bank. 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. The test content and the constructs measured by the test remained the same for Science Grades 5 and 8 assessments between the 2014 and 2015 administrations and the 2015 test scores for Science continued to be reported on the same scales as in the previous years. Table 7.14 shows the state-level means for all grades from 2007–08 through 2014–15 for Science.

As shown in Table 7.14, the mean scale score for Grade 5 remained stable (a difference of less than 1 scale score point), and the Grade 8 mean scale score decreased by approximately 4 scale score points between the 2013–14 and the 2014–15 administrations. The overall mean scale score trends for Grades 5 and 8 has been stable across the eight years of the assessment administration with the year-to-year differences ranging from 0 to less than 4 scale score points in any year.

Table 7.15 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 ELA test administration. As stated earlier in this

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section of the report the ELA test scores were reported on the new 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 Smarter Balanced on their item bank. 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. The past data are provided in the table for reference purpose only and separated from this year's data by a grey horizontal bar.

Table 7.16 shows the percentage of students in each achievement level from 2005–06 through 2014–15 on the Mathematics test. Similarly to ELA, the Mathematics test scores were reported on the new 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 Smarter Balanced on their item bank. Therefore, the percentages of students in each achievement level after the 2014–15 test administration are not directly comparable to the percentages students in each achievement level after the 2013–14 test administration. The past data are provided in the table for reference purpose only and separated from this year data by a grey horizontal bar.

Table 7.17 shows the percentage of students in each achievement level from 2007–08 through 2014–15 on the Science test. In Grade 5, the percentage of students at or above *Proficient* remained stable from 2013–14 to 2014–15 (a difference less than a half of a percentage point), and in Grade 8, the percentage of students at or above *Proficient* decreased by three percent.

7.4 Reports

Score reports are the primary means of communicating test scores to relevant district personnel (i.e., testing coordinators or superintendents), teachers, and parents. AERA, APA, and 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* (CTB/McGraw-Hill, 2015).

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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)

The staffs at DESE and DRC/CTB strive to create documents that will be 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 2014-2015 administration year, DRC/CTB reported the MAP Grade-Level Assessment through the Missouri MAP Online Reporting System. The MAP online reporting system was delivered on the PRISM 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 which 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. Total test scores and achievement levels indictors are displayed in a table-type format for the content area chosen. Percent correct is reported for the Claims and GLE Strands. Upon selecting a student from the roster list their Student Individual Report will open. A PDF of the data displayed can be printed. A sample Student Roster report is provided in Appendix E, Figure E1.

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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, student identifying information and the 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 along with the student's scale score is shown, along with the achievement level associated with that scale score, for a given content area. This 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 brief explanation of the meaning of the content area achievement level indicators. For English Language Arts and Mathematics only, claim-level descriptors and the achievement level are also indicated.

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 report 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 of the content areas administered. The label lists the student's scale score and achievement level for the content area. DRC/CTB 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.

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7.5 Data Structures

A data file referred to as General Research File (GRF) was provided to DESE by DRC/CTB. It contains one record for every test book submitted; each record contains demographic information for each student as well as item responses, raw score, content and process standard raw scores, and scale score data for each content area.

7.5.1 General Research File

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

7.6 Interpreting Test Results

The *Guide to Interpreting Results* was written for Missouri teachers and administrators who receive score reports from the 2014–15 administration of the MAP. The *Guide to Interpreting Results* was developed collaboratively by DRC/CTB and DESE staff. DESE staff had opportunities to review, provide feedback, and give final approval.

This guide has four 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. The third section presents the achievement-level descriptors for all grade/content areas. Finally, the fourth section presents sample score reports. The 2015 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-15-v2.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/CTB address multiple best practices of the testing industry but, in particular, are related to the following *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 2014):

- 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.

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- 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.

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Table 7.24: Participation Rates: All Students

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics	Accountable in Science	Percent Reportable in Science
3	68003	99.78%	68017	99.95%		
4	67015	99.78%	67029	99.96%		
5	66419	99.80%	66431	99.96%	66412	99.95%
6	66062	99.77%	66019	99.91%		
7	66000	99.75%	65038	99.88%		
8	66528	99.75%	52842	99.84%	66526	99.86%

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

Table 7.25: Participation Rates: Males

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics	Accountable in Science	Percent Reportable in Science
3	34889	99.76%	34893	99.94%		
4	34247	99.77%	34253	99.97%		
5	33974	99.78%	33978	99.96%	33965	99.95%
6	33832	99.77%	33793	99.89%		
7	33941	99.73%	33427	99.88%		
8	33728	99.71%	27288	99.79%	33726	99.81%

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

Table 7.26: Participation Rates: Females

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics	Accountable in Science	Percent Reportable in Science
3	33114	99.80%	33124	99.96%		
4	32768	99.80%	32776	99.94%		
5	32445	99.82%	32453	99.96%	32447	99.95%
6	32230	99.78%	32226	99.93%		
7	32059	99.77%	31611	99.89%		
8	32800	99.79%	25554	99.90%	32800	99.90%

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

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Table 7.27: Participation Rates: White

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics	Accountable in Science	Percent Reportable in Science
3	48285	99.91%	48279	99.94%		
4	48249	99.92%	48246	99.96%		
5	48309	99.93%	48298	99.96%	48288	99.95%
6	48279	99.88%	48245	99.90%		
7	48218	99.89%	47484	99.90%		
8	49019	99.86%	38107	99.84%	49009	99.86%

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

Table 7.28: Participation Rates: Black

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics	Accountable in Science	Percent Reportable in Science
3	11206	99.74%	11202	99.96%		
4	10736	99.71%	10728	99.93%		
5	10702	99.73%	10697	99.97%	10688	99.96%
6	10621	99.66%	10612	99.96%		
7	10698	99.61%	10655	99.82%		
8	10696	99.72%	9453	99.79%	10684	99.81%

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

Table 7.29: Participation Rates: Hispanic

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics	Accountable in Science	Percent Reportable in Science
3	4338	99.31%	4354	99.98%		
4	4130	99.08%	4146	99.95%		
5	3858	99.27%	3873	100.00%	3874	99.97%
6	3732	98.95%	3754	99.92%		
7	3722	98.87%	3709	99.87%		
8	3600	98.78%	2935	99.97%	3618	99.86%

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

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Table 7.30: Participation Rates: Asian/Pacific Islander

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics	Accountable in Science	Percent Reportable in Science
3	1474	97.35%	1484	99.87%		
4	1481	97.50%	1492	100.00%		
5	1478	97.29%	1490	100.00%	1490	100.00%
6	1453	98.97%	1433	100.00%		
7	1443	98.06%	1292	99.92%		
8	1411	98.30%	857	100.00%	1418	99.93%

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

Table 7.31: Participation Rates: American Indian/Alaska Native

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics	Accountable in Science	Percent Reportable in Science
3	234	100.00%	233	100.00%		
4	269	100.00%	269	100.00%		
5	298	100.00%	298	100.00%	296	100.00%
6	269	99.63%	270	99.63%		
7	292	99.66%	288	99.65%		
8	286	100.00%	242	100.00%	286	100.00%

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

Table 7.32: Participation Rates: Other Race/Ethnicity

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics	Accountable in Science	Percent Reportable in Science
3	2466	99.72%	2465	99.96%		
4	2150	99.95%	2148	100.00%		
5	1774	99.83%	1775	99.89%	1776	99.83%
6	1708	99.88%	1705	99.77%		
7	1627	99.82%	1610	99.88%		
8	1516	99.93%	1248	99.84%	1511	99.87%

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

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Table 7.33: Participation Rates: Students Receiving Accommodations

Grade	Accountable in ELA	Percent Reportable in ELA	Accountable in Mathematics	Percent Reportable in Mathematics	Accountable in Science	Percent Reportable in Science
3	15867	99.66%	16969	99.92%		
4	15657	99.73%	16584	99.93%		
5	15265	99.67%	16125	99.98%	15856	99.94%
6	14191	99.58%	14699	99.90%		
7	12864	99.53%	13493	99.84%		
8	12659	99.55%	12005	99.69%	13119	99.64%

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

Table 7.34: State-Level Scale Score Statistics: English Language Arts/Literacy

Grade	N	Mean SS	S.D. SS	Percentile				
				10th	25th	50th	75th	90th
3	67,854	2446	86.8	2330	2384	2449	2510	2559
4	66,868	2487	89.2	2365	2426	2494	2552	2599
5	66,287	2517	83.8	2405	2460	2522	2577	2623
6	65,913	2537	90.4	2414	2475	2542	2603	2651
7	65,833	2564	91.6	2440	2502	2569	2630	2679
8	66,362	2581	88.4	2464	2522	2584	2644	2695

Table 7.35: State-Level Scale Score Statistics: Mathematics

Grade	N	Mean SS	S.D. SS	Percentile				
				10th	25th	50th	75th	90th
3	67,982	2439	77.4	2343	2389	2439	2491	2537
4	66,999	2483	76.5	2386	2432	2484	2535	2581
5	66,406	2504	81.7	2399	2446	2504	2564	2611
6	65,960	2521	92.0	2403	2462	2525	2584	2636
7	64,963	2530	97.3	2409	2466	2529	2596	2654
8	52,758	2530	96.1	2408	2466	2530	2595	2653

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

Table 7.36: State-Level Scale Score: Science

Grade	N	Mean SS	S.D. SS	Scale Scores by Percentiles				
				10th	25th	50th	75th	90th
5	66,381	664	31.7	624	645	666	685	701
8	66,430	698	31.7	658	681	702	720	734

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Table 7.37: Comparison of State-Level Means, 2008 through 2015 Census Data: Science

Grade	Year	N	Mean SS	S.D. SS
5	2008	65,586	661.64	31.52
	2009	67,118	662.22	30.40
	2010	66,558	664.76	32.48
	2011	67,196	666.04	33.43
	2012	66,492	667.99	34.23
	2013	65,850	667.54	33.03
	2014	65,935	664.06	30.50
	2015	66,381	664.00	31.72
8	2008	67,209	694.36	30.67
	2009	66,702	695.65	30.94
	2010	66,101	698.28	31.07
	2011	65,828	700.05	30.98
	2012	66,724	700.18	31.92
	2013	66,418	699.92	31.71
	2014	66,912	701.94	29.53
	2015	66,430	698.19	31.67

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Table 7.38: Comparison of Percentage of Students in Each Achievement Level, English Language Arts/Literacy 2006 through 2015 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
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
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

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Table 7.15: Comparison of Percentage of Students in Each Achievement Level, English Language Arts/Literacy 2006 through 2015 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
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
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

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Table 7.39: Comparison of Percentage of Students in Each Achievement Level, Mathematics 2006 through 2015 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
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
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

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Table 7.16: 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
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
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

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

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Table 7.40: Comparison of Percentage of Students in Each Achievement Level, Science 2008 through 2015 Census Data

Grade	Year	N	No Level	Below Basic	Basic	Proficient	Advanced	Prof. & Adv.
5	2008	65,734	0.2	11.2	44.0	29.6	14.9	44.5
	2009	67,307	0.3	10.6	44.1	30.3	14.8	45.1
	2010	66,730	0.3	10.4	40.5	29.6	19.3	48.9
	2011	67,461	0.4	10.0	39.1	29.5	21.0	50.5
	2012	66,675	0.3	9.8	38.5	27.2	24.3	51.4
	2013	65,980	0.2	9.6	39.0	28.1	23.1	51.3
	2014	66,153	0.4	9.0	43.3	31.5	15.9	47.3
	2015	66,411	0.0	10.6	42.4	28.8	18.1	47.0
8	2008	67,574	0.5	19.3	37.0	36.7	6.5	43.2
	2009	67,077	0.6	18.2	36.5	37.2	7.6	44.8
	2010	66,463	0.5	16.4	35.1	38.4	9.6	48.0
	2011	66,205	0.6	15.7	33.7	38.6	11.4	50.0
	2012	67,037	0.5	16.1	33.8	37.0	12.6	49.6
	2013	66,710	0.4	15.7	33.8	38.4	11.6	50.0
	2014	67,168	0.4	12.8	35.0	40.5	11.4	51.9
	2015	66,524	0.1	16.7	34.3	39.1	9.8	48.9

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CHAPTER 8: ACHIEVEMENT-LEVEL SETTING

In this chapter, we briefly describe the MAP achievement-level 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 were administered English Language Arts/Literacy and Mathematics tests measuring different content and constructs in the 2014–15 test administration. The new tests built using the SBAC item bank were fully aligned to the Common Core standards. The new test scores were reported on the new scales and students were classified into achievement levels based on their knowledge and ability to perform different tasks in relation to the new test content and standards to which the ELA and Mathematics assessments were aligned.

The Bookmark standard setting was held in 2008 to establish cut scores for the Science MAP (refer to the *Missouri Assessment Program Bookmark Standard Setting Technical Report 2008 for Missouri Achievement-Level Setting Grades 5, 8, and 11 Science* [2008]. The reporting scales and the cut scores for Grades 5 and 8 remained unchanged throughout assessment administrations. Given that items not previously field tested in Missouri (developed by the University of Iowa) were included in the 2014–15 Science tests, a validation of Science cut points, after which the existing cut scores were upheld, was performed after the 2014–15 assessment administration.

The AERA, APA, & NCME (2014) Standards addressed in Chapter 8 are 5.21 and 5.22, which will be presented in the pertinent section of this chapter.

A brief overview of the SBAC standard setting procedures, during which the cut scores for ELA and Mathematics (later implemented in Missouri) were derived, is presented in this section of the report. A detailed discussion and the results of the standard setting can be found in Chapter 10 of the *Smarter Balanced Technical Report* (2015), posted at http://www.smarterbalanced.org/wordpress/wp-content/uploads/2011/12/Chapter-10-Achievement-Level-Setting-121014_mm.pdf

In addition, a short description of the cut point validation procedure for Science, during which the participants upheld the existing cut scores, is provided in this section of the report. Details of this procedure and results may be found in the *Missouri Assessment Program Cut Point Validation Technical Report Grades 5 and 8 Science* (2015).

Both Technical Reports address AERA, APA, and NCME Standard 5.21:

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

In terms of the validity 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.

8.1 Smarter Balanced Achievement Level Setting for English Language Arts/Literacy and Mathematics

The Smarter Balanced Assessment Consortium considered achievement level setting to be the culminating set of activities in their four-year enterprise to create, field test, and implement a set of rigorous assessments closely aligned to the Common Core and to provide guidance to educators regarding the achievements of their students, with particular reference to college and career readiness. The goal of the standard setting process was to identify assessment scores that delineate levels of achievement described by achievement level descriptors. Smarter Balanced has adopted four levels of achievement separated by three threshold cuts: Level 1 and Level 2; Level 2 and Level 3; Level 3 and level 4. The division between Levels 2 and 3 is used as the proficiency criterion in accountability. The achievement level setting process used two components, an online panel that allowed broad stakeholder participation and provided a wide data set, and a more traditional in-person workshop that provided focused judgment from a representative stakeholder panel. The in-person workshop included a final cross-grade review stage. The online panel and in-person workshop used a Bookmark Standard Setting Procedure (Lewis, Mitzel, Mercado, & Schultz, 2012), while the vertical articulation (cross-grade review) employed a procedure described by Cizek & Bunch (2007, Chapter 14). Details of both procedures are described in Chapter 10 of the *Smarter Balanced Technical Report* (2015). Three hundred and ninety-three Missouri educators participated in the online panel, fourteen educators participated in the in-person panel, and three Missouri educators participated in the cross-grade cut score review.

8.2 Cut Point Validation for Grades 5 and 8 Science

The Missouri Department of Elementary and Secondary Education (DESE) partnered with McGraw-Hill Education CTB to conduct a cut point validation (CPV) for the Grades 5 and 8 Science tests of the MAP. The workshop was held in Columbia, Missouri, on June 11–12, 2015. A modification of the Bookmark Standard Setting Procedure (BSSP) (Lewis, Mitzel, & Green, 1996; Lewis, Mitzel, Mercado, & Schulz, 2012) was implemented to validate the cut points for the assessments. Workshop participants worked individually and in concert to consider cut points associated with four achievement levels: *Below Basic*, *Basic*, *Proficient*, and *Advanced*, with *Advanced* representing the highest level of knowledge, skills, and abilities. As mentioned earlier in this chapter, the existing cut points for these tests were established in 2008 following a standard setting with Missouri educators using the BSSP (CTB/McGraw-Hill, 2008). A

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total of 18 participants from across the state of Missouri participated in the workshop. The workshop was facilitated by researchers and content experts from McGraw-Hill Education CTB. During the workshop, participants considered the test items, achievement level descriptors, Grade Level Expectations (GLEs), and test data. Following the workshop, DESE considered participants' recommendations. After consulting with McGraw-Hill Education CTB and with members of its technical advisory committee, DESE determined that participants' recommendations were consistent with the existing cut points. Accordingly, DESE found that CPV participants validated the existing cut points, and that the existing cut points (and associated achievement level descriptors) are suitable for continued use. Details and outcomes of the Science Cut Point Validation workshop can be also found in the *Missouri Assessment Program Cut Point Validation Technical Report for Grades 5 and 8 Science* submitted to DESE in September 2015.

At both workshops, the panelists' work involved multiple rounds of discussion and voting. AERA, APA, & NCME (2014) Standard 5.22 states the following:

> 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)

8.3 Cut Scores

In this section, we present the cut scores for each grade/content area of MAP. Tables 8.1 through 8.3 show the cut scores for Grades 3 through 8 ELA and Mathematics and for Grades 5 and 8 Science, respectively.

8.3.1. Claim Cut Scores

As stated in Section 6.5.1 *Claim-Level Scores*, student performance on ELA and Mathematics Claims was classified into one of the three achievement levels: *Below Standard*, *At/Near Standard*, and *Above Standard*. Detailed rules for calculating achievement levels for ELA and Mathematics Claims can be found in the *Smarter Balanced Scoring Specifications, 2014-2015 Administration Summative and Interim Assessments: ELA Grades 3–8, 11 and Mathematics Grades 3–8, 11, V.7* in Appendix D.

8.4 Achievement-Level Descriptors

In Appendix F of this report, we present the short achievement-level descriptors that were adopted by DESE for the reporting purposes.

8.5 Summary

This chapter presented a brief overview of the achievement level setting process used by Smarter Balanced for derivation of the ELA and Mathematics cut scores, as well as the overview of the cut point validation procedure for Science. These procedures are addressed in more detail in the relevant Technical Reports.

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The standard settings undertaken by the Smarter Balanced and by McGraw-Hill Education CTB address the following *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.

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Table 8.1: English Language Arts/Literacy Cut Scores

Grade	Cut Scores		
	Basic	Proficient	Advanced
3	2367	2432	2490
4	2416	2473	2533
5	2442	2502	2582
6	2457	2531	2618
7	2479	2552	2649
8	2487	2567	2668

Table 8.2: Mathematics Cut Scores

Grade	Cut Scores		
	Basic	Proficient	Advanced
3	2381	2436	2501
4	2411	2485	2549
5	2455	2528	2579
6	2473	2552	2610
7	2484	2567	2635
8	2504	2586	2653

Table 8.3: Science Cut Scores

Grade	Cut Scores		
	Basic	Proficient	Advanced
5	626	669	692
8	671	703	735

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CHAPTER 9: EVIDENCE OF CONSTRUCT-RELATED VALIDITY

Evidence for construct-related validity—the meaning of test scores and the inferences they support—is the central concept underlying the MAP validation process. In this section, DRC/CTB presents evidence of construct-related validity through studies of test reliability, convergent validity, and divergent validity. All analyses in this section are based on 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, 2.15, 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, 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 of validity.

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The AERA, APA, & NCME (2014) *Standards* indicate 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/CTB 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. These include Standards 2.0, 2.3, 2.13, and 2.19, each articulated below.

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

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 reported in raw score units. The conditional SEM is discussed in Section 9.2.3 and is presented in scale score units. Note that the SEM associated with any type of score is not reported for 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

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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

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

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, 9.2, and 9.3 for ELA, Mathematics, and Science, respectively. These reliability coefficients were computed using Missouri student census data. The reliability statistics ranged from 0.86 to 0.91 for all ELA forms. For Mathematics, the reliabilities ranged from 0.87 to 0.91 for regular test forms and were over 0.76 for the transcribed and Spanish version forms. (Note that reliability coefficients are presented only for test forms administered to at least 50 students.) The reliability coefficients for Science ranged from 0.86 to 0.91 for all forms. 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

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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:

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

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

The SEM at the test form level was computed in raw score metric and is also presented in Tables 9.1, 9.2, and 9.3 for ELA, Mathematics, and Science respectively.

9.2.3 Conditional Standard Error of Measurement

In contrast to SEM, the conditional standard errors of measurement (CSEM) express 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 Table 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):

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

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

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

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

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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 9.4 and range from 23 to 30 scale score points for ELA, from 21 to 33 scale score points for Mathematics, and from 8 to 11 scale score points for Science.

Figures 9.1 through 9.3 display the CSEM curves for each grade/content area. 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 9.3 demonstrate that the tests are designed so that measurement error is minimized 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, which states as follows:

> 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) × (H+1), where H is the number of cut scores, such that two cut scores yield a 3×3 contingency table.

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Example of Contingency Table with 2 Cut Scores

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

DRC/CTB 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 (**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 table above using the raw scores obtained from Step 2.
- Step 4: Repeat Steps 2 and 3 *R* times and get average values over *R* replications.
- Step 5: Multiply 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 scores) and quadrature point (true score).

Note that the classification consistency and classification accuracy analyses were conducted using data for regular test forms only. It is not recommended to perform the classification consistency and classification accuracy analyses on the Transcribed forms or Spanish version of the Mathematics forms data due to a low number of students taking these forms which may negatively affect the stability of the results, thus making the results interpretation difficult. Classification consistency and classification accuracy conditioned on performance level (Table 9.5) and on cut score (Table 9.6) are presented

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for the 2015 MAP in this section of the report. As shown in Table 9.5, classification accuracy conditioned on achievement level range from 0.53 to 0.95 and classification consistency conditioned on achievement level range from 0.50 to 0.84 for all ELA achievement levels, with a few exceptions. Lower classification accuracy and consistency values were generally found for students classified in the highest achievement level, particularly in Grades 5 through 8. For Mathematics, classification accuracy conditioned on achievement level range from 0.36 to 0.93, and classification consistency conditioned on achievement level range from 0.50 to 0.85, with the classification accuracy and consistency for students classified in the *Advanced* achievement level being lower than the other three achievement levels. For Science, classification accuracy conditioned on achievement level range from 0.63 to 0.88, and classification consistency conditioned on achievement level range from 0.54 to 0.78. 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 scores. The classification accuracy and consistency statistics above 0.80 for all test forms and all cut point. These results suggest that consistent and accurate performance level classifications are being made for students in Missouri based on the MAP.

9.2.5 Convergent Validity

Convergent validity is a subtype of construct validity that can be estimated by the extent to which measures of constructs that theoretically should be related to each other are, in fact, observed as related to each other. 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 should only measure Mathematics, not Science, Language, or Reading.

This technical report summarizes additional statistics that contribute to construct validity (Cronbach's coefficient alpha reported previously in this section and item fit reported in Chapter 6 for Science and in Appendix C for ELA and Mathematics). The internal consistency coefficient (Cronbach's alpha) reported above is a measure of item homogeneity. In order for a group of items to be homogeneous, they must measure the same construct (construct validity) or represent the same content domain (content

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validity). Because IRT models were used to calibrate test items and to report student scores, item fit is also relevant to construct validity. The extent to which test items function as the IRT model prescribes is relevant to the validation of test scores. As shown in Chapter 6, only four items were flagged for poor model/data fit across all Science tests.

9.3 Principal Components Analysis

As another measure of construct validity, DRC/CTB 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 principal components factor analysis 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 grade/content area MAPs, 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. All of the MAP subject area tests exhibit first principal components accounting for more than 15% of the test variance for ELA (see Table 9.7), for more than 19% of the test variance for Mathematics (see Table 9.8), and for more than 16% of the test variance for Science (see Table 9.9). To further investigate the unidimensionality of the ELA, Mathematics, and Science tests, the ratio of the first eigenvalue to the second eigenvalue was explored (see Tables 9.7 through 9.9). These ratios show that the first eigenvalue is at least four times as large as the second eigenvalue for all of the grade/content areas. This substantial difference in magnitude indicates that one factor appears to be dominant and that the ELA, Mathematics, and Science 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

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irrelevant to doing well in a subject, does not appear to create significant nuisance factors.

9.4 Analyses by Claims and GLE Strands

Three sets of analyses were conducted at the Claim level for ELA and Mathematics and at the GLE Strand level for Science in another attempt to assess the construct validity of MAP. First, correlation coefficients that measure the relationship between the Claim or Strand scores were computed. Second, the reliability of each Claim or GLE Strand was computed. Finally, the SEM was computed for each reportable Claim or GLE Strand.

9.4.1 Correlations among Claims and GLE Strands Subscores

In this section, we report the strength of the interrelationships among the Claims or GLE Strands by computing correlation between them. Tables 9.10 through 9.12 report the uncorrected Pearson product-moment (PPM) correlation coefficients, as well as the PPM corrected for attenuation (CAPPM), in addition to the reliability coefficients described above. The PPM among the Claim or GLE Strand subscores is presented below the diagonal portion of the matrix, the CAPPM is presented above the diagonal portion of the matrix, and the reliability coefficients are shown on the diagonal in each table.

The uncorrected PPM in Tables 9.10 through 9.12 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 Claim or GLE Strand is moderately to strongly related to performance on another Claim or GLE Strand within the same grade and content area. The exceptions for ELA are correlation between Research Claim and Listening Claim in one of the Grade 4 forms (r=0.29), correlations between Research and Listening Claims (r=0.24) and Research and Writing Claims (r=0.29) for one of the Grade 6 forms, correlation between Research and Listening Claims (r=0.27) in another Grade 6 form. In all these cases a low number of items in Research Claim might have affected the strengths of the correlation coefficients. For Mathematics, low correlations were observed between Communicating Reasoning and Problem Solving and Modeling and Data Analysis Claims on each test form in Grades 3, 4, 6, and 7. These correlations ranged from 0.15 to 0.27. The number of items in each Claim was either 5 or 6. For Science the lowest correlation between GLE Strands was 0.29 (between Impact of Science, Technology and Human Activity, and Force and Motion GLE strands) in one of the Grade 5 forms. As noted above, the value of the correlation coefficients will be affected by the limited number of items measuring each Claim or GLE Strand. So, caution should be used when comparing the PPM coefficients measuring the relationships between Claims or GLE Strands to those measuring the relationships between content areas (Table 9.16). We expect to see a more modest relationship (smaller correlation coefficients) reported between the Claims or GLE Strands as a consequence of the lower number of items measuring each of the reporting categories. The PPM between two Claim or GLE Strand subscores may be artificially low because of measurement error.

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

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> 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,

$$CAPPM = \frac{r_{xy}}{\sqrt{r_{xx} r_{yy}}}, \tag{9.5}$$

where r_{xy} is the PPM between two Claims or GLE Strands, r_{xx} is the reliability of one of those Claims or GLE Strands, and r_{yy} is the reliability for the other Claim or GLE Strand.

Across all tables, the CAPPM indicate strong relationships between the Claims or GLE 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 9.10 through 9.12 are further evidence of the validity of the test construct. Since the overall content area is comprised of the Claims or GLE Strands 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 of Claims or GLE Strands

Raw score summary statistics (mean and standard deviation), Cronbach's (1951) coefficient alpha, and SEM were computed for each of the Claims or GLE Strands by grade/content area using the census data. These statistics are presented in Tables 9.13 through 9.15 for ELA, Mathematics, and Science, 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 Claim or GLE Strand assessed by a small number of items compared to a Claim or GLE Strand assessed by a larger number of items. Note that the reliability coefficients are not presented for Spanish version of the Mathematics test forms (except Grade 5) due to the number of students taking these forms being lower than 50.

9.4.3 Standard Error of Measurement of Claims or GLE Strands

In this chapter, we also report the SEM associated with each of the Claims or GLE Strands in Tables 9.13 through 9.15 for ELA, Mathematics, and Science, respectively. These SEMs are reported in the raw score correct metric. SEM values are not presented for Spanish version of the Mathematics test forms (except Grade 5) due to the number of students taking these forms being lower than 50.

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9.5 Divergent (Discriminant) Validity

Measures of different constructs should not be highly correlated with each other. Divergent validity is a subtype of construct validity that 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 validity.

To assess the divergent validity of the MAP tests, correlations were computed between the ELA, Mathematics, and Science scale scores for students who took more than one MAP subject area test in 2015. These correlations are based on the census data and the results are shown in Table 9.16. The correlation coefficients ranged from 0.74 (between ELA and Mathematics in Grade 3) to 0.80 (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 at 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 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 to the MAP program 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 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/CTB address multiple best practices of the testing industry but, in particular, are related to the following *Standards for Educational and Psychological Testing* (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.

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- 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 2.15—When there is credible evidence for expecting that conditional standard errors of measurement or test information functions will differ substantially for various subgroups, investigation of the extent and impact of such differences should be undertaken and reported as soon as is feasible.
- 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.

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Table 9.1: Reliability in English Language Arts/Literacy

Grade	Form	Number of Items	Number of Score Points	Cronbach's Alpha	SEM	N-Count
3	CA1	44	47	0.91	2.90	30336
	CA2	44	47	0.90	2.85	18632
	CA3	44	47	0.90	2.86	18584
	CT1	46	49	0.89	2.95	208
4	CA1	44	47	0.90	2.89	29624
	CA2	44	47	0.90	2.83	18496
	CA3	44	47	0.89	2.85	18512
	CT1	46	49	0.86	3.01	225
5	CA1PA1	48	58	0.91	3.36	27492
	CA1PA2	48	58	0.90	3.31	968
	CA1PA3	48	58	0.91	3.27	589
	CA2PA1	48	57	0.90	3.36	608
	CA2PA2	48	57	0.89	3.27	16840
	CA2PA3	48	57	0.89	3.28	965
	CA3PA1	48	57	0.89	3.37	997
	CA3PA2	48	57	0.90	3.36	590
	CA3PA3	48	57	0.88	3.33	16912
	CT1PT1	50	60	0.91	3.16	234
6	CA1	45	48	0.87	3.05	29476
	CA2	45	48	0.88	2.98	18096
	CA3	45	48	0.88	3.02	18136
	CT1	47	50	0.89	2.97	201
7	CA1	45	48	0.90	3.00	28604
	CA2	45	48	0.89	2.98	18536
	CA3	45	48	0.88	3.00	18484
	CT1	47	50	0.89	2.89	198
8	CA1PA1	49	59	0.91	3.34	26408
	CA1PA2	49	59	0.91	3.43	1177
	CA1PA3	49	58	0.90	3.33	1241
	CA2PA1	49	59	0.90	3.36	1225
	CA2PA2	49	59	0.89	3.49	16178
	CA2PA3	49	58	0.90	3.38	1156
	CA3PA1	49	59	0.90	3.35	1214
	CA3PA2	49	59	0.90	3.44	1224
	CA3PA3	49	58	0.90	3.31	16296
	CT1PT1	51	60	0.90	3.26	226

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Table 9.2: Reliability in Mathematics

Grade	Form	Number of Items	Number of Score Points	Cronbach's Alpha	SEM	N-Count
3	CA1	31	33	0.90	2.35	32624
	CA2	31	33	0.88	2.40	17404
	CA3	31	33	0.88	2.43	17496
	CS1	31	33	-	-	*47*
	CT1	35	36	0.88	2.54	245
4	CA1	31	33	0.91	2.33	31876
	CA2	31	33	0.89	2.31	17376
	CA3	31	33	0.88	2.29	17420
	CS1	31	33	-	-	*46*
	CT1	35	36	0.86	2.54	272
5	CA1PA1	37	45	0.90	2.87	22432
	CA1PA2	37	45	0.89	2.91	8762
	CA2PA1	37	45	0.89	2.96	8776
	CA2PA2	37	45	0.89	2.89	8724
	CA3PA1	37	45	0.89	3.00	8692
	CA3PA2	37	45	0.89	2.94	8684
	CS1PS1	37	45	0.83	2.82	55
	CT1PT1	41	47	0.87	2.76	270
6	CA1	30	31	0.88	2.13	30216
	CA2	30	31	0.89	2.14	17736
	CA3	30	31	0.88	2.22	17744
	CS1	30	31	-	-	*39*
	CT1	34	35	0.89	1.98	224
7	CA1	31	32	0.90	2.22	28968
	CA2	31	32	0.88	2.34	17848
	CA3	31	32	0.88	2.35	17872
	CS1	31	32	-	-	*36*
	CT1	35	37	0.86	1.96	233
8	CA1PA1	37	45	0.87	2.46	16732
	CA1PA2	37	45	0.87	2.59	7158
	CA2PA1	37	45	0.88	2.63	7136
	CA2PA2	37	45	0.88	2.64	7130
	CA3PA1	37	45	0.88	2.64	7159
	CA3PA2	37	45	0.87	2.65	7165
	CS1PS1	37	45	-	-	*28*
	CT1PT1	39	43	0.76	2.11	239

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

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Table 9.3: Reliability in Science

Grade	Form	Number of Items	Number of Score Points	Cronbach's Alpha	SEM	N-Count
5	CA2	41	60	0.89	3.56	40104
	CA3	41	60	0.86	3.49	26268
8	CA2	39	61	0.91	3.82	38704
	CA3	38	60	0.88	3.78	27464
	CT2	39	60	0.90	3.46	253

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

Content Area	Grade	Basic		Proficient		Advanced	
		Cut Score	CSEM	Cut Score	CSEM	Cut Score	CSEM
English Language Arts/ Literacy	3	2367	25	2432	24	2490	26
	4	2416	26	2473	26	2533	27
	5	2442	23	2502	23	2582	26
	6	2457	30	2531	28	2618	30
	7	2479	28	2552	26	2649	29
	8	2487	26	2567	24	2668	27
Mathematics	3	2381	22	2436	21	2501	23
	4	2411	23	2485	21	2549	22
	5	2455	26	2528	23	2579	21
	6	2473	29	2552	26	2610	26
	7	2484	30	2567	24	2635	26
	8	2504	33	2586	27	2653	25
Science	5	626	10	669	10	692	11
	8	671	10	703	8	735	9

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Table 9.5: Decision 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/ Literacy	3	CA1	0.84	0.75	0.73	0.70	0.78	0.63	0.58	0.73
		CA2	0.82	0.65	0.70	0.83	0.79	0.54	0.54	0.80
		CA3	0.86	0.70	0.66	0.77	0.79	0.59	0.52	0.78
	4	CA1	0.92	0.60	0.56	0.64	0.82	0.50	0.53	0.71
		CA2	0.92	0.61	0.54	0.54	0.80	0.53	0.58	0.69
		CA3	0.92	0.57	0.55	0.59	0.79	0.51	0.57	0.70
	5	CA1PA1	0.94	0.67	0.64	0.43	0.83	0.57	0.69	0.57
		CA1PA2	0.95	0.62	0.63	0.34	0.84	0.57	0.70	0.54
		CA1PA3	0.95	0.66	0.63	0.41	0.83	0.62	0.68	0.58
		CA2PA1	0.92	0.68	0.63	0.46	0.83	0.56	0.66	0.63
		CA2PA2	0.93	0.68	0.63	0.41	0.81	0.59	0.68	0.57
		CA2PA3	0.92	0.67	0.63	0.42	0.82	0.59	0.68	0.57
		CA3PA1	0.95	0.68	0.53	0.28	0.79	0.64	0.67	0.48
		CA3PA2	0.95	0.63	0.57	0.27	0.82	0.58	0.71	0.48
		CA3PA3	0.94	0.64	0.57	0.29	0.78	0.58	0.72	0.52
	6	CA1	0.88	0.69	0.56	0.29	0.77	0.59	0.64	0.38
		CA2	0.73	0.70	0.80	0.55	0.72	0.57	0.70	0.55
		CA3	0.80	0.75	0.74	0.47	0.71	0.59	0.70	0.51
	7	CA1	0.88	0.71	0.77	0.42	0.81	0.60	0.73	0.51
		CA2	0.88	0.72	0.78	0.48	0.76	0.63	0.73	0.59
		CA3	0.77	0.72	0.85	0.54	0.72	0.59	0.74	0.59
	8	CA1PA1	0.92	0.74	0.67	0.21	0.79	0.68	0.78	0.41
		CA1PA2	0.88	0.80	0.73	0.24	0.77	0.68	0.79	0.41
		CA1PA3	0.94	0.73	0.70	0.21	0.76	0.69	0.78	0.43
		CA2PA1	0.91	0.75	0.65	0.15	0.77	0.64	0.76	0.31
		CA2PA2	0.84	0.80	0.68	0.21	0.68	0.68	0.79	0.44
		CA2PA3	0.92	0.74	0.65	0.16	0.76	0.66	0.78	0.36
		CA3PA1	0.95	0.69	0.62	0.17	0.80	0.69	0.79	0.32
		CA3PA2	0.93	0.77	0.67	0.20	0.75	0.70	0.78	0.41
		CA3PA3	0.94	0.71	0.65	0.19	0.77	0.66	0.78	0.36

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Table 9.5: Decision Accuracy and Consistency Conditioned on Level of Achievement (cont.)

Content Area	Grade	Form	Accuracy				Consistency			
			Below Basic	Basic	Prof.	Adv.	Below Basic	Basic	Prof.	Adv.
Mathematics	3	CA1	0.89	0.71	0.65	0.55	0.80	0.62	0.64	0.67
		CA2	0.93	0.63	0.56	0.46	0.77	0.60	0.62	0.64
		CA3	0.87	0.72	0.66	0.51	0.74	0.64	0.67	0.66
	4	CA1	0.87	0.76	0.67	0.57	0.76	0.67	0.61	0.64
		CA2	0.83	0.78	0.72	0.59	0.71	0.68	0.65	0.68
		CA3	0.82	0.76	0.72	0.64	0.65	0.68	0.64	0.65
	5	CA1PA1	0.82	0.73	0.69	0.75	0.79	0.59	0.54	0.68
		CA1PA2	0.67	0.70	0.66	0.73	0.64	0.60	0.56	0.70
		CA2PA1	0.76	0.76	0.75	0.75	0.69	0.66	0.61	0.74
		CA2PA2	0.73	0.73	0.67	0.81	0.70	0.65	0.55	0.74
		CA3PA1	0.81	0.76	0.62	0.59	0.76	0.67	0.54	0.67
		CA3PA2	0.88	0.69	0.68	0.83	0.82	0.63	0.55	0.73
	6	CA1	0.81	0.70	0.67	0.75	0.79	0.59	0.53	0.68
		CA2	0.77	0.70	0.61	0.86	0.72	0.64	0.50	0.75
		CA3	0.83	0.75	0.64	0.70	0.73	0.63	0.53	0.71
	7	CA1	0.66	0.75	0.79	0.73	0.74	0.68	0.64	0.65
		CA2	0.69	0.78	0.74	0.62	0.66	0.66	0.63	0.65
		CA3	0.80	0.77	0.59	0.44	0.73	0.66	0.62	0.56
	8	CA1PA1	0.79	0.65	0.76	0.83	0.85	0.62	0.62	0.67
		CA1PA2	0.67	0.69	0.75	0.72	0.70	0.59	0.63	0.63
		CA2PA1	0.79	0.75	0.62	0.40	0.73	0.60	0.60	0.52
		CA2PA2	0.79	0.75	0.61	0.36	0.74	0.60	0.61	0.52
		CA3PA1	0.74	0.74	0.63	0.44	0.71	0.60	0.59	0.52
		CA3PA2	0.75	0.75	0.62	0.39	0.73	0.60	0.57	0.50
Science	5	CA2	0.86	0.82	0.65	0.84	0.78	0.77	0.55	0.70
		CA3	0.83	0.82	0.63	0.83	0.74	0.77	0.54	0.73
	8	CA2	0.86	0.78	0.83	0.70	0.77	0.72	0.73	0.55
		CA3	0.88	0.76	0.82	0.83	0.78	0.73	0.76	0.70

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Table 9.6: Decision 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/ Literacy	3	CA1	0.93	0.92	0.89	0.90	0.88	0.88
		CA2	0.94	0.91	0.90	0.92	0.88	0.86
		CA3	0.94	0.91	0.89	0.92	0.88	0.86
	4	CA1	0.92	0.89	0.88	0.89	0.87	0.88
		CA2	0.93	0.87	0.81	0.91	0.86	0.86
		CA3	0.92	0.87	0.85	0.90	0.85	0.87
	5	CA1PA1	0.92	0.88	0.86	0.90	0.87	0.91
		CA1PA2	0.92	0.86	0.86	0.91	0.85	0.93
		CA1PA3	0.91	0.89	0.89	0.89	0.88	0.93
		CA2PA1	0.91	0.87	0.90	0.89	0.85	0.94
		CA2PA2	0.93	0.86	0.86	0.91	0.85	0.91
		CA2PA3	0.92	0.86	0.88	0.90	0.85	0.93
		CA3PA1	0.92	0.83	0.85	0.89	0.85	0.94
		CA3PA2	0.90	0.86	0.86	0.88	0.86	0.95
		CA3PA3	0.92	0.83	0.81	0.90	0.83	0.93
	6	CA1	0.91	0.85	0.87	0.87	0.84	0.93
		CA2	0.92	0.90	0.89	0.91	0.86	0.88
		CA3	0.94	0.89	0.86	0.91	0.85	0.87
	7	CA1	0.93	0.90	0.90	0.90	0.87	0.93
		CA2	0.94	0.90	0.89	0.92	0.86	0.91
		CA3	0.95	0.91	0.89	0.93	0.86	0.89
	8	CA1PA1	0.92	0.87	0.88	0.90	0.87	0.96
		CA1PA2	0.94	0.88	0.87	0.92	0.86	0.95
		CA1PA3	0.92	0.86	0.88	0.91	0.86	0.96
		CA2PA1	0.93	0.85	0.85	0.90	0.84	0.96
		CA2PA2	0.95	0.84	0.84	0.93	0.84	0.95
		CA2PA3	0.92	0.86	0.84	0.90	0.86	0.96
		CA3PA1	0.92	0.83	0.86	0.91	0.87	0.96
		CA3PA2	0.93	0.85	0.88	0.91	0.86	0.96
		CA3PA3	0.93	0.84	0.84	0.92	0.85	0.95

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Table 9.6: Decision Accuracy and Consistency at Achievement Cut Points (cont.)

Content Area	Grade	Form	Accuracy			Consistency		
			Below Basic/ Basic	Basic/ Prof.	Prof./ Adv.	Below Basic/ Basic	Basic/ Prof.	Prof./ Adv.
Mathematics	3	CA1	0.91	0.89	0.91	0.88	0.87	0.93
		CA2	0.90	0.85	0.87	0.88	0.86	0.91
		CA3	0.92	0.87	0.89	0.89	0.86	0.92
	4	CA1	0.91	0.89	0.92	0.88	0.86	0.92
		CA2	0.93	0.89	0.90	0.91	0.85	0.91
		CA3	0.94	0.89	0.90	0.91	0.84	0.89
	5	CA1PA1	0.89	0.92	0.94	0.85	0.89	0.92
		CA1PA2	0.89	0.88	0.91	0.87	0.84	0.89
		CA2PA1	0.92	0.91	0.93	0.88	0.86	0.92
		CA2PA2	0.91	0.90	0.92	0.89	0.86	0.89
		CA3PA1	0.91	0.89	0.91	0.89	0.85	0.91
		CA3PA2	0.94	0.90	0.92	0.92	0.87	0.88
	6	CA1	0.89	0.91	0.94	0.86	0.87	0.92
		CA2	0.92	0.89	0.91	0.89	0.86	0.88
		CA3	0.92	0.89	0.92	0.88	0.84	0.90
	7	CA1	0.86	0.91	0.95	0.86	0.88	0.93
		CA2	0.89	0.90	0.93	0.87	0.86	0.92
		CA3	0.89	0.88	0.91	0.86	0.87	0.94
	8	CA1PA1	0.89	0.90	0.96	0.88	0.89	0.95
		CA1PA2	0.87	0.88	0.94	0.86	0.84	0.93
		CA2PA1	0.88	0.89	0.92	0.83	0.85	0.95
		CA2PA2	0.87	0.89	0.92	0.83	0.85	0.96
		CA3PA1	0.86	0.89	0.93	0.82	0.85	0.95
		CA3PA2	0.86	0.89	0.93	0.82	0.85	0.95
Science	5	CA2	0.96	0.90	0.92	0.94	0.86	0.89
		CA3	0.97	0.90	0.90	0.96	0.86	0.86
	8	CA2	0.94	0.91	0.95	0.92	0.87	0.94
		CA3	0.96	0.91	0.94	0.94	0.89	0.92

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Table 9.7: Principal Component Analysis for English Language Arts/Literacy

Grade	Form	Components	Eigenvalue	Percent of Variance Explained	Cumulative Percent of Variance Explained
3	CA1	First Component	9.44	21.46	21.46
		Second Component	1.38	3.13	24.59
		Ratio (First/Second)	6.87		
	CA2	First Component	8.62	19.59	19.59
		Second Component	1.43	3.24	22.83
		Ratio (First/Second)	6.04		
	CA3	First Component	8.49	19.29	19.29
		Second Component	1.35	3.06	22.35
		Ratio (First/Second)	6.31		
4	CA1	First Component	8.62	19.58	19.58
		Second Component	1.36	3.09	22.67
		Ratio (First/Second)	6.33		
	CA2	First Component	8.41	19.12	19.12
		Second Component	1.42	3.22	22.34
		Ratio (First/Second)	5.94		
	CA3	First Component	7.86	17.87	17.87
		Second Component	1.41	3.20	21.07
		Ratio (First/Second)	5.58		
5	CA1PA1	First Component	10.11	21.06	21.06
		Second Component	1.47	3.05	24.11
		Ratio (First/Second)	6.90		
	CA1PA2	First Component	9.51	19.80	19.80
		Second Component	1.52	3.16	22.96
		Ratio (First/Second)	6.27		
	CA1PA3	First Component	10.12	21.09	21.09
		Second Component	1.68	3.49	24.58
		Ratio (First/Second)	6.04		

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

Grade	Form	Components	Eigenvalue	Percent of Variance Explained	Cumulative Percent of Variance Explained
5	CA2PA1	First Component	9.02	18.78	18.78
		Second Component	1.64	3.41	22.19
		Ratio (First/Second)	5.51		
	CA2PA2	First Component	8.41	17.52	17.52
		Second Component	1.57	3.27	20.79
		Ratio (First/Second)	5.36		
	CA2PA3	First Component	8.91	18.56	18.56
		Second Component	1.64	3.41	21.97
		Ratio (First/Second)	5.44		
	CA3PA1	First Component	8.93	18.61	18.61
		Second Component	1.57	3.27	21.88
		Ratio (First/Second)	5.69		
	CA3PA2	First Component	9.39	19.57	19.57
		Second Component	1.62	3.38	22.94
		Ratio (First/Second)	5.79		
	CA3PA3	First Component	8.28	17.25	17.25
		Second Component	1.55	3.24	20.49
		Ratio (First/Second)	5.33		
6	CA1	First Component	7.13	15.84	15.84
		Second Component	1.20	2.66	18.50
		Ratio (First/Second)	5.96		
	CA2	First Component	7.46	16.58	16.58
		Second Component	1.23	2.73	19.32
		Ratio (First/Second)	6.07		
	CA3	First Component	7.44	16.54	16.54
		Second Component	1.23	2.74	19.28
		Ratio (First/Second)	6.04		

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

Grade	Form	Components	Eigenvalue	Percent of Variance Explained	Cumulative Percent of Variance Explained
7	CA1	First Component	9.05	20.10	20.10
		Second Component	1.22	2.71	22.81
		Ratio (First/Second)	7.42		
	CA2	First Component	8.25	18.34	18.34
		Second Component	1.26	2.79	21.14
		Ratio (First/Second)	6.56		
	CA3	First Component	7.70	17.11	17.11
		Second Component	1.37	3.04	20.16
		Ratio (First/Second)	5.62		
8	CA1PA1	First Component	9.97	20.35	20.35
		Second Component	1.52	3.10	23.46
		Ratio (First/Second)	6.56		
	CA1PA2	First Component	10.04	20.50	20.50
		Second Component	1.52	3.09	23.59
		Ratio (First/Second)	6.63		
	CA1PA3	First Component	9.08	18.53	18.53
		Second Component	1.66	3.39	21.92
		Ratio (First/Second)	5.47		
	CA2PA1	First Component	8.99	18.35	18.35
		Second Component	1.51	3.07	21.42
		Ratio (First/Second)	5.97		
	CA2PA2	First Component	8.50	17.34	17.34
		Second Component	1.46	2.97	20.31
		Ratio (First/Second)	5.84		
	CA2PA3	First Component	9.17	18.72	18.72
		Second Component	1.51	3.08	21.80
		Ratio (First/Second)	6.07		
	CA3PA1	First Component	9.11	18.59	18.59
		Second Component	1.62	3.30	21.89
		Ratio (First/Second)	5.63		
	CA3PA2	First Component	9.39	19.15	19.15
		Second Component	1.47	3.00	22.16
		Ratio (First/Second)	6.37		
	CA3PA3	First Component	8.91	18.18	18.18
		Second Component	1.48	3.02	21.20
		Ratio (First/Second)	6.02		

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Table 9.8: Principal Component Analysis for Mathematics

Grade	Form	Components	Eigenvalue	Percent of Variance Explained	Cumulative Percent of Variance Explained
3	CA1	First Component	8.31	26.80	26.80
		Second Component	1.98	6.40	33.20
		Ratio (First/Second)	4.19		
	CA2	First Component	7.28	23.47	23.47
		Second Component	1.63	5.27	28.74
		Ratio (First/Second)	4.45		
	CA3	First Component	7.21	23.26	23.26
		Second Component	1.63	5.27	28.53
		Ratio (First/Second)	4.41		
4	CA1	First Component	8.40	27.08	27.08
		Second Component	1.61	5.19	32.27
		Ratio (First/Second)	5.22		
	CA2	First Component	7.53	24.28	24.28
		Second Component	1.52	4.92	29.20
		Ratio (First/Second)	4.94		
	CA3	First Component	7.14	23.02	23.02
		Second Component	1.54	4.97	28.00
		Ratio (First/Second)	4.63		
5	CA1PA1	First Component	8.47	22.89	22.89
		Second Component	1.59	4.31	27.20
		Ratio (First/Second)	5.32		
	CA1PA2	First Component	7.97	21.54	21.54
		Second Component	1.61	4.36	25.90
		Ratio (First/Second)	4.94		
	CA2PA1	First Component	8.08	21.83	21.83
		Second Component	1.50	4.07	25.89
		Ratio (First/Second)	5.37		
	CA2PA2	First Component	8.20	22.17	22.17
		Second Component	1.50	4.06	26.23
		Ratio (First/Second)	5.46		
	CA3PA1	First Component	7.83	21.15	21.15
		Second Component	1.48	3.99	25.15
		Ratio (First/Second)	5.30		
	CA3PA2	First Component	7.86	21.24	21.24
		Second Component	1.46	3.96	25.19
		Ratio (First/Second)	5.37		

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Table 9.8: Principal Component Analysis for Mathematics (cont.)

Grade	Form	Components	Eigenvalue	Percent of Variance Explained	Cumulative Percent of Variance Explained
6	CA1	First Component	7.27	24.25	24.25
		Second Component	1.62	5.38	29.63
		Ratio (First/Second)	4.50		
	CA2	First Component	7.20	24.00	24.00
		Second Component	1.64	5.46	29.47
		Ratio (First/Second)	4.39		
	CA3	First Component	6.94	23.14	23.14
		Second Component	1.57	5.24	28.38
		Ratio (First/Second)	4.42		
7	CA1	First Component	8.16	26.31	26.31
		Second Component	1.44	4.64	30.96
		Ratio (First/Second)	5.67		
	CA2	First Component	7.22	23.30	23.30
		Second Component	1.38	4.45	27.75
		Ratio (First/Second)	5.23		
	CA3	First Component	7.51	24.21	24.21
		Second Component	1.47	4.74	28.95
		Ratio (First/Second)	5.11		
8	CA1PA1	First Component	7.40	19.99	19.99
		Second Component	1.70	4.60	24.59
		Ratio (First/Second)	4.34		
	CA1PA2	First Component	7.09	19.17	19.17
		Second Component	1.61	4.36	23.53
		Ratio (First/Second)	4.40		
	CA2PA1	First Component	7.62	20.58	20.58
		Second Component	1.50	4.06	24.64
		Ratio (First/Second)	5.07		
	CA2PA2	First Component	7.53	20.34	20.34
		Second Component	1.59	4.30	24.65
		Ratio (First/Second)	4.73		
	CA3PA1	First Component	7.65	20.68	20.68
		Second Component	1.29	3.50	24.18
		Ratio (First/Second)	5.92		
	CA3PA2	First Component	7.38	19.94	19.94
		Second Component	1.32	3.57	23.51
		Ratio (First/Second)	5.58		

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Table 9.9: Principal Component Analysis for Science

Grade	Form	Components	Eigenvalue	Percent of Variance Explained	Cumulative Percent of Variance Explained
5	CA2	First Component	8.07	19.68	19.68
		Second Component	1.38	3.37	23.05
		Ratio (First/Second)	5.83		
	CA3	First Component	6.85	16.71	16.71
		Second Component	1.33	3.23	19.94
		Ratio (First/Second)	5.17		
8	CA2	First Component	9.19	23.56	23.56
		Second Component	1.22	3.13	26.69
		Ratio (First/Second)	7.52		
	CA3	First Component	7.66	20.15	20.15
		Second Component	1.26	3.32	23.47
		Ratio (First/Second)	6.07		

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Table 9.10: Uncorrected Correlation Coefficient (below Diagonal) and Corrected Correlation Coefficient (above Diagonal) among Claims: English Language Arts/Literacy

Grade	Form	No.	Claim	Number of Items	1	2	3	4
3	CA1	1	Reading	20	.	0.68	0.67	0.63
		2	Writing	10	0.52	.	0.55	0.54
		3	Listening	9	0.51	0.39	.	0.48
		4	Research	5	0.44	0.35	0.31	.
	CA2	1	Reading	20	.	0.75	0.70	0.66
		2	Writing	10	0.57	.	0.64	0.60
		3	Listening	9	0.51	0.44	.	0.55
		4	Research	5	0.42	0.36	0.32	.
	CA3	1	Reading	20	.	0.75	0.70	0.70
		2	Writing	10	0.57	.	0.63	0.59
		3	Listening	9	0.50	0.42	.	0.54
		4	Research	5	0.46	0.37	0.32	.
	CT1	1	Reading	19	.	1.02	0.82	0.91
		2	Writing	10	0.68	.	0.87	1.00
		3	Listening	9	0.57	0.51	.	0.72
		4	Research	8	0.66	0.60	0.45	.
4	CA1	1	Reading	20	.	0.71	0.64	0.64
		2	Writing	10	0.53	.	0.62	0.53
		3	Listening	9	0.48	0.41	.	0.50
		4	Research	5	0.41	0.31	0.29	.
	CA2	1	Reading	20	.	0.73	0.71	0.66
		2	Writing	10	0.54	.	0.66	0.60
		3	Listening	9	0.52	0.46	.	0.53
		4	Research	5	0.44	0.39	0.34	.
	CA3	1	Reading	20	.	0.74	0.73	0.70
		2	Writing	10	0.54	.	0.70	0.62
		3	Listening	9	0.51	0.46	.	0.57
		4	Research	5	0.44	0.36	0.33	.
	CT1	1	Reading	20	.	0.97	0.97	0.94
		2	Writing	10	0.61	.	0.89	1.00
		3	Listening	9	0.60	0.48	.	0.84
		4	Research	7	0.59	0.54	0.45	.

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Table 9.10: Uncorrected Correlation Coefficient (below Diagonal) and Corrected Correlation Coefficient (above Diagonal) among Claims: English Language Arts/Literacy (cont.)

Grade	Form	No.	Claim	Number of Items	1	2	3	4
5	CA1PA1	1	Reading	20	.	0.84	0.77	0.81
		2	Writing	11	0.62	.	0.76	0.84
		3	Listening	9	0.57	0.50	.	0.71
		4	Research	8	0.61	0.57	0.48	.
	CA1PA2	1	Reading	20	.	0.99	0.95	0.99
		2	Writing	11	0.72	.	0.92	1.03
		3	Listening	9	0.69	0.59	.	0.92
		4	Research	8	0.70	0.64	0.58	.
	CA1PA3	1	Reading	20	.	0.98	0.95	0.94
		2	Writing	11	0.72	.	1.01	1.03
		3	Listening	9	0.71	0.67	.	0.94
		4	Research	8	0.69	0.67	0.62	.
	CA2PA1	1	Reading	20	.	0.97	0.99	0.97
		2	Writing	11	0.72	.	0.96	1.01
		3	Listening	9	0.64	0.60	.	0.97
		4	Research	8	0.70	0.70	0.59	.
	CA2PA2	1	Reading	20	.	0.86	0.86	0.86
		2	Writing	11	0.62	.	0.82	0.90
		3	Listening	9	0.54	0.49	.	0.81
		4	Research	8	0.59	0.59	0.46	.
	CA2PA3	1	Reading	20	.	0.95	0.96	0.93
		2	Writing	11	0.72	.	0.96	0.98
		3	Listening	9	0.61	0.59	.	0.98
		4	Research	8	0.64	0.66	0.55	.
	CA3PA1	1	Reading	20	.	0.97	0.90	0.93
		2	Writing	11	0.70	.	0.91	1.01
		3	Listening	9	0.61	0.57	.	0.93
		4	Research	8	0.67	0.68	0.58	.
	CA3PA2	1	Reading	20	.	0.98	0.88	0.98
		2	Writing	11	0.71	.	0.94	1.00
		3	Listening	9	0.62	0.62	.	0.93
		4	Research	8	0.71	0.67	0.61	.

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Table 9.10: Uncorrected Correlation Coefficient (below Diagonal) and Corrected Correlation Coefficient (above Diagonal) among Claims: English Language Arts/Literacy (cont.)

Grade	Form	No.	Claim	Number of Items	1	2	3	4
5	CA3PA2	1	Reading	20	.	0.98	0.88	0.98
		2	Writing	11	0.71	.	0.94	1.00
		3	Listening	9	0.62	0.62	.	0.93
		4	Research	8	0.71	0.67	0.61	.
	CA3PA3	1	Reading	20	.	0.88	0.81	0.84
		2	Writing	11	0.62	.	0.80	0.89
		3	Listening	9	0.53	0.49	.	0.78
		4	Research	8	0.58	0.57	0.47	.
	CT1PT1	1	Reading	19	.	0.94	0.99	0.92
		2	Writing	11	0.70	.	0.93	0.86
		3	Listening	9	0.70	0.64	.	0.89
		4	Research	11	0.68	0.61	0.60	.
6	CA1	1	Reading	21	.	0.76	0.73	0.65
		2	Writing	10	0.53	.	0.73	0.62
		3	Listening	9	0.47	0.42	.	0.56
		4	Research	5	0.34	0.29	0.24	.
	CA2	1	Reading	21	.	0.79	0.74	0.67
		2	Writing	10	0.57	.	0.66	0.64
		3	Listening	9	0.50	0.41	.	0.54
		4	Research	5	0.39	0.33	0.27	.
	CA3	1	Reading	21	.	0.76	0.75	0.72
		2	Writing	10	0.54	.	0.73	0.64
		3	Listening	9	0.47	0.42	.	0.60
		4	Research	5	0.46	0.37	0.31	.
	CT1	1	Reading	21	.	0.95	0.89	1.00
		2	Writing	10	0.70	.	0.76	0.88
		3	Listening	8	0.60	0.49	.	0.86
		4	Research	8	0.67	0.57	0.51	.

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Table 9.10: Uncorrected Correlation Coefficient (below Diagonal) and Corrected Correlation Coefficient (above Diagonal) among Claims: English Language Arts/Literacy (cont.)

Grade	Form	No.	Claim	Number of Items	1	2	3	4
7	CA1	1	Reading	21	.	0.70	0.68	0.64
		2	Writing	10	0.52	.	0.61	0.58
		3	Listening	9	0.52	0.42	.	0.50
		4	Research	5	0.42	0.34	0.30	.
	CA2	1	Reading	21	.	0.74	0.72	0.69
		2	Writing	10	0.53	.	0.65	0.61
		3	Listening	9	0.51	0.42	.	0.58
		4	Research	5	0.46	0.37	0.34	.
	CA3	1	Reading	21	.	0.79	0.74	0.69
		2	Writing	10	0.55	.	0.68	0.64
		3	Listening	9	0.52	0.42	.	0.58
		4	Research	5	0.42	0.34	0.31	.
	CT1	1	Reading	20	.	0.92	0.78	0.92
		2	Writing	10	0.68	.	0.77	0.81
		3	Listening	9	0.60	0.53	.	0.82
		4	Research	8	0.53	0.41	0.44	.
8	CA1PA1	1	Reading	21	.	0.86	0.73	0.80
		2	Writing	11	0.68	.	0.70	0.83
		3	Listening	9	0.49	0.44	.	0.66
		4	Research	8	0.58	0.57	0.39	.
	CA1PA2	1	Reading	21	.	0.97	0.91	0.96
		2	Writing	11	0.76	.	0.89	0.97
		3	Listening	9	0.60	0.55	.	0.90
		4	Research	8	0.71	0.68	0.53	.
	CA1PA3	1	Reading	21	.	0.96	0.83	0.94
		2	Writing	11	0.74	.	0.81	0.97
		3	Listening	9	0.54	0.51	.	0.84
		4	Research	8	0.67	0.66	0.49	.
	CA2PA1	1	Reading	21	.	0.95	0.96	0.92
		2	Writing	11	0.72	.	0.88	0.94
		3	Listening	9	0.61	0.52	.	0.84
		4	Research	8	0.67	0.64	0.48	.

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Table 9.10: Uncorrected Correlation Coefficient (below Diagonal) and Corrected Correlation Coefficient (above Diagonal) among Claims: English Language Arts/Literacy (cont.)

Grade	Form	No.	Claim	Number of Items	1	2	3	4
8	CA2PA2	1	Reading	21	.	0.88	0.79	0.86
		2	Writing	11	0.65	.	0.76	0.89
		3	Listening	9	0.49	0.44	.	0.73
		4	Research	8	0.61	0.60	0.41	.
	CA2PA3	1	Reading	21	.	0.92	0.86	0.93
		2	Writing	11	0.70	.	0.81	0.96
		3	Listening	9	0.57	0.51	.	0.81
		4	Research	8	0.70	0.67	0.50	.
	CA3PA1	1	Reading	21	.	0.96	0.92	0.93
		2	Writing	11	0.72	.	0.93	0.94
		3	Listening	9	0.61	0.56	.	0.84
		4	Research	8	0.66	0.61	0.48	.
	CA3PA2	1	Reading	21	.	1.00	0.90	0.96
		2	Writing	11	0.75	.	0.89	1.01
		3	Listening	9	0.60	0.54	.	0.89
		4	Research	8	0.71	0.67	0.52	.
	CA3PA3	1	Reading	21	.	0.88	0.78	0.85
		2	Writing	11	0.67	.	0.74	0.87
		3	Listening	9	0.51	0.44	.	0.67
		4	Research	8	0.61	0.57	0.38	.
	CT1PT1	1	Reading	21	.	1.00	0.87	0.94
		2	Writing	11	0.74	.	0.91	1.05
		3	Listening	9	0.59	0.55	.	0.77
		4	Research	10	0.69	0.69	0.46	.

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Table 9.11: Uncorrected Correlation Coefficient (below Diagonal) and Corrected Correlation Coefficient (above Diagonal) among Claims: Mathematics

Grade	Form	No.	Claim	Number of Items	1	2	3
3	CA1	1	Concepts and Procedures	20	.	0.41	0.48
		2	Problem Solving and Modeling and Data Analysis	5	0.30	.	0.22
		3	Communicating Reasoning	6	0.37	0.15	.
	CA2	1	Concepts and Procedures	20	.	0.47	0.55
		2	Problem Solving and Modeling and Data Analysis	5	0.33	.	0.28
		3	Communicating Reasoning	6	0.40	0.18	.
	CA3	1	Concepts and Procedures	20	.	0.51	0.49
		2	Problem Solving and Modeling and Data Analysis	5	0.36	.	0.29
		3	Communicating Reasoning	6	0.36	0.18	.
	CT1	1	Concepts and Procedures	20	.	0.98	0.68
		2	Problem Solving and Modeling and Data Analysis	7	0.72	.	0.81
		3	Communicating Reasoning	8	0.43	0.45	.
4	CA1	1	Concepts and Procedures	20	.	0.45	0.50
		2	Problem Solving and Modeling and Data Analysis	5	0.33	.	0.36
		3	Communicating Reasoning	6	0.39	0.23	.
	CA2	1	Concepts and Procedures	20	.	0.47	0.56
		2	Problem Solving and Modeling and Data Analysis	5	0.35	.	0.38
		3	Communicating Reasoning	6	0.42	0.26	.
	CA3	1	Concepts and Procedures	20	.	0.61	0.57
		2	Problem Solving and Modeling and Data Analysis	5	0.43	.	0.45
		3	Communicating Reasoning	6	0.40	0.27	.
	CT1	1	Concepts and Procedures	21	.	0.97	0.95
		2	Problem Solving and Modeling and Data Analysis	6	0.53	.	0.85
		3	Communicating Reasoning	8	0.65	0.38	.

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Table 9.11: Uncorrected Correlation Coefficient (below Diagonal) and Corrected Correlation Coefficient (above Diagonal) among Claims: Mathematics (cont.)

Grade	Form	No.	Claim	Number of Items	1	2	3
5	CA1PA1	1	Concepts and Procedures	20	.	0.70	0.72
		2	Problem Solving and Modeling and Data Analysis	9	0.53	.	0.76
		3	Communicating Reasoning	8	0.53	0.54	.
	CA1PA2	1	Concepts and Procedures	20	.	0.76	0.77
		2	Problem Solving and Modeling and Data Analysis	9	0.57	.	0.84
		3	Communicating Reasoning	8	0.56	0.58	.
	CA2PA1	1	Concepts and Procedures	20	.	0.75	0.73
		2	Problem Solving and Modeling and Data Analysis	9	0.56	.	0.86
		3	Communicating Reasoning	8	0.54	0.61	.
	CA2PA2	1	Concepts and Procedures	20	.	0.79	0.76
		2	Problem Solving and Modeling and Data Analysis	9	0.59	.	0.86
		3	Communicating Reasoning	8	0.56	0.62	.
	CA3PA1	1	Concepts and Procedures	20	.	0.73	0.73
		2	Problem Solving and Modeling and Data Analysis	9	0.53	.	0.81
		3	Communicating Reasoning	8	0.54	0.56	.
	CA3PA2	1	Concepts and Procedures	20	.	0.74	0.74
		2	Problem Solving and Modeling and Data Analysis	9	0.55	.	0.88
		3	Communicating Reasoning	8	0.54	0.61	.
	CT1PT1	1	Concepts and Procedures	20	.	0.99	1.00
		2	Problem Solving and Modeling and Data Analysis	11	0.71	.	1.03
		3	Communicating Reasoning	10	0.65	0.62	.

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Table 9.11: Uncorrected Correlation Coefficient (below Diagonal) and Corrected Correlation Coefficient (above Diagonal) among Claims: Mathematics (cont.)

Grade	Form	No.	Claim	Number of Items	1	2	3
6	CA1	1	Concepts and Procedures	19	.	0.49	0.55
		2	Problem Solving and Modeling and Data Analysis	5	0.37	.	0.38
		3	Communicating Reasoning	6	0.37	0.24	.
	CA2	1	Concepts and Procedures	19	.	0.61	0.50
		2	Problem Solving and Modeling and Data Analysis	5	0.44	.	0.35
		3	Communicating Reasoning	6	0.36	0.22	.
	CA3	1	Concepts and Procedures	19	.	0.54	0.59
		2	Problem Solving and Modeling and Data Analysis	5	0.40	.	0.40
		3	Communicating Reasoning	6	0.40	0.25	.
	CT1	1	Concepts and Procedures	19	.	0.88	0.76
		2	Problem Solving and Modeling and Data Analysis	7	0.62	.	0.89
		3	Communicating Reasoning	8	0.51	0.49	.
7	CA1	1	Concepts and Procedures	20	.	0.41	0.53
		2	Problem Solving and Modeling and Data Analysis	5	0.30	.	0.28
		3	Communicating Reasoning	6	0.41	0.19	.
	CA2	1	Concepts and Procedures	20	.	0.57	0.59
		2	Problem Solving and Modeling and Data Analysis	5	0.37	.	0.31
		3	Communicating Reasoning	6	0.42	0.17	.
	CA3	1	Concepts and Procedures	20	.	0.54	0.50
		2	Problem Solving and Modeling and Data Analysis	5	0.38	.	0.36
		3	Communicating Reasoning	6	0.34	0.21	.
	CT1	1	Concepts and Procedures	20	.	0.90	0.94
		2	Problem Solving and Modeling and Data Analysis	7	0.65	.	1.00
		3	Communicating Reasoning	8	0.58	0.58	.

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Table 9.11: Uncorrected Correlation Coefficient (below Diagonal) and Corrected Correlation Coefficient (above Diagonal) among Claims: Mathematics (cont.)

Grade	Form	No.	Claim	Number of Items	1	2	3
8	CA1PA1	1	Concepts and Procedures	20	.	0.79	0.84
		2	Problem Solving and Modeling and Data Analysis	9	0.58	.	0.86
		3	Communicating Reasoning	8	0.54	0.49	.
	CA1PA2	1	Concepts and Procedures	20	.	0.81	0.84
		2	Problem Solving and Modeling and Data Analysis	9	0.59	.	0.88
		3	Communicating Reasoning	8	0.55	0.52	.
	CA2PA1	1	Concepts and Procedures	20	.	0.76	0.83
		2	Problem Solving and Modeling and Data Analysis	9	0.56	.	0.86
		3	Communicating Reasoning	8	0.58	0.53	.
	CA2PA2	1	Concepts and Procedures	20	.	0.79	0.83
		2	Problem Solving and Modeling and Data Analysis	9	0.57	.	0.83
		3	Communicating Reasoning	8	0.57	0.50	.
	CA3PA1	1	Concepts and Procedures	20	.	0.82	0.88
		2	Problem Solving and Modeling and Data Analysis	9	0.61	.	0.85
		3	Communicating Reasoning	8	0.60	0.54	.
	CA3PA2	1	Concepts and Procedures	20	.	0.83	0.93
		2	Problem Solving and Modeling and Data Analysis	9	0.60	.	0.92
		3	Communicating Reasoning	8	0.62	0.56	.
	CT1PT1	1	Concepts and Procedures	20	.	0.89	0.82
		2	Problem Solving and Modeling and Data Analysis	10	0.47	.	0.89
		3	Communicating Reasoning	9	0.44	0.42	.

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Table 9.12: Uncorrected Correlation Coefficient (below Diagonal) and Corrected Correlation Coefficient (above Diagonal) among GLE Strands: Science

Grade	Form	No.	GLE Strand	Number of Items	1	2	3	4	5	6	7	8
5	CA2	1	Matter and Energy	5	.	1.00	0.96	0.98	1.00	0.96	0.92	0.89
		2	Force and Motion	3	0.44	.	0.92	0.93	0.97	0.95	0.94	0.85
		3	Living Organisms	5	0.45	0.36	.	1.03	0.99	0.98	0.85	0.92
		4	Ecosystems	7	0.52	0.42	0.50	.	1.03	0.97	0.86	0.93
		5	Earth's Systems	6	0.51	0.42	0.46	0.54	.	0.95	0.91	0.90
		6	The Universe	4	0.45	0.37	0.41	0.47	0.44	.	0.88	0.93
		7	Scientific Inquiry	9	0.55	0.47	0.46	0.53	0.54	0.47	.	0.80
		8	Impact of Sci., Tech. and Human Activity	2	0.39	0.32	0.37	0.42	0.39	0.37	0.41	.
	CA3	1	Matter and Energy	5	.	0.83	0.95	0.93	0.96	0.89	0.80	0.92
		2	Force and Motion	3	0.32	.	0.80	0.75	0.79	0.79	0.72	0.77
		3	Living Organisms	5	0.34	0.31	.	0.97	0.98	0.94	0.83	0.95
		4	Ecosystems	7	0.40	0.35	0.41	.	0.97	0.92	0.82	0.97
		5	Earth's Systems	5	0.36	0.32	0.37	0.44	.	0.93	0.81	0.98
		6	The Universe	5	0.38	0.37	0.40	0.47	0.42	.	0.82	0.93
		7	Scientific Inquiry	9	0.39	0.38	0.40	0.47	0.41	0.47	.	0.80
		8	Impact of Sci., Tech. and Human Activity	2	0.33	0.29	0.33	0.41	0.37	0.40	0.38	.

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Table 9.12: Uncorrected Correlation Coefficient (below Diagonal) and Corrected Correlation Coefficient (above Diagonal) among GLE Strands: Science (cont.)

Grade	Form	No.	GLE Strand	Number of Items	1	2	3	4	5	6	7	8
8	CA2	1	Matter and Energy	6	.	1.05	0.94	0.93	0.98	0.98	0.92	0.96
		2	Force and Motion	2	0.50	.	0.91	0.94	0.99	1.02	1.00	0.92
		3	Living Organisms	4	0.56	0.42	.	0.93	0.97	0.93	0.86	0.94
		4	Ecosystems	4	0.53	0.43	0.52	.	0.97	0.97	0.86	1.01
		5	Earth's Systems	7	0.59	0.47	0.57	0.55	.	1.00	0.88	0.96
		6	The Universe	4	0.50	0.41	0.46	0.47	0.50	.	0.91	0.96
		7	Scientific Inquiry	9	0.63	0.54	0.58	0.55	0.60	0.52	.	0.87
		8	Impact of Sci., Tech. and Human Activity	3	0.39	0.30	0.38	0.39	0.39	0.33	0.40	.
	CA3	1	Matter and Energy	6	.	0.95	1.02	0.92	0.99	1.00	0.93	1.04
		2	Force and Motion	2	0.40	.	0.93	0.92	0.95	0.94	0.88	1.05
		3	Living Organisms	4	0.49	0.37	.	0.98	1.01	0.95	0.87	1.04
		4	Ecosystems	4	0.39	0.32	0.39	.	1.00	0.87	0.80	1.03
		5	Earth's Systems	6	0.46	0.37	0.45	0.39	.	0.95	0.82	1.08
		6	The Universe	4	0.55	0.43	0.49	0.40	0.48	.	0.85	1.02
		7	Scientific Inquiry	9	0.57	0.45	0.50	0.41	0.46	0.56	.	0.93
		8	Impact of Sci., Tech. and Human Activity	3	0.44	0.37	0.41	0.36	0.42	0.46	0.47	.
	CT2	1	Matter and Energy	6	.	1.44	1.01	0.94	1.11	0.92	0.90	1.07
		2	Force and Motion	2	0.49	.	1.34	1.44	1.32	1.56	1.35	1.45
		3	Living Organisms	4	0.59	0.44	.	1.03	1.12	1.00	0.91	1.10
		4	Ecosystems	4	0.55	0.48	0.59	.	1.08	0.98	0.78	1.18
		5	Earth's Systems	7	0.61	0.41	0.60	0.58	.	1.00	0.86	1.02
		6	The Universe	4	0.39	0.38	0.42	0.41	0.39	.	1.01	1.09
		7	Scientific Inquiry	9	0.62	0.52	0.61	0.52	0.54	0.49	.	0.92
		8	Impact of Sci., Tech. and Human Activity	3	0.45	0.34	0.45	0.48	0.39	0.32	0.44	.

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Table 9.13: Mean, Standard Deviation, and Standard Error of Measurement (SEM) of English Language Arts/Literacy Claims

Grade	Form	Claim	Number of Items	Number of Score Points	N Count	Mean	Std. Dev.	Cronbach's Alpha	SEM
3	CA1	1	20	22	30336	11.66	4.65	0.82	1.95
		2	10	11	30332	5.94	2.63	0.71	1.43
		3	9	9	30332	3.93	2.34	0.71	1.27
		4	5	5	30336	2.82	1.42	0.58	0.92
	CA2	1	20	22	18632	11.36	4.36	0.80	1.94
		2	10	11	18632	6.87	2.42	0.72	1.28
		3	9	9	18624	4.37	2.23	0.67	1.28
		4	5	5	18632	2.84	1.39	0.50	0.98
	CA3	1	20	22	18584	11.98	4.39	0.80	1.97
		2	10	11	18584	6.53	2.40	0.70	1.31
		3	9	9	18584	4.05	2.13	0.64	1.29
		4	5	5	18584	3.30	1.36	0.55	0.92
	CT1	1	19	21	208	7.00	4.15	0.80	1.84
		2	10	11	208	3.82	2.17	0.56	1.45
		3	9	9	208	2.74	2.03	0.62	1.26
		4	8	8	208	3.10	2.06	0.65	1.23
4	CA1	1	20	22	29624	10.57	4.56	0.82	1.95
		2	10	11	29624	5.58	2.40	0.67	1.38
		3	9	9	29624	5.02	2.19	0.67	1.26
		4	5	5	29624	2.97	1.41	0.51	0.99
	CA2	1	20	22	18496	10.24	4.06	0.77	1.96
		2	10	11	18492	6.87	2.50	0.71	1.34
		3	9	9	18496	6.07	2.10	0.69	1.18
		4	5	5	18496	2.93	1.46	0.59	0.93
	CA3	1	20	22	18512	9.85	4.23	0.78	1.98
		2	10	11	18512	6.77	2.25	0.67	1.30
		3	9	9	18512	5.71	2.05	0.64	1.23
		4	5	5	18512	2.79	1.37	0.51	0.96
	CT1	1	20	22	225	6.67	3.75	0.73	1.95
		2	10	11	230	4.20	2.15	0.54	1.46
		3	9	9	225	2.83	1.87	0.54	1.28
		4	7	7	230	2.64	1.71	0.53	1.17

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Table 9.13: Mean, Standard Deviation, and Standard Error of Measurement (SEM) of English Language Arts/Literacy Claims (cont.)

Grade	Form	Claim	Number of Items	Number of Score Points	N Count	Mean	Std. Dev.	Cronbach's Alpha	SEM
5	CA1PA1	1	20	22	27492	10.94	4.68	0.83	1.93
		2	11	17	27488	8.85	3.35	0.66	1.97
		3	9	9	27568	4.87	2.19	0.65	1.29
		4	8	10	27568	4.92	2.52	0.70	1.38
	CA1PA2	1	20	22	968	11.11	4.54	0.82	1.92
		2	11	17	968	8.82	3.22	0.64	1.94
		3	9	9	968	4.90	2.17	0.64	1.30
		4	8	10	968	4.74	2.18	0.61	1.36
	CA1PA3	1	20	22	589	10.20	4.70	0.84	1.91
		2	11	17	590	8.42	3.19	0.65	1.89
		3	9	9	590	4.60	2.23	0.67	1.28
		4	8	10	590	3.98	2.29	0.65	1.35
	CA2PA1	1	20	21	608	10.10	3.96	0.77	1.90
		2	11	17	609	9.33	3.60	0.71	1.95
		3	9	9	608	3.96	1.94	0.55	1.31
		4	8	10	609	4.50	2.50	0.67	1.43
	CA2PA2	1	20	21	16840	11.27	3.81	0.75	1.89
		2	11	17	16840	10.22	3.33	0.69	1.86
		3	9	9	16836	4.38	1.88	0.52	1.31
		4	8	10	16840	4.90	2.22	0.62	1.37
	CA2PA3	1	20	21	965	10.78	3.94	0.77	1.89
		2	11	17	965	9.81	3.49	0.73	1.81
		3	9	9	964	4.18	1.89	0.52	1.31
		4	8	10	965	4.15	2.32	0.62	1.44
	CA3PA1	1	20	21	997	10.71	4.01	0.77	1.91
		2	11	17	997	9.64	3.42	0.67	1.97
		3	9	9	997	4.15	2.07	0.59	1.33
		4	8	10	997	4.27	2.46	0.67	1.40
	CA3PA2	1	20	21	590	10.66	4.04	0.78	1.91
		2	11	17	590	9.04	3.52	0.68	2.00
		3	9	9	590	4.13	2.20	0.64	1.32
		4	8	10	590	3.98	2.34	0.67	1.34

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Table 9.13: Mean, Standard Deviation, and Standard Error of Measurement (SEM) of English Language Arts/Literacy Claims (cont.)

Grade	Form	Claim	Number of Items	Number of Score Points	N Count	Mean	Std. Dev.	Cronbach's Alpha	SEM
5	CA3PA3	1	20	21	16912	11.59	3.76	0.75	1.90
		2	11	17	16912	10.14	3.18	0.65	1.88
		3	9	9	16912	4.56	2.04	0.57	1.33
		4	8	10	16912	4.16	2.36	0.63	1.44
	CT1PT1	1	19	21	234	5.80	3.83	0.78	1.80
		2	11	17	237	5.82	3.38	0.73	1.77
		3	9	9	233	3.08	2.13	0.65	1.27
		4	11	13	237	3.11	2.45	0.69	1.36
6	CA1	1	21	23	29476	10.17	4.40	0.78	2.07
		2	10	11	29468	6.11	2.42	0.64	1.46
		3	9	9	29476	5.29	1.96	0.53	1.34
		4	5	5	29476	2.42	1.28	0.36	1.03
	CA2	1	21	23	18096	11.08	4.51	0.79	2.06
		2	10	11	18096	6.43	2.23	0.65	1.32
		3	9	9	18096	4.69	2.11	0.58	1.36
		4	5	5	18096	2.58	1.30	0.42	0.99
	CA3	1	21	23	18136	11.24	4.49	0.78	2.11
		2	10	11	18132	6.21	2.35	0.65	1.39
		3	9	9	18136	5.52	1.89	0.50	1.33
		4	5	5	18136	2.95	1.40	0.54	0.95
	CT1	1	21	23	201	7.31	4.09	0.77	1.96
		2	10	11	201	4.12	2.50	0.70	1.37
		3	8	8	201	3.15	1.92	0.59	1.23
		4	8	8	201	2.86	1.91	0.59	1.23

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Table 9.13: Mean, Standard Deviation, and Standard Error of Measurement (SEM) of English Language Arts/Literacy Claims (cont.)

Grade	Form	Claim	Number of Items	Number of Score Points	N Count	Mean	Std. Dev.	Cronbach's Alpha	SEM
7	CA1	1	21	23	28604	11.36	4.88	0.82	2.07
		2	10	11	28592	4.41	2.52	0.66	1.47
		3	9	9	28592	5.18	2.34	0.72	1.25
		4	5	5	28604	2.69	1.37	0.52	0.96
	CA2	1	21	23	18536	12.94	4.49	0.80	2.01
		2	10	11	18540	4.90	2.50	0.65	1.47
		3	9	9	18540	5.95	2.08	0.63	1.27
		4	5	5	18536	2.41	1.48	0.56	0.99
	CA3	1	21	23	18484	12.55	4.49	0.79	2.04
		2	10	11	18484	5.27	2.46	0.62	1.52
		3	9	9	18484	5.88	1.97	0.63	1.20
		4	5	5	18484	2.57	1.36	0.46	1.00
	CT1	1	20	22	198	7.66	4.56	0.82	1.92
		2	10	11	198	2.84	2.20	0.66	1.27
		3	9	9	198	3.28	2.34	0.72	1.24
		4	8	8	198	2.19	1.49	0.40	1.16
8	CA1PA1	1	21	23	26408	12.53	4.93	0.83	2.02
		2	11	17	26400	7.93	3.78	0.75	1.90
		3	9	9	26412	4.53	1.88	0.54	1.27
		4	8	10	26412	3.20	2.14	0.63	1.29
	CA1PA2	1	21	23	1177	13.08	4.92	0.83	2.02
		2	11	17	1176	8.34	3.91	0.74	1.99
		3	9	9	1177	4.68	1.85	0.53	1.27
		4	8	10	1177	3.51	2.32	0.65	1.37
	CA1PA3	1	21	23	1241	13.09	4.64	0.81	2.03
		2	11	16	1239	8.38	3.49	0.73	1.82
		3	9	9	1241	4.64	1.85	0.53	1.27
		4	8	10	1241	3.82	2.29	0.63	1.39

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Table 9.13: Mean, Standard Deviation, and Standard Error of Measurement (SEM) of English Language Arts/Literacy Claims (cont.)

Grade	Form	Claim	Number of Items	Number of Score Points	N Count	Mean	Std. Dev.	Cronbach's Alpha	SEM
8	CA2PA1	1	21	23	1225	11.36	4.68	0.81	2.06
		2	11	17	1224	9.04	3.49	0.71	1.89
		3	9	9	1225	5.60	1.86	0.50	1.32
		4	8	10	1225	3.29	2.16	0.66	1.27
	CA2PA2	1	21	23	16178	12.15	4.50	0.79	2.08
		2	11	17	16172	9.49	3.62	0.70	2.00
		3	9	9	16178	5.67	1.83	0.48	1.32
		4	8	10	16176	3.80	2.32	0.64	1.39
	CA2PA3	1	21	23	1156	11.44	4.73	0.81	2.06
		2	11	16	1153	8.96	3.48	0.71	1.86
		3	9	9	1156	5.54	1.95	0.54	1.32
		4	8	10	1156	3.87	2.43	0.70	1.33
	CA3PA1	1	21	23	1214	12.13	4.82	0.84	1.95
		2	11	17	1214	8.81	3.47	0.68	1.96
		3	9	9	1214	5.36	1.90	0.54	1.29
		4	8	10	1214	3.41	2.10	0.61	1.32
	CA3PA2	1	21	23	1223	11.81	4.77	0.84	1.94
		2	11	17	1223	8.85	3.66	0.68	2.06
		3	9	9	1223	5.32	1.91	0.53	1.30
		4	8	10	1223	3.61	2.32	0.64	1.39
	CA3PA3	1	21	23	16296	12.56	4.66	0.83	1.94
		2	11	16	16296	9.23	3.31	0.69	1.85
		3	9	9	16296	5.48	1.86	0.51	1.29
		4	8	10	16296	4.19	2.30	0.63	1.39
	CT1PT1	1	21	23	226	7.53	4.64	0.83	1.93
		2	11	17	226	5.73	3.23	0.67	1.85
		3	9	9	226	2.75	1.89	0.55	1.26
		4	10	11	226	3.27	2.25	0.64	1.35

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Table 9.14: Mean, Standard Deviation, and Standard Error of Measurement (SEM) of Mathematics Claims

Grade	Form	Claim	Number of Items	Number of Score Points	N Count	Mean	Std. Dev.	Cronbach's Alpha	SEM
3	CA1	1	20	21	32624	12.18	4.81	0.85	1.83
		2	5	5	32624	1.78	1.48	0.63	0.90
		3	6	7	32624	2.29	2.03	0.70	1.12
	CA2	1	20	21	17404	12.55	4.25	0.81	1.85
		2	5	5	17412	1.98	1.51	0.62	0.94
		3	6	7	17404	3.31	2.04	0.67	1.17
	CA3	1	20	21	17496	13.19	4.39	0.82	1.88
		2	5	5	17496	2.21	1.46	0.62	0.89
		3	6	7	17496	2.64	2.08	0.65	1.22
	CS1	1	20	21	47	9.98	4.39	-	-
		2	5	5	47	1.45	1.44	-	-
		3	6	7	47	1.13	1.36	-	-
	CT1	1	20	20	245	10.20	4.84	0.84	1.92
		2	7	7	241	3.36	1.90	0.64	1.14
		3	8	9	245	1.73	1.52	0.48	1.10
4	CA1	1	20	20	31876	11.38	4.95	0.87	1.79
		2	5	6	31876	1.21	1.39	0.59	0.89
		3	6	7	31876	2.77	2.09	0.70	1.15
	CA2	1	20	20	17376	12.03	4.08	0.83	1.70
		2	5	6	17376	1.86	1.70	0.67	0.97
		3	6	7	17376	2.78	2.06	0.67	1.18
	CA3	1	20	20	17420	12.09	4.20	0.83	1.72
		2	5	6	17420	2.42	1.55	0.60	0.98
		3	6	7	17420	2.85	1.77	0.59	1.14
	CS1	1	20	20	46	8.24	5.00	-	-
		2	5	6	46	0.61	1.06	-	-
		3	6	7	46	1.63	1.60	-	-
	CT1	1	21	22	272	8.22	4.52	0.82	1.91
		2	6	6	272	2.75	1.43	0.36	1.14
		3	8	8	272	2.72	1.88	0.58	1.23

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

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Table 9.14: Mean, Standard Deviation, and Standard Error of Measurement (SEM) of Mathematics Claims (cont.)

Grade	Form	Claim	Number of Items	Number of Score Points	N Count	Mean	Std. Dev.	Cronbach's Alpha	SEM
5	CA1PA1	1	20	20	22432	8.96	4.23	0.79	1.92
		2	9	14	22432	4.01	3.33	0.74	1.70
		3	8	11	22432	2.61	2.20	0.68	1.24
	CA1PA2	1	20	20	8762	10.58	4.09	0.78	1.91
		2	9	14	8760	4.86	3.22	0.72	1.69
		3	8	11	8762	3.42	2.32	0.66	1.36
	CA2PA1	1	20	20	8776	10.58	4.01	0.77	1.91
		2	9	13	8776	5.05	3.21	0.72	1.71
		3	8	12	8776	3.97	2.61	0.71	1.42
	CA2PA2	1	20	20	8724	10.59	4.06	0.78	1.91
		2	9	13	8722	4.80	3.05	0.72	1.61
		3	8	12	8722	4.05	2.65	0.71	1.42
	CA3PA1	1	20	20	8692	10.84	4.11	0.78	1.92
		2	9	12	8692	4.73	3.08	0.69	1.72
		3	8	13	8692	3.62	2.71	0.69	1.51
	CA3PA2	1	20	20	8684	10.99	4.12	0.78	1.92
		2	9	12	8684	4.58	2.91	0.69	1.61
		3	8	13	8684	3.74	2.73	0.69	1.52
	CS1PS1	1	20	20	55	7.38	3.58	0.72	1.89
		2	9	14	55	2.87	2.78	0.64	1.67
		3	8	11	55	1.84	1.68	0.47	1.22
	CT1PT1	1	20	20	270	6.62	3.89	0.77	1.84
		2	11	15	270	3.75	2.89	0.67	1.65
		3	10	12	270	2.31	1.78	0.54	1.20
6	CA1	1	19	19	30216	9.47	4.03	0.82	1.72
		2	5	6	30208	1.46	1.55	0.70	0.84
		3	6	6	30212	1.53	1.38	0.56	0.91
	CA2	1	19	19	17736	10.14	4.02	0.83	1.68
		2	5	6	17732	1.54	1.39	0.62	0.86
		3	6	6	17736	2.25	1.62	0.62	1.00
	CA3	1	19	19	17744	9.66	3.95	0.80	1.74
		2	5	6	17740	1.91	1.66	0.67	0.95
		3	6	6	17744	2.67	1.50	0.58	0.97

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Table 9.14: Mean, Standard Deviation, and Standard Error of Measurement (SEM) of Mathematics Claims (cont.)

Grade	Form	Claim	Number of Items	Number of Score Points	N Count	Mean	Std. Dev.	Cronbach's Alpha	SEM
6	CS1	1	19	19	39	6.46	3.99	-	-
		2	5	6	39	0.56	0.88	-	-
		3	6	6	39	0.82	1.00	-	-
	CT1	1	19	19	224	4.73	4.16	0.85	1.63
		2	7	8	224	0.65	1.09	0.58	0.71
		3	8	8	224	0.95	1.22	0.53	0.84
7	CA1	1	20	20	28968	9.09	4.52	0.84	1.82
		2	5	5	28948	1.08	1.31	0.65	0.77
		3	6	7	28948	1.76	1.82	0.70	1.00
	CA2	1	20	20	17848	10.66	4.47	0.83	1.87
		2	5	5	17840	1.36	1.22	0.51	0.86
		3	6	7	17840	2.02	1.77	0.62	1.09
	CA3	1	20	20	17872	10.16	4.60	0.84	1.87
		2	5	5	17864	1.75	1.26	0.60	0.80
		3	6	7	17872	2.33	1.74	0.55	1.17
	CS1	1	20	20	36	5.08	3.24	-	-
		2	5	5	36	0.28	0.66	-	-
		3	6	7	36	0.83	1.11	-	-
	CT1	1	20	20	233	4.12	3.13	0.77	1.50
		2	7	8	233	0.78	1.39	0.67	0.79
		3	8	9	233	1.42	1.39	0.49	0.99
8	CA1PA1	1	20	22	16732	9.18	4.51	0.82	1.92
		2	9	10	16724	1.59	1.74	0.66	1.02
		3	8	13	16732	2.03	1.59	0.50	1.13
	CA1PA2	1	20	22	7158	10.90	4.39	0.81	1.93
		2	9	10	7155	2.44	1.97	0.65	1.17
		3	8	13	7158	2.35	1.85	0.54	1.25
	CA2PA1	1	20	22	7136	9.93	4.64	0.81	2.00
		2	9	10	7133	2.26	1.91	0.65	1.13
		3	8	13	7133	2.85	1.98	0.59	1.27
	CA2PA2	1	20	22	7130	9.94	4.62	0.81	2.01
		2	9	10	7124	2.57	1.94	0.65	1.15
		3	8	13	7124	2.79	1.93	0.57	1.26

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

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Table 9.14: Mean, Standard Deviation, and Standard Error of Measurement (SEM) of Mathematics Claims (cont.)

Grade	Form	Claim	Number of Items	Number of Score Points	N Count	Mean	Std. Dev.	Cronbach's Alpha	SEM
8	CA3PA1	1	20	22	7159	9.26	4.43	0.80	1.99
		2	9	10	7154	2.35	2.10	0.69	1.18
		3	8	13	7154	3.43	1.95	0.58	1.26
	CA3PA2	1	20	22	7165	9.31	4.38	0.79	1.99
		2	9	10	7161	2.69	2.07	0.65	1.22
		3	8	13	7161	3.36	1.89	0.57	1.24
	CS1PS1	1	20	22	28	6.21	2.95	-	-
		2	9	10	28	0.68	0.86	-	-
		3	8	13	28	1.39	0.88	-	-
	CT1PT1	1	20	20	239	3.91	2.54	0.60	1.61
		2	10	11	239	0.72	1.08	0.46	0.79
		3	9	12	239	1.40	1.57	0.49	1.12

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

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Table 9.15: Mean, Standard Deviation, and Standard Error of Measurement (SEM) of Science GLE Strands

Grade	Form	GLE Strand	Number of Items	Number of Score Points	N Count	Mean	Std. Dev.	Cronbach's Alpha	SEM
5	CA2	1	5	7	40104	4.12	1.77	0.52	1.23
		2	3	5	40104	2.12	1.35	0.37	1.07
		3	5	7	40104	4.70	1.51	0.42	1.15
		4	7	9	40104	5.93	1.89	0.55	1.27
		5	6	8	40104	4.35	1.83	0.50	1.29
		6	4	6	40104	4.21	1.41	0.42	1.07
		7	9	14	40088	7.20	3.35	0.69	1.85
		8	2	4	40104	2.75	1.01	0.38	0.80
	CA3	1	5	7	26268	4.81	1.46	0.36	1.17
		2	3	5	26268	3.11	1.46	0.42	1.11
		3	5	7	26268	4.91	1.40	0.35	1.13
		4	7	9	26268	6.87	1.64	0.51	1.14
		5	5	7	26268	4.65	1.42	0.40	1.10
		6	5	7	26268	4.96	1.59	0.52	1.10
		7	9	14	26260	7.93	3.14	0.65	1.86
		8	2	4	26268	3.10	1.07	0.35	0.86
8	CA2	1	6	8	38704	4.20	2.13	0.61	1.33
		2	2	4	38704	1.47	1.15	0.38	0.91
		3	4	6	38704	3.01	1.70	0.58	1.10
		4	4	6	38704	3.95	1.53	0.54	1.04
		5	7	9	38704	4.58	2.28	0.59	1.46
		6	4	6	38704	3.36	1.52	0.43	1.15
		7	9	17	38664	7.54	4.42	0.77	2.12
		8	3	5	38704	2.77	1.41	0.28	1.20
	CA3	1	6	8	27464	4.45	1.98	0.51	1.39
		2	2	4	27464	1.99	1.24	0.35	0.99
		3	4	6	27464	3.15	1.53	0.45	1.13
		4	4	6	27464	3.68	1.45	0.35	1.17
		5	6	8	27464	4.37	1.50	0.43	1.13
		6	4	6	27464	3.16	1.70	0.59	1.09
		7	9	17	27436	8.36	4.19	0.73	2.16
		8	3	5	27464	2.98	1.34	0.35	1.08
	CT2	1	6	8	253	2.74	1.99	0.60	1.26
		2	2	4	253	0.71	0.79	0.19	0.71
		3	4	6	253	1.84	1.51	0.57	0.99
		4	4	6	253	2.77	1.69	0.58	1.10
		5	7	9	253	3.02	1.93	0.50	1.36
		6	4	6	253	2.28	1.37	0.30	1.15
		7	9	16	253	4.11	3.64	0.78	1.71
		8	3	5	253	1.92	1.40	0.29	1.18

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Table 9.16: Inter-Correlation of English Language Arts/Literacy, Mathematics, and Science Scale Scores

Grade	ELA/MA	ELA/SC	MA/SC
3	0.74	-	-
4	0.75	-	-
5	0.77	0.79	0.77
6	0.75	-	-
7	0.75	-	-
8	0.72	0.80	0.75

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Figure 9.1: CSEM Curves English Language Arts/Literacy, Grades 3–8

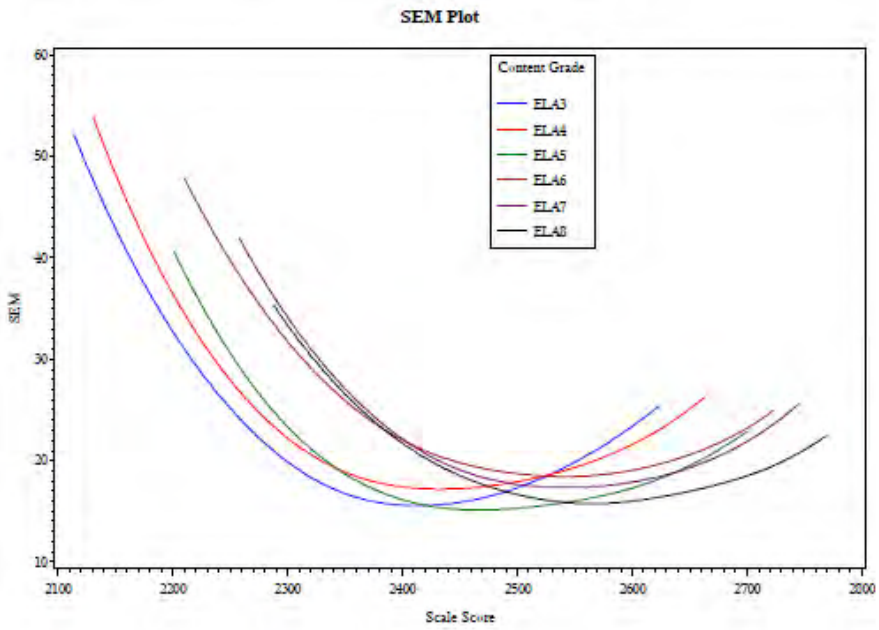

Figure 9.2: CSEM Curves Mathematics, Grades 3–8

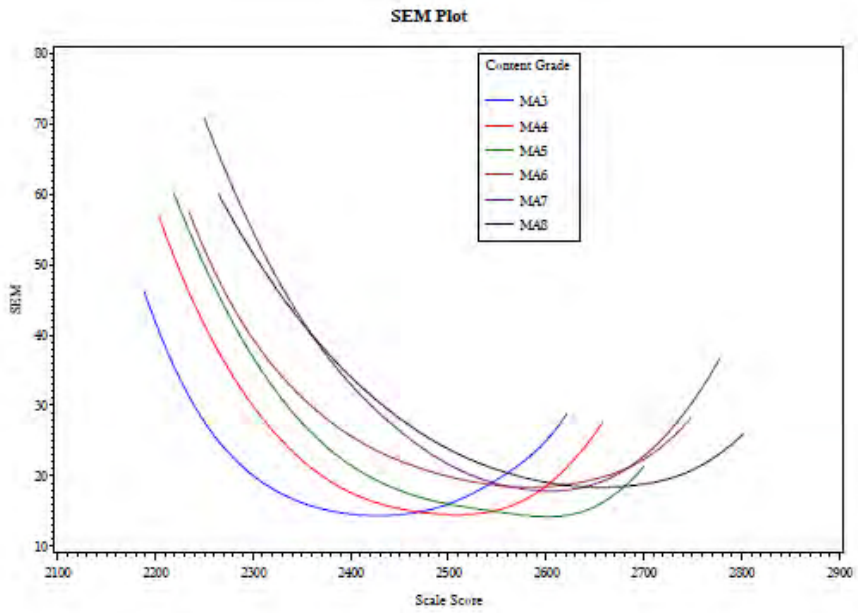

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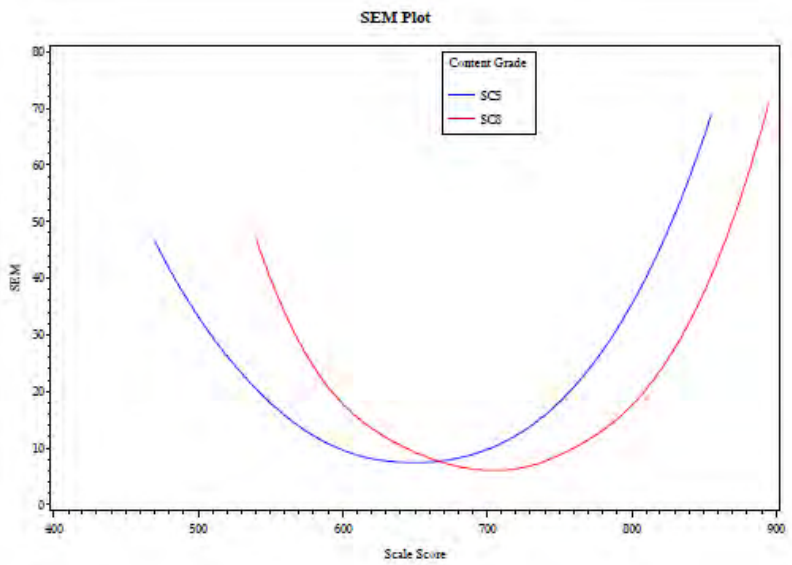
Figure 9.3: CSEM Curves Science, Grades 5 and 8



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CHAPTER 10: FAIRNESS

As noted in the *Standards* (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. 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 differentially 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 be the way the standard is addressed in this chapter.

> **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/CTB 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/CTB 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/CTB content experts avoided including item flagged for DIF. 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 extensive training of test scores for MAP comply with Standards 3.4 and 3.5:

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> **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/CTB to minimize words, phrases, and content that may be regarded as offensive by members of particular demographic subgroups. Section 3.2.5 of Chapter 3 discusses the Content and Bias Review conducted for MAP. This review is 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 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, item writers and test developers followed several published guidelines for reducing or eliminating bias. Smarter Balanced developed Bias and Sensitivity Guidelines to help ensure that the ELA and Mathematics items are fair for all groups of test takers, despite differences in characteristics including, but not limited to, disability status, race/ethnicity, gender, regional background, native language, religion, sexual orientation, and socioeconomic status. For details on the process used by Smarter Balanced to ensure assessment fairness, refer to Chapter 5 of the *Smarter Balanced Technical Report* (2015) posted at http://www.smarterbalanced.org/wordpress/wp-content/uploads/2011/12/Chapter-05-Test-Fairness-FINAL-2015-05-15-mm.pdf

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CTB used *Guidelines for Bias-Free Publishing* (Macmillan/McGraw-Hill, 1993a) and *Reflecting Diversity: Multicultural Guidelines for Educational Publishing Professionals* (Macmillan/McGraw-Hill, 1993b) to guide them through development of Science items included in the 2014–15 assessments. Test developers reviewed all items and other testing materials with these guidelines in mind. Internal editorial reviews were conducted by at least three different people: a content editor who directly supervised the item writers, a style editor, and a content supervisor. The final test was again reviewed by at least these same people and was also subjected to an independent review by a quality assurance editor.

Third, careful attention is typically given to item statistics 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. DIF statistics are also examined during test construction. Items that have exhibited significant DIF against one or more subgroups are removed from further consideration unless it is essential to include them in order to meet content specifications. Additional steps to reduce bias, including the use of Bias Review committees comprised of Missouri participants, are described in more detail in Chapter 3 of this report.

10.2 Evaluating Bias through Differential Item Functioning (DIF) Statistics

After administering the test, an empirical approach known as differential item functioning (DIF) was used to examine the items. The DIF statistics indicate the degree to which members of a particular subgroup performs better or worse than expected on each item as compared to the 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 have been thoroughly reviewed for content and bias by Missouri educators and DRC/CTB Content experts ensure that they do not tap knowledge or specific ability 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/CTB 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

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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/CTB 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 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 kth 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 (ETS) 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

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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^2_{MH}) 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^2_{MH}, then, estimates a pooled common-odds ratio. Taking the natural logarithm of the common-odds ratio and its confidence limits and multiplying these with the constant −2.35, the resulting values may 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} = proportion of the focal group members at the kth level of the matching variable, $m_{Fk} = 1/N_{F1k}$, and $m_{Rk} = 1/N_{R1k}$. Items are flagged using the same rules that are used in NAEP:

- 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, 10.2, and 10.3 show the DIF results for the following subgroups:

- ***Gender***: Focal group is females; reference group is males.

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- ***Race/Ethnicity***: Focal groups are students whose race/ethnicity is reported as Black, Hispanic, Asian/Pacific Islander, American Indian/Alaska Native, or Other; reference group is students whose race/ethnicity is reported as White.

- ***Accommodations***: Focal group is students who received one or more testing accommodations; 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, 10.2, and 10.3 summarize the number of DIF flags by grade and test form for each focal group that included at least 200 students for ELA, Mathematics, and Science, respectively. The analyses were conducted by test form. As noted previously, multiple test forms were administered within one grade and content area in 2014–15 MAP. Consequently, the number of American Indian/Alaska Native students taking each form was smaller than 200 and no DIF was performed for this group on any test form. In addition, fewer than 200 Asian/ Pacific Islander students took form CA3 in Grade 8 Mathematics and no DIF was performed for this group using the data for this test form. Core (CA) and performance event (PA) forms were analyzed separately in order to obtain at least 200 cases for minority subgroups.

For example, consider Grade 3 ELA, form CA1 (see Table 10.1). In this form, three items were flagged for DIF for the female subgroup: all three exhibited moderate positive DIF. Four items were flagged for DIF for the Asian/Pacific Islander subgroup. Of these items, three items exhibited moderate negative DIF and one item exhibited large positive DIF. Two items were flagged for the Black subgroup: one displaying moderate negative DIF and one showing moderate positive DIF. Two items were flagged for Hispanic subgroup: one displaying moderate negative DIF and one showing large negative DIF. Lastly, two items were flagged for the accommodated subgroup: one of them exhibited moderate negative DIF and the other one showed 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/CTB Content experts. Further, ELA and Mathematics items were reviewed for possible DIF flags during the field test stage of test development (refer to Chapter 5, of the Smarter Balanced Assessment Consortium Technical Report [2015] published at http://www.smarterbalanced.org/wordpress/wp-content/uploads/2011/12/Chapter-05-Test-Fairness-FINAL-2015-05-15-mm.pdf.

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10.3 Evaluating Bias through Impact Analysis

The impact of achievement testing on minority subgroups can be determined and reported in the form of average scores and also in terms of test score reliability. Tables 10.4 through 10.9 present the number of students, scale score means and standard deviations, effect size (Cohen's *d*), and test form reliability statistics (Coefficient Alpha, see Chapter 9) for the various subgroups of interest.

10.3.1 Reliability

Tables 10.10 through 10.23 show the regular test form reliability coefficients and SEM by student race/ethnicity, gender, and whether or not students are using any testing accommodations. The reliability coefficients for English Language Arts/Literacy forms ranged from 0.83 to 0.93. For Mathematics the reliability coefficients ranged from 0.83 to 0.94, except for the Grade 7, form CA3 reliability coefficient of 0.76 for the American Indian/Alaska Native group. For Science, the reliability coefficients ranged from 0.83 to 0.93. 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. Test reliability by subgroup of students was not computed for transcribed forms or the Spanish version of Mathematics forms due to low number of student taking these forms.

10.3.2 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

$$d = \frac{\overline{x_a} - \overline{x_b}}{\sqrt{\frac{(n_a - 1)s_a^2 + (n_b - 1)s_b^2}{(n_a + n_b) - 2}}},$$

where $\overline{x_a}$ is the mean score of group A, $\overline{x_b}$ 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) offers 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 10.4 through 10.9. On the English Language Arts/Literacy test in all grades, there are small differences in mean test scores between female and male students where female students outperform male students.

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There is a medium difference in mean English Language Arts/Literacy test scores of Black students compared to White students, where Black students underperform White students in all grades. There is a small difference between the mean test scores of Hispanic and White students, where Hispanic students underperform White students on English Language Arts/Literacy in all grades. Similarly, there is a small difference between the mean test scores of American Indian/Alaska Native and White students, where American Indian/Alaska Native students underperform White students on English Language Arts/Literacy in all grades, except for Grade 5, where the difference between the two groups is not significant. There is also a small difference between the mean English Language Arts/Literacy test scores of Asian/Pacific Islander students and White students, where Asian/Pacific Islander students outperform White students in all grades.

There is a medium difference in mean English Language Arts/Literacy test scores of students using testing accommodations compared to students not using testing accommodation for students in Grades 3 and 4. There is a large difference in mean English Language Arts/Literacy test scores of students using testing accommodations compared to students not using testing accommodation for students in Grades 5 through 8. In all grade levels, students not using testing accommodations outperform their peers who use accommodations.

In Mathematics, there is a medium difference between the mean tests scores of Black and White students for Grades 3 through 6 and Grade 8 and a large difference for Grade 7, where Black students underperform White students in all grades. There is a small difference in mean Mathematics test scores of Hispanic students compared to White students in all grades, where Hispanic students underperform White students. There is a small difference between the mean test scores of American Indian/Alaska Native students and White students, where American Indian/Alaska Native students underperform White students in all grades. 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 6, where there is a medium difference in mean test scores. Asian/Pacific Islander students outperform White students in all grades.

There is a medium difference between the mean Mathematics test scores of students not needing testing accommodations and students using testing accommodation in all grades except for Grade 6, where there is a large difference. Students not using testing accommodations outperform students using testing accommodations in all grades.

There is a large difference between the mean Science test scores of Black students compared to White students in Grades 5 and 8, where Black students underperform White students. There is a medium difference between mean Science test scores of Hispanic students compared to White students in Grade 5 and a small difference in Grade 8, where Hispanic students underperform White students. There is a small difference between the mean Science test scores of American Indian/Alaska Native students compared to White students in both grades, where American Indian/Alaska Native students underperform White students.

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There is a large difference between the mean Science test scores of students not needing testing accommodations and students using testing accommodation in both grades, where students not using testing accommodations outperform students using testing accommodations.

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 addresses multiple best practices of the testing industry, and in particular is related to the following *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 2014):

- 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.
- Standard 3.16—When credible research indicates that test scores for some relevant subgroups are differentially affected by construct-irrelevant characteristics of the test or of the examinees, when legally permissible, test users should use the test only for those subgroups for which there is sufficient evidence of validity to support score interpretations for the intended uses.

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Table 10. 1: 2015 MAP DIF Statistics: Number of Flagged Items, English Language Arts/Literacy

English Language Arts/ Literacy		Grade	3			4		
		Form	CA1	CA2	CA3	CA1	CA2	CA3
		# of Items	44	44	44	44	44	44
Group	**DIF Magnitude**	**DIF Direction**	**Number of Flagged Items**					
Female	Moderate	Negative	0	0	0	0	2	0
		Positive	3	2	1	2	1	4
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	1	2	0
Asian/ Pacific Islander	Moderate	Negative	3	2	2	0	3	1
		Positive	0	4	4	0	1	1
	Large	Negative	0	1	0	0	0	1
		Positive	1	1	0	0	0	1
Black	Moderate	Negative	1	0	0	0	0	0
		Positive	1	0	0	0	0	1
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	1
Hispanic	Moderate	Negative	1	1	1	0	0	0
		Positive	0	0	0	0	0	1
	Large	Negative	1	0	0	0	0	0
		Positive	0	0	0	0	0	0
Other	Moderate	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	1
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	0
Accommo-dations	Moderate	Negative	1	0	0	1	0	1
		Positive	1	0	0	0	0	0
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	0

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Table 10.1: 2015 MAP DIF Statistics: Number of Flagged Items, English Language Arts/Literacy (cont.)

English Language Arts/ Literacy		Grade	5					
		Form	CA1	CA2	CA3	PA1	PA2	PA3
		# of Items	44	44	44	4	4	4
Group	**DIF Magnitude**	**DIF Direction**	**Number of Flagged Items**					
Female	Moderate	Negative	1	3	3	0	0	0
		Positive	2	0	1	0	0	0
	Large	Negative	0	0	0	0	0	0
		Positive	1	2	1	0	0	0
Asian/ Pacific Islander	Moderate	Negative	1	1	2	0	0	0
		Positive	2	0	1	0	0	0
	Large	Negative	1	0	0	0	0	0
		Positive	0	0	0	0	0	0
Black	Moderate	Negative	0	2	1	0	0	0
		Positive	1	0	0	0	0	0
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	0
Hispanic	Moderate	Negative	1	1	1	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
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	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

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Table 10.1: 2015 MAP DIF Statistics: Number of Flagged Items, English Language Arts/Literacy (cont.)

English Language Arts/ Literacy		Grade	6			7		
		Form	CA1	CA2	CA3	CA1	CA2	CA3
		# of Items	45	45	45	45	45	45
Group	**DIF Magnitude**	**DIF Direction**	**Number of Flagged Items**					
Female	Moderate	Negative	2	1	0	1	0	3
		Positive	0	2	2	2	2	1
	Large	Negative	0	0	0	0	0	0
		Positive	2	1	1	1	1	2
Asian/ Pacific Islander	Moderate	Negative	1	4	1	1	0	2
		Positive	3	0	1	1	2	1
	Large	Negative	0	0	1	0	1	0
		Positive	0	0	0	0	1	1
Black	Moderate	Negative	1	0	2	0	2	0
		Positive	0	0	1	0	1	0
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	0
Hispanic	Moderate	Negative	1	0	1	0	2	0
		Positive	0	0	0	0	1	0
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	0
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	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

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Table 10.1: 2015 MAP DIF Statistics: Number of Flagged Items, English Language Arts/Literacy (cont.)

English Language Arts/ Literacy		Grade	8					
		Form	CA1	CA2	CA3	PA1	PA2	PA3
		# of Items	45	45	45	4	4	4
Group	**DIF Magnitude**	**DIF Direction**	**Number of Flagged Items**					
Female	Moderate	Negative	3	5	2	0	0	0
		Positive	1	0	1	0	0	0
	Large	Negative	0	1	0	0	0	0
		Positive	3	3	2	0	0	0
Asian/ Pacific Islander	Moderate	Negative	5	2	2	0	0	0
		Positive	1	2	2	0	0	0
	Large	Negative	0	0	0	0	0	0
		Positive	1	0	0	0	0	0
Black	Moderate	Negative	0	0	0	0	0	0
		Positive	1	0	0	0	0	0
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	0
Hispanic	Moderate	Negative	1	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
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	0	1	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

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Table 10.2: 2015 MAP DIF Statistics: Number of Flagged Items, Mathematics

Mathematics		Grade	3			4		
		Form	CA1	CA2	CA3	CA1	CA2	CA3
		# of Items	31	31	31	31	31	31
Group	**DIF Magnitude**	**DIF Direction**	**Number of Flagged Items**					
Female	Moderate	Negative	0	1	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
Asian/ Pacific Islander	Moderate	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	1
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	0
Black	Moderate	Negative	1	1	0	1	2	2
		Positive	0	0	0	0	2	3
	Large	Negative	0	1	0	0	0	0
		Positive	0	0	0	0	0	0
Hispanic	Moderate	Negative	1	1	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
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	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

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Table 10.2: 2015 MAP DIF Statistics: Number of Flagged Items, Mathematics (cont.)

Mathematics		Grade	5				
		Form	CA1	CA2	CA3	PA1	PA2
		# of Items	31	31	31	6	6
Group	**DIF Magnitude**	**DIF Direction**	**Number of Flagged Items**				
Female	Moderate	Negative	0	0	0	0	0
		Positive	0	0	0	0	0
	Large	Negative	0	0	0	0	0
		Positive	0	0	0	0	0
Asian/ Pacific Islander	Moderate	Negative	0	1	0	0	0
		Positive	0	0	0	0	0
	Large	Negative	0	0	0	0	0
		Positive	0	0	0	0	0
Black	Moderate	Negative	1	1	1	0	0
		Positive	1	0	0	0	0
	Large	Negative	0	0	1	0	0
		Positive	0	0	0	0	0
Hispanic	Moderate	Negative	0	0	0	0	0
		Positive	0	0	0	0	0
	Large	Negative	0	0	0	0	0
		Positive	0	0	0	0	0
Other	Moderate	Negative	0	0	0	0	0
		Positive	0	0	0	0	0
	Large	Negative	0	0	0	0	0
		Positive	0	0	0	0	0
Accommo-dations	Moderate	Negative	0	0	0	0	0
		Positive	0	0	0	0	0
	Large	Negative	0	0	0	0	0
		Positive	0	0	0	0	0

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Table 10.2: 2015 MAP DIF Statistics: Number of Flagged Items, Mathematics (cont.)

Mathematics		Grade	6			7		
		Form	CA1	CA2	CA3	CA1	CA2	CA3
		# of Items	30	30	30	31	31	31
Group	**DIF Magnitude**	**DIF Direction**	**Number of Flagged Items**					
Female	Moderate	Negative	1	0	1	0	1	1
		Positive	0	0	0	1	0	0
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	0
Asian/ Pacific Islander	Moderate	Negative	0	1	1	1	1	0
		Positive	0	1	2	0	0	0
	Large	Negative	1	0	0	1	0	0
		Positive	0	0	0	0	0	0
Black	Moderate	Negative	0	0	0	0	1	1
		Positive	0	1	2	1	0	0
	Large	Negative	0	0	0	0	0	1
		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
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	0	0	0	0	0	0
		Positive	1	0	0	1	2	2
	Large	Negative	0	0	0	0	0	0
		Positive	0	0	0	0	0	0

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Table 10.2: 2015 MAP DIF Statistics: Number of Flagged Items, Mathematics (cont.)

Mathematics		Grade	8				
		Form	CA1	CA2	CA3	PA1	PA2
		# of Items	31	31	31	6	6
Group	**DIF Magnitude**	**DIF Direction**	**Number of Flagged Items**				
Female	Moderate	Negative	0	0	0	0	0
		Positive	0	0	0	0	0
	Large	Negative	0	0	0	0	0
		Positive	0	0	0	0	0
Asian/ Pacific Islander	Moderate	Negative	0	1	0	0	0
		Positive	0	0	0	0	0
	Large	Negative	0	0	0	0	0
		Positive	0	0	0	0	0
Black	Moderate	Negative	0	0	1	0	0
		Positive	1	0	1	0	0
	Large	Negative	0	0	0	0	0
		Positive	0	0	0	0	0
Hispanic	Moderate	Negative	0	0	0	0	0
		Positive	0	0	0	0	0
	Large	Negative	0	0	0	0	0
		Positive	0	0	0	0	0
Other	Moderate	Negative	0	0	0	0	0
		Positive	0	0	0	0	0
	Large	Negative	0	0	0	0	0
		Positive	0	0	0	0	0
Accommo-dations	Moderate	Negative	0	0	0	0	0
		Positive	0	1	0	0	0
	Large	Negative	0	0	0	0	0
		Positive	0	0	0	0	0

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Table 10.3: 2015 MAP DIF Statistics: Number of Flagged Items, Science

Science		Grade	5		8	
		Form	CA2	CA3	CA2	CA3
		# of Items	41	41	39	38
Group	**DIF Magnitude**	**DIF Direction**	**Number of Flagged Items**			
Female	Moderate	Negative	1	1	3	1
		Positive	0	0	2	1
	Large	Negative	0	0	0	0
		Positive	0	0	1	1
Asian/ Pacific Islander	Moderate	Negative	3	2	1	1
		Positive	0	1	1	0
	Large	Negative	0	0	0	0
		Positive	0	0	0	1
Black	Moderate	Negative	1	4	1	0
		Positive	0	1	1	2
	Large	Negative	0	0	0	0
		Positive	0	0	0	0
Hispanic	Moderate	Negative	1	1	0	0
		Positive	0	1	0	0
	Large	Negative	0	0	0	0
		Positive	0	0	0	0
Other	Moderate	Negative	0	0	0	0
		Positive	0	0	0	0
	Large	Negative	0	0	0	0
		Positive	0	0	0	0
Accommo-dations	Moderate	Negative	0	0	0	1
		Positive	1	0	0	0
	Large	Negative	0	0	0	0
		Positive	0	0	0	0

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Table 10.4: Impact Analysis, Grade 3

Content Area	Category	Group	N	Mean	Std. Dev.	Effect Size
English Language Arts/ Literacy	Race/ Ethnicity	White (not Hispanic)	48241	2459.14	83.51	
		Asian/Pacific Islander	1435	2480.21	87.36	-0.25
		Black (not Hispanic)	11177	2394.27	81.46	0.78
		Hispanic	4308	2425.56	80.22	0.40
		Am. Indian/Alaska N.	234	2436.31	88.84	0.27
		Other	2459	2445.41	85.44	0.16
	Gender	Male	34806	2436.28	86.79	
		Female	33048	2456.63	85.49	-0.24
	Accommo-dations	No	52041	2459.18	83.22	
		Yes	15813	2403.44	84.42	0.67
Mathematics	Race/ Ethnicity	White (not Hispanic)	48252	2449.87	74.45	
		Asian/Pacific Islander	1482	2481.57	82.30	-0.42
		Black (not Hispanic)	11198	2394.59	72.37	0.75
		Hispanic	4353	2420.94	73.29	0.39
		Am. Indian/Alaska N.	233	2423.31	80.16	0.36
		Other	2464	2437.24	77.44	0.17
	Gender	Male	34871	2440.22	80.21	
		Female	33111	2437.83	74.40	0.03
	Accommo-dations	No	51027	2452.16	71.33	
		Yes	16955	2399.60	81.61	0.71

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Table 10.5: Impact Analysis, Grade 4

Content Area	Category	Group	N	Mean	Std. Dev.	Effect Size
English Language Arts/ Literacy	Race/ Ethnicity	White (not Hispanic)	48209	2498.68	85.68	
		Asian/Pacific Islander	1444	2524.94	89.34	-0.31
		Black (not Hispanic)	10705	2436.84	87.32	0.72
		Hispanic	4092	2467.31	85.66	0.37
		Am. Indian/Alaska N.	269	2477.22	85.23	0.25
		Other	2149	2486.37	86.80	0.14
	Gender	Male	34167	2476.14	89.63	
		Female	32701	2498.24	87.39	-0.25
	Accommo-dations	No	51254	2502.31	82.37	
		Yes	15614	2436.49	92.20	0.78
Mathematics	Race/ Ethnicity	White (not Hispanic)	48225	2493.92	73.09	
		Asian/Pacific Islander	1492	2525.76	81.62	-0.43
		Black (not Hispanic)	10721	2436.45	72.13	0.79
		Hispanic	4144	2465.02	72.00	0.40
		Am. Indian/Alaska N.	269	2473.33	74.92	0.28
		Other	2148	2480.29	75.77	0.19
	Gender	Male	34242	2484.09	78.58	
		Female	32757	2482.12	74.17	0.03
	Accommo-dations	No	50426	2496.51	70.84	
		Yes	16573	2442.41	78.50	0.74

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Table 10.6: Impact Analysis, Grade 5

Content Area	Category	Group	N	Mean	Std. Dev.	Effect Size
English Language Arts/ Literacy	Race/ Ethnicity	White (not Hispanic)	48277	2527.50	80.83	
		Asian/Pacific Islander	1438	2556.39	84.46	-0.36
		Black (not Hispanic)	10673	2473.37	81.81	0.67
		Hispanic	3830	2498.75	80.84	0.36
		Am. Indian/Alaska N.	298	2512.60	80.41	0.18
		Other	1771	2517.19	81.54	0.13
	Gender	Male	33899	2505.73	84.01	
		Female	32388	2529.63	81.72	-0.29
	Accommo-dations	No	51073	2532.01	77.04	
		Yes	15214	2468.40	86.72	0.80
Mathematics	Race/ Ethnicity	White (not Hispanic)	48278	2514.82	79.24	
		Asian/Pacific Islander	1490	2552.12	85.74	-0.47
		Black (not Hispanic)	10694	2457.36	74.23	0.73
		Hispanic	3873	2486.10	77.44	0.36
		Am. Indian/Alaska N.	298	2498.26	79.44	0.21
		Other	1773	2501.93	81.65	0.16
	Gender	Male	33966	2503.21	83.76	
		Female	32440	2505.47	79.51	-0.03
	Accommo-dations	No	50285	2518.78	76.69	
		Yes	16121	2459.18	80.49	0.77
Science	Race/ Ethnicity	White (not Hispanic)	48265	669.31	29.04	
		Asian/Pacific Islander	1490	673.06	34.10	-0.13
		Black (not Hispanic)	10684	642.41	32.97	0.90
		Hispanic	3873	654.24	32.04	0.51
		Am. Indian/Alaska N.	296	662.08	29.23	0.25
		Other	1773	663.49	30.67	0.20
	Gender	Male	33949	664.09	32.37	
		Female	32432	663.90	31.02	0.01
	Accommo-dations	No	50534	669.94	28.51	
		Yes	15847	645.04	33.91	0.83

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Table 10.7: Impact Analysis, Grade 6

Content Area	Category	Group	N	Mean	Std. Dev.	Effect Size
English Language Arts/ Literacy	Race/ Ethnicity	White (not Hispanic)	48223	2548.20	87.09	
		Asian/Pacific Islander	1438	2580.43	93.12	-0.37
		Black (not Hispanic)	10585	2488.86	87.98	0.68
		Hispanic	3693	2518.61	86.21	0.34
		Am. Indian/Alaska N.	268	2524.65	89.51	0.27
		Other	1706	2535.69	90.00	0.14
	Gender	Male	33755	2523.85	90.35	
		Female	32158	2551.40	88.18	-0.31
	Accommo-dations	No	51781	2552.86	84.63	
		Yes	14132	2480.26	87.70	0.85
Mathematics	Race/ Ethnicity	White (not Hispanic)	48198	2533.70	88.14	
		Asian/Pacific Islander	1433	2580.85	97.89	-0.53
		Black (not Hispanic)	10608	2465.43	85.95	0.78
		Hispanic	3751	2501.40	86.26	0.37
		Am. Indian/Alaska N.	269	2508.41	93.54	0.29
		Other	1701	2516.20	92.54	0.20
	Gender	Male	33757	2519.00	95.20	
		Female	32203	2523.81	88.50	-0.05
	Accommo-dations	No	51276	2538.09	84.86	
		Yes	14684	2462.88	92.14	0.87

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Table 10.8: Impact Analysis, Grade 7

Content Area	Category	Group	N	Mean	Std. Dev.	Effect Size
English Language Arts/ Literacy	Race/ Ethnicity	White (not Hispanic)	48167	2575.38	87.91	
		Asian/Pacific Islander	1415	2606.44	98.11	-0.35
		Black (not Hispanic)	10656	2513.24	88.63	0.71
		Hispanic	3680	2541.42	88.81	0.39
		Am. Indian/Alaska N.	291	2548.37	85.84	0.31
		Other	1624	2563.23	89.33	0.14
	Gender	Male	33848	2548.56	92.25	
		Female	31985	2579.67	88.04	-0.34
	Accommo-dations	No	53030	2579.63	84.38	
		Yes	12803	2497.61	90.50	0.96
Mathematics	Race/ Ethnicity	White (not Hispanic)	47437	2543.84	92.81	
		Asian/Pacific Islander	1291	2584.66	108.19	-0.44
		Black (not Hispanic)	10636	2470.22	91.50	0.80
		Hispanic	3704	2505.44	91.40	0.41
		Am. Indian/Alaska N.	287	2519.15	85.62	0.27
		Other	1608	2523.71	97.57	0.22
	Gender	Male	33387	2527.83	100.50	
		Female	31576	2531.89	93.64	-0.04
	Accommo-dations	No	51491	2544.82	91.82	
		Yes	13472	2472.38	96.01	0.78

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Table 10.9: Impact Analysis, Grade 8

Content Area	Category	Group	N	Mean	Std. Dev.	Effect Size
English Language Arts/ Literacy	Race/ Ethnicity	White (not Hispanic)	48952	2591.82	85.01	
		Asian/Pacific Islander	1387	2626.09	95.69	-0.40
		Black (not Hispanic)	10666	2532.71	86.01	0.69
		Hispanic	3556	2564.03	83.79	0.33
		Am. Indian/Alaska N.	286	2567.85	82.95	0.28
		Other	1515	2580.85	86.81	0.13
	Gender	Male	33630	2564.41	89.58	
		Female	32732	2598.44	83.66	-0.39
	Accommo-dations	No	53760	2596.00	82.00	
		Yes	12602	2518.02	86.65	0.94
Mathematics	Race/ Ethnicity	White (not Hispanic)	38046	2542.18	92.50	
		Asian/Pacific Islander	857	2574.60	115.59	-0.35
		Black (not Hispanic)	9433	2482.68	94.05	0.64
		Hispanic	2934	2513.04	91.57	0.32
		Am. Indian/Alaska N.	242	2517.34	82.46	0.27
		Other	1246	2531.43	95.41	0.12
	Gender	Male	27230	2525.49	98.49	
		Female	25528	2534.97	93.26	-0.10
	Accommo-dations	No	40790	2545.94	91.58	
		Yes	11968	2476.01	91.39	0.76
Science	Race/ Ethnicity	White (not Hispanic)	48941	703.73	28.30	
		Asian/Pacific Islander	1417	709.10	34.97	-0.19
		Black (not Hispanic)	10664	674.38	34.04	1.00
		Hispanic	3613	689.73	31.82	0.49
		Am. Indian/Alaska N.	286	695.47	28.41	0.29
		Other	1509	697.49	31.30	0.22
	Gender	Male	33663	697.82	32.84	
		Female	32767	698.57	30.41	-0.02
	Accommo-dations	No	53358	703.69	28.08	
		Yes	13072	675.77	35.38	0.94

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Table 10.10: Grade 3 English Language Arts/Literacy Reliability and SEM by Subgroup

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA1	Race/Ethnicity	White (not Hispanic)	20764	0.91	2.90
		Asian/Pacific Islander	762	0.92	2.84
		Black (not Hispanic)	5275	0.90	2.91
		Hispanic	2371	0.89	2.94
		Am. Indian/Alaska N.	88	0.91	2.90
		Other	1077	0.91	2.92
	Gender	Male	15812	0.91	2.90
		Female	14524	0.91	2.90
	Accommodations	No	17680	0.90	2.88
		Yes	12658	0.90	2.92
CA2	Race/Ethnicity	White (not Hispanic)	13638	0.89	2.83
		Asian/Pacific Islander	331	0.90	2.75
		Black (not Hispanic)	2952	0.88	2.90
		Hispanic	928	0.89	2.88
		Am. Indian/Alaska N.	81	0.91	2.84
		Other	704	0.90	2.87
	Gender	Male	9400	0.90	2.84
		Female	9234	0.90	2.85
	Accommodations	No	17208	0.89	2.85
		Yes	1426	0.88	2.85
CA3	Race/Ethnicity	White (not Hispanic)	13672	0.89	2.84
		Asian/Pacific Islander	335	0.89	2.77
		Black (not Hispanic)	2880	0.88	2.93
		Hispanic	973	0.89	2.91
		Am. Indian/Alaska N.	65	0.91	2.87
		Other	662	0.90	2.86
	Gender	Male	9400	0.90	2.86
		Female	9186	0.89	2.86
	Accommodations	No	17148	0.89	2.86
		Yes	1439	0.89	2.87

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Table 10.11: Grade 4 English Language Arts/Literacy Reliability and SEM by Subgroup

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA1	Race/Ethnicity	White (not Hispanic)	20704	0.89	2.89
		Asian/Pacific Islander	673	0.91	2.85
		Black (not Hispanic)	5066	0.88	2.90
		Hispanic	2153	0.88	2.92
		Am. Indian/Alaska N.	117	0.88	2.88
		Other	912	0.90	2.88
	Gender	Male	15308	0.90	2.87
		Female	14316	0.90	2.90
	Accommodations	No	17464	0.89	2.87
		Yes	12162	0.89	2.90
CA2	Race/Ethnicity	White (not Hispanic)	13726	0.89	2.83
		Asian/Pacific Islander	395	0.87	2.76
		Black (not Hispanic)	2765	0.89	2.85
		Hispanic	943	0.89	2.84
		Am. Indian/Alaska N.	71	0.90	2.81
		Other	598	0.90	2.85
	Gender	Male	9342	0.90	2.81
		Female	9156	0.89	2.84
	Accommodations	No	16916	0.88	2.84
		Yes	1583	0.91	2.78
CA3	Race/Ethnicity	White (not Hispanic)	13644	0.88	2.85
		Asian/Pacific Islander	367	0.89	2.77
		Black (not Hispanic)	2819	0.89	2.84
		Hispanic	966	0.87	2.88
		Am. Indian/Alaska N.	80	0.89	2.86
		Other	636	0.87	2.88
	Gender	Male	9356	0.89	2.83
		Female	9156	0.88	2.86
	Accommodations	No	16868	0.87	2.85
		Yes	1644	0.90	2.78

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Table 10.12: Grade 5 English Language Arts/Literacy Reliability and SEM by Subgroup

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA1PA1	Race/Ethnicity	White (not Hispanic)	19492	0.91	3.34
		Asian/Pacific Islander	653	0.92	3.31
		Black (not Hispanic)	4644	0.90	3.35
		Hispanic	1829	0.90	3.35
		Am. Indian/Alaska N.	128	0.91	3.27
		Other	747	0.90	3.41
	Gender	Male	14278	0.91	3.32
		Female	13216	0.91	3.36
	Accommodations	No	15996	0.89	3.32
		Yes	11498	0.91	3.34
CA1PA2	Race/Ethnicity	White (not Hispanic)	758	0.90	3.30
		Asian/Pacific Islander	*12*	-	-
		Black (not Hispanic)	138	0.89	3.31
		Hispanic	*36*	-	-
		Am. Indian/Alaska N.	*6*	-	-
		Other	*18*	-	-
	Gender	Male	498	0.90	3.29
		Female	470	0.90	3.30
	Accommodations	No	848	0.89	3.30
		Yes	120	0.88	3.23
CA1PA3	Race/Ethnicity	White (not Hispanic)	408	0.91	3.26
		Asian/Pacific Islander	*9*	-	-
		Black (not Hispanic)	112	0.88	3.29
		Hispanic	*40*	-	-
		Am. Indian/Alaska N.	*1*	.	.
		Other	*19*	-	-
	Gender	Male	291	0.91	3.24
		Female	298	0.91	3.27
	Accommodations	No	497	0.90	3.27
		Yes	92	0.89	3.11
CA2PA1	Race/Ethnicity	White (not Hispanic)	443	0.89	3.34
		Asian/Pacific Islander	*10*	-	-
		Black (not Hispanic)	99	0.86	3.36
		Hispanic	*36*	-	-
		Am. Indian/Alaska N.	*2*	-	-
		Other	*18*	-	-
	Gender	Male	334	0.90	3.30
		Female	274	0.89	3.39
	Accommodations	No	492	0.88	3.36
		Yes	116	0.87	3.26

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

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Table 10.12: Grade 5 English Language Arts/Literacy Reliability and SEM by Subgroup (cont.)

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA2PA2	Race/Ethnicity	White (not Hispanic)	12538	0.88	3.24
		Asian/Pacific Islander	353	0.87	3.16
		Black (not Hispanic)	2604	0.88	3.35
		Hispanic	831	0.87	3.30
		Am. Indian/Alaska N.	73	0.87	3.24
		Other	441	0.88	3.26
	Gender	Male	8312	0.89	3.26
		Female	8528	0.88	3.25
	Accommodations	No	15482	0.87	3.26
		Yes	1359	0.89	3.26
CA2PA3	Race/Ethnicity	White (not Hispanic)	741	0.89	3.26
		Asian/Pacific Islander	*13*	-	-
		Black (not Hispanic)	134	0.89	3.29
		Hispanic	*50*	0.91	3.29
		Am. Indian/Alaska N.	*1*	-	-
		Other	*26*	-	-
	Gender	Male	512	0.89	3.26
		Female	453	0.89	3.27
	Accommodations	No	854	0.88	3.27
		Yes	111	0.90	3.09
CA3PA1	Race/Ethnicity	White (not Hispanic)	760	0.89	3.35
		Asian/Pacific Islander	*13*	*0.89*	*3.37*
		Black (not Hispanic)	146	0.89	3.43
		Hispanic	*50*	0.90	3.40
		Am. Indian/Alaska N.	*3*	-	-
		Other	*25*	-	-
	Gender	Male	521	0.90	3.35
		Female	476	0.89	3.34
	Accommodations	No	848	0.87	3.35
		Yes	149	0.89	3.27
CA3PA2	Race/Ethnicity	White (not Hispanic)	418	0.89	3.37
		Asian/Pacific Islander	*7*	-	-
		Black (not Hispanic)	108	0.89	3.33
		Hispanic	*36*	-	-
		Am. Indian/Alaska N.	*3*	-	-
		Other	*18*	-	-
	Gender	Male	329	0.90	3.35
		Female	261	0.89	3.35
	Accommodations	No	485	0.88	3.35
		Yes	105	0.83	3.16

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

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Table 10.12: Grade 5 English Language Arts/Literacy Reliability and SEM by Subgroup (cont.)

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA3PA3	Race/Ethnicity	White (not Hispanic)	12520	0.87	3.31
		Asian/Pacific Islander	353	0.87	3.24
		Black (not Hispanic)	2616	0.88	3.37
		Hispanic	892	0.88	3.36
		Am. Indian/Alaska N.	81	0.88	3.29
		Other	452	0.89	3.35
	Gender	Male	8606	0.89	3.31
		Female	8308	0.88	3.32
	Accommodations	No	15558	0.87	3.32
		Yes	1357	0.89	3.27

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Table 10.13: Grade 6 English Language Arts/Literacy Reliability and SEM by Subgroup

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA1	Race/Ethnicity	White (not Hispanic)	21132	0.86	3.05
		Asian/Pacific Islander	644	0.89	3.00
		Black (not Hispanic)	5030	0.85	3.06
		Hispanic	1823	0.85	3.07
		Am. Indian/Alaska N.	113	0.87	3.05
		Other	736	0.87	3.05
	Gender	Male	15602	0.87	3.03
		Female	13874	0.86	3.06
	Accommodations	No	17648	0.84	3.05
		Yes	11828	0.85	3.04
CA2	Race/Ethnicity	White (not Hispanic)	13428	0.87	2.99
		Asian/Pacific Islander	388	0.88	2.88
		Black (not Hispanic)	2811	0.87	2.97
		Hispanic	917	0.87	2.99
		Am. Indian/Alaska N.	78	0.86	2.99
		Other	475	0.89	2.98
	Gender	Male	9064	0.88	2.97
		Female	9032	0.87	2.98
	Accommodations	No	17064	0.87	2.99
		Yes	1031	0.87	2.90
CA3	Race/Ethnicity	White (not Hispanic)	13530	0.87	3.01
		Asian/Pacific Islander	397	0.85	2.96
		Black (not Hispanic)	2710	0.87	3.03
		Hispanic	932	0.86	3.05
		Am. Indian/Alaska N.	77	0.87	3.03
		Other	489	0.87	3.05
	Gender	Male	8956	0.88	2.99
		Female	9180	0.87	3.03
	Accommodations	No	17056	0.87	3.03
		Yes	1080	0.87	2.93

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Table 10.14: Grade 7 English Language Arts/Literacy Reliability and SEM by Subgroup

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA1	Race/Ethnicity	White (not Hispanic)	20452	0.90	3.01
		Asian/Pacific Islander	649	0.92	2.94
		Black (not Hispanic)	4916	0.89	2.97
		Hispanic	1767	0.89	3.02
		Am. Indian/Alaska N.	127	0.88	3.04
		Other	696	0.90	3.02
	Gender	Male	15034	0.90	2.98
		Female	13572	0.90	3.01
	Accommodations	No	17988	0.89	3.01
		Yes	10616	0.89	2.96
CA2	Race/Ethnicity	White (not Hispanic)	13872	0.88	2.98
		Asian/Pacific Islander	401	0.89	2.90
		Black (not Hispanic)	2835	0.89	2.98
		Hispanic	901	0.89	3.01
		Am. Indian/Alaska N.	84	0.88	3.00
		Other	445	0.89	3.00
	Gender	Male	9350	0.90	2.96
		Female	9188	0.88	2.99
	Accommodations	No	17524	0.89	2.99
		Yes	1014	0.89	2.88
CA3	Race/Ethnicity	White (not Hispanic)	13710	0.87	2.99
		Asian/Pacific Islander	359	0.90	2.91
		Black (not Hispanic)	2863	0.88	2.98
		Hispanic	996	0.88	3.00
		Am. Indian/Alaska N.	80	0.87	3.00
		Other	479	0.88	3.01
	Gender	Male	9328	0.89	2.97
		Female	9158	0.88	3.00
	Accommodations	No	17488	0.88	3.00
		Yes	998	0.88	2.91

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Table 10.15: Grade 8 English Language Arts/Literacy Reliability and SEM by Subgroup

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA1PA1	Race/Ethnicity	White (not Hispanic)	18952	0.91	3.33
		Asian/Pacific Islander	581	0.93	3.31
		Black (not Hispanic)	4601	0.89	3.32
		Hispanic	1555	0.90	3.33
		Am. Indian/Alaska N.	125	0.90	3.34
		Other	591	0.91	3.34
	Gender	Male	13776	0.91	3.30
		Female	12632	0.90	3.34
	Accommodations	No	16234	0.90	3.31
		Yes	10174	0.90	3.31
CA1PA2	Race/Ethnicity	White (not Hispanic)	892	0.91	3.41
		Asian/Pacific Islander	*24*	-	-
		Black (not Hispanic)	159	0.90	3.44
		Hispanic	61	0.88	3.45
		Am. Indian/Alaska N.	*5*	-	-
		Other	*36*	-	-
	Gender	Male	581	0.92	3.37
		Female	596	0.90	3.42
	Accommodations	No	1077	0.91	3.42
		Yes	100	0.91	3.23
CA1PA3	Race/Ethnicity	White (not Hispanic)	975	0.89	3.31
		Asian/Pacific Islander	*12*	-	-
		Black (not Hispanic)	180	0.87	3.36
		Hispanic	*47*	-	-
		Am. Indian/Alaska N.	*5*	-	-
		Other	*22*	-	-
	Gender	Male	607	0.90	3.30
		Female	634	0.89	3.30
	Accommodations	No	1150	0.90	3.33
		Yes	91	0.90	3.23
CA2PA1	Race/Ethnicity	White (not Hispanic)	948	0.89	3.35
		Asian/Pacific Islander	*24*	-	-
		Black (not Hispanic)	177	0.88	3.39
		Hispanic	54	0.89	3.35
		Am. Indian/Alaska N.	*2*	-	-
		Other	*20*	-	-
	Gender	Male	610	0.90	3.36
		Female	615	0.89	3.33
	Accommodations	No	1130	0.89	3.36
		Yes	95	0.87	3.18

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

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Table 10.15: Grade 8 English Language Arts/Literacy Reliability and SEM by Subgroup (cont.)

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA2PA2	Race/Ethnicity	White (not Hispanic)	12114	0.89	3.47
		Asian/Pacific Islander	318	0.90	3.35
		Black (not Hispanic)	2489	0.88	3.51
		Hispanic	793	0.88	3.48
		Am. Indian/Alaska N.	68	0.89	3.52
		Other	396	0.89	3.49
	Gender	Male	8023	0.89	3.45
		Female	8156	0.89	3.47
	Accommodations	No	15350	0.89	3.48
		Yes	828	0.89	3.35
CA2PA3	Race/Ethnicity	White (not Hispanic)	885	0.90	3.38
		Asian/Pacific Islander	*30*	-	-
		Black (not Hispanic)	156	0.88	3.35
		Hispanic	56	0.90	3.43
		Am. Indian/Alaska N.	*5*	-	-
		Other	*24*	-	-
	Gender	Male	602	0.91	3.35
		Female	554	0.89	3.35
	Accommodations	No	1067	0.90	3.37
		Yes	89	0.83	3.31
CA3PA1	Race/Ethnicity	White (not Hispanic)	932	0.90	3.33
		Asian/Pacific Islander	*11*	-	-
		Black (not Hispanic)	171	0.89	3.36
		Hispanic	64	0.88	3.35
		Am. Indian/Alaska N.	*5*	-	-
		Other	*31*	-	-
	Gender	Male	597	0.91	3.32
		Female	617	0.89	3.32
	Accommodations	No	1094	0.89	3.34
		Yes	120	0.89	3.27
CA3PA2	Race/Ethnicity	White (not Hispanic)	937	0.90	3.42
		Asian/Pacific Islander	*22*	-	-
		Black (not Hispanic)	177	0.89	3.40
		Hispanic	51	0.91	3.29
		Am. Indian/Alaska N.	*6*	-	-
		Other	*30*	-	-
	Gender	Male	627	0.91	3.39
		Female	596	0.90	3.43
	Accommodations	No	1136	0.90	3.42
		Yes	87	0.88	3.30

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

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Table 10.15: Grade 8 English Language Arts/Literacy Reliability and SEM by Subgroup (cont.)

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA3PA3	Race/Ethnicity	White (not Hispanic)	12154	0.89	3.30
		Asian/Pacific Islander	357	0.91	3.17
		Black (not Hispanic)	2503	0.90	3.32
		Hispanic	858	0.88	3.33
		Am. Indian/Alaska N.	64	0.90	3.33
		Other	360	0.89	3.34
	Gender	Male	8045	0.90	3.30
		Female	8252	0.89	3.29
	Accommodations	No	15480	0.89	3.30
		Yes	816	0.89	3.25

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Table 10.16: Grade 3 Mathematics Reliability and SEM by Subgroup

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA1	Race/Ethnicity	White (not Hispanic)	22220	0.90	2.36
		Asian/Pacific Islander	817	0.92	2.29
		Black (not Hispanic)	5605	0.88	2.27
		Hispanic	2674	0.88	2.34
		Am. Indian/Alaska N.	121	0.90	2.32
		Other	1189	0.90	2.34
	Gender	Male	17264	0.91	2.35
		Female	15362	0.90	2.35
	Accommodations	No	17408	0.88	2.35
		Yes	15216	0.90	2.32
CA2	Race/Ethnicity	White (not Hispanic)	12876	0.87	2.41
		Asian/Pacific Islander	317	0.88	2.32
		Black (not Hispanic)	2745	0.87	2.31
		Hispanic	795	0.87	2.40
		Am. Indian/Alaska N.	53	0.88	2.38
		Other	619	0.89	2.40
	Gender	Male	8636	0.89	2.40
		Female	8768	0.88	2.40
	Accommodations	No	16776	0.88	2.40
		Yes	626	0.88	2.38
CA3	Race/Ethnicity	White (not Hispanic)	12936	0.87	2.45
		Asian/Pacific Islander	331	0.89	2.36
		Black (not Hispanic)	2746	0.87	2.35
		Hispanic	787	0.87	2.44
		Am. Indian/Alaska N.	59	0.88	2.46
		Other	638	0.88	2.43
	Gender	Male	8682	0.89	2.43
		Female	8814	0.88	2.44
	Accommodations	No	16832	0.88	2.43
		Yes	663	0.89	2.43

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Table 10.17: Grade 4 Mathematics Reliability and SEM by Subgroup

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA1	Race/Ethnicity	White (not Hispanic)	22092	0.90	2.35
		Asian/Pacific Islander	768	0.92	2.29
		Black (not Hispanic)	5455	0.89	2.24
		Hispanic	2403	0.89	2.32
		Am. Indian/Alaska N.	128	0.88	2.36
		Other	1030	0.90	2.33
	Gender	Male	16744	0.91	2.32
		Female	15132	0.90	2.34
	Accommodations	No	17144	0.89	2.37
		Yes	14734	0.90	2.28
CA2	Race/Ethnicity	White (not Hispanic)	12982	0.88	2.34
		Asian/Pacific Islander	355	0.88	2.31
		Black (not Hispanic)	2615	0.88	2.16
		Hispanic	818	0.86	2.30
		Am. Indian/Alaska N.	73	0.89	2.27
		Other	534	0.89	2.32
	Gender	Male	8736	0.90	2.30
		Female	8640	0.89	2.32
	Accommodations	No	16588	0.89	2.32
		Yes	787	0.90	2.16
CA3	Race/Ethnicity	White (not Hispanic)	13010	0.87	2.31
		Asian/Pacific Islander	348	0.90	2.25
		Black (not Hispanic)	2588	0.87	2.19
		Hispanic	829	0.87	2.29
		Am. Indian/Alaska N.	66	0.92	2.26
		Other	581	0.89	2.28
	Gender	Male	8548	0.89	2.28
		Female	8874	0.88	2.30
	Accommodations	No	16684	0.88	2.29
		Yes	737	0.89	2.23

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Table 10.18: Grade 5 Mathematics Reliability and SEM by Subgroup

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA1PA1	Race/Ethnicity	White (not Hispanic)	15374	0.90	2.92
		Asian/Pacific Islander	547	0.92	2.94
		Black (not Hispanic)	4064	0.85	2.65
		Hispanic	1714	0.87	2.79
		Am. Indian/Alaska N.	115	0.87	2.88
		Other	619	0.89	2.89
	Gender	Male	12084	0.90	2.85
		Female	10350	0.89	2.90
	Accommodations	No	8694	0.89	2.99
		Yes	13740	0.88	2.77
CA1PA2	Race/Ethnicity	White (not Hispanic)	6651	0.88	2.94
		Asian/Pacific Islander	184	0.90	2.96
		Black (not Hispanic)	1302	0.84	2.72
		Hispanic	363	0.87	2.93
		Am. Indian/Alaska N.	*30*	-	-
		Other	232	0.89	2.91
	Gender	Male	4364	0.90	2.90
		Female	4398	0.88	2.92
	Accommodations	No	8328	0.89	2.92
		Yes	433	0.87	2.75
CA2PA1	Race/Ethnicity	White (not Hispanic)	6524	0.88	2.98
		Asian/Pacific Islander	203	0.90	2.99
		Black (not Hispanic)	1345	0.87	2.76
		Hispanic	442	0.86	2.95
		Am. Indian/Alaska N.	*36*	-	-
		Other	227	0.89	2.94
	Gender	Male	4326	0.90	2.94
		Female	4451	0.88	2.96
	Accommodations	No	8368	0.89	2.96
		Yes	409	0.90	2.76
CA2PA2	Race/Ethnicity	White (not Hispanic)	6569	0.89	2.92
		Asian/Pacific Islander	178	0.90	2.92
		Black (not Hispanic)	1284	0.87	2.69
		Hispanic	404	0.88	2.87
		Am. Indian/Alaska N.	*31*	-	-
		Other	259	0.89	2.89
	Gender	Male	4317	0.90	2.89
		Female	4408	0.88	2.90
	Accommodations	No	8338	0.89	2.90
		Yes	386	0.89	2.71

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

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Table 10.18: Grade 5 Mathematics Reliability and SEM by Subgroup (cont.)

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA3PA1	Race/Ethnicity	White (not Hispanic)	6457	0.88	3.03
		Asian/Pacific Islander	163	0.91	3.03
		Black (not Hispanic)	1361	0.86	2.81
		Hispanic	459	0.88	2.99
		Am. Indian/Alaska N.	*35*	-	-
		Other	218	0.90	2.96
	Gender	Male	4326	0.89	3.00
		Female	4367	0.88	3.00
	Accommodations	No	8280	0.88	3.01
		Yes	412	0.88	2.80
CA3PA2	Race/Ethnicity	White (not Hispanic)	6545	0.88	2.97
		Asian/Pacific Islander	194	0.90	2.93
		Black (not Hispanic)	1277	0.86	2.76
		Hispanic	403	0.86	2.91
		Am. Indian/Alaska N.	51	0.85	2.99
		Other	214	0.89	2.90
	Gender	Male	4342	0.89	2.95
		Female	4342	0.89	2.94
	Accommodations	No	8264	0.89	2.95
		Yes	420	0.88	2.78

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

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Table 10.19: Grade 6 Mathematics Reliability and SEM by Subgroup

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA1	Race/Ethnicity	White (not Hispanic)	21616	0.88	2.16
		Asian/Pacific Islander	669	0.91	2.17
		Black (not Hispanic)	5133	0.84	2.01
		Hispanic	1927	0.86	2.09
		Am. Indian/Alaska N.	111	0.87	2.11
		Other	757	0.87	2.14
	Gender	Male	15982	0.89	2.13
		Female	14232	0.88	2.14
	Accommodations	No	17492	0.87	2.18
		Yes	12722	0.86	2.04
CA2	Race/Ethnicity	White (not Hispanic)	13216	0.88	2.15
		Asian/Pacific Islander	381	0.90	2.12
		Black (not Hispanic)	2693	0.86	2.05
		Hispanic	906	0.87	2.15
		Am. Indian/Alaska N.	77	0.87	2.12
		Other	464	0.89	2.13
	Gender	Male	8878	0.89	2.14
		Female	8858	0.88	2.14
	Accommodations	No	16892	0.88	2.15
		Yes	843	0.89	2.01
CA3	Race/Ethnicity	White (not Hispanic)	13226	0.87	2.24
		Asian/Pacific Islander	372	0.89	2.19
		Black (not Hispanic)	2739	0.86	2.10
		Hispanic	852	0.86	2.20
		Am. Indian/Alaska N.	81	0.88	2.23
		Other	473	0.89	2.21
	Gender	Male	8730	0.89	2.22
		Female	9012	0.87	2.21
	Accommodations	No	16876	0.88	2.22
		Yes	868	0.90	2.07

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Table 10.20: Grade 7 Mathematics Reliability and SEM by Subgroup

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA1	Race/Ethnicity	White (not Hispanic)	20744	0.90	2.26
		Asian/Pacific Islander	591	0.93	2.27
		Black (not Hispanic)	5022	0.85	2.04
		Hispanic	1772	0.87	2.17
		Am. Indian/Alaska N.	133	0.87	2.18
		Other	706	0.90	2.21
	Gender	Male	15308	0.90	2.20
		Female	13660	0.90	2.24
	Accommodations	No	17436	0.89	2.29
		Yes	11532	0.88	2.09
CA2	Race/Ethnicity	White (not Hispanic)	13276	0.87	2.36
		Asian/Pacific Islander	344	0.90	2.33
		Black (not Hispanic)	2760	0.84	2.20
		Hispanic	932	0.87	2.31
		Am. Indian/Alaska N.	83	0.85	2.36
		Other	452	0.88	2.32
	Gender	Male	8970	0.88	2.32
		Female	8878	0.87	2.35
	Accommodations	No	17012	0.87	2.34
		Yes	835	0.85	2.18
CA3	Race/Ethnicity	White (not Hispanic)	13282	0.87	2.38
		Asian/Pacific Islander	348	0.89	2.36
		Black (not Hispanic)	2792	0.85	2.22
		Hispanic	934	0.86	2.32
		Am. Indian/Alaska N.	71	0.76	2.39
		Other	445	0.88	2.32
	Gender	Male	8928	0.89	2.33
		Female	8942	0.87	2.37
	Accommodations	No	17016	0.88	2.36
		Yes	855	0.87	2.19

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Table 10.21: Grade 8 Mathematics Reliability and SEM by Subgroup

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA1PA1	Race/Ethnicity	White (not Hispanic)	11556	0.87	2.50
		Asian/Pacific Islander	315	0.93	2.58
		Black (not Hispanic)	3278	0.84	2.31
		Hispanic	1125	0.83	2.41
		Am. Indian/Alaska N.	64	0.84	2.44
		Other	393	0.88	2.45
	Gender	Male	9184	0.88	2.44
		Female	7547	0.87	2.48
	Accommodations	No	7067	0.87	2.59
		Yes	9664	0.84	2.36
CA1PA2	Race/Ethnicity	White (not Hispanic)	5308	0.86	2.62
		Asian/Pacific Islander	124	0.92	2.72
		Black (not Hispanic)	1202	0.85	2.44
		Hispanic	342	0.85	2.59
		Am. Indian/Alaska N.	*27*	-	-
		Other	155	0.88	2.63
	Gender	Male	3601	0.88	2.57
		Female	3557	0.87	2.61
	Accommodations	No	6746	0.87	2.60
		Yes	412	0.84	2.37
CA2PA1	Race/Ethnicity	White (not Hispanic)	5231	0.87	2.67
		Asian/Pacific Islander	107	0.92	2.72
		Black (not Hispanic)	1194	0.87	2.44
		Hispanic	365	0.87	2.56
		Am. Indian/Alaska N.	*40*	-	-
		Other	199	0.87	2.64
	Gender	Male	3585	0.89	2.61
		Female	3551	0.87	2.65
	Accommodations	No	6726	0.88	2.65
		Yes	410	0.84	2.31
CA2PA2	Race/Ethnicity	White (not Hispanic)	5251	0.87	2.68
		Asian/Pacific Islander	112	0.93	2.73
		Black (not Hispanic)	1217	0.87	2.45
		Hispanic	359	0.86	2.61
		Am. Indian/Alaska N.	*43*	-	-
		Other	148	0.89	2.59
	Gender	Male	3558	0.88	2.62
		Female	3572	0.88	2.66
	Accommodations	No	6710	0.88	2.66
		Yes	420	0.87	2.37

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

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Table 10.21: Grade 8 Mathematics Reliability and SEM by Subgroup (cont.)

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA3PA1	Race/Ethnicity	White (not Hispanic)	5289	0.87	2.67
		Asian/Pacific Islander	81	0.94	2.69
		Black (not Hispanic)	1244	0.86	2.46
		Hispanic	346	0.87	2.62
		Am. Indian/Alaska N.	*35*	-	-
		Other	164	0.89	2.61
	Gender	Male	3585	0.89	2.63
		Female	3574	0.87	2.65
	Accommodations	No	6767	0.88	2.65
		Yes	392	0.87	2.38
CA3PA2	Race/Ethnicity	White (not Hispanic)	5257	0.87	2.68
		Asian/Pacific Islander	110	0.90	2.75
		Black (not Hispanic)	1239	0.86	2.48
		Hispanic	345	0.85	2.64
		Am. Indian/Alaska N.	*32*	-	-
		Other	182	0.87	2.63
	Gender	Male	3540	0.88	2.64
		Female	3625	0.87	2.65
	Accommodations	No	6740	0.87	2.66
		Yes	425	0.85	2.40

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

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Table 10.22: Grade 5 Science Reliability and SEM by Subgroup

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA2	Race/Ethnicity	White (not Hispanic)	28592	0.87	3.54
		Asian/Pacific Islander	933	0.90	3.52
		Black (not Hispanic)	6751	0.88	3.59
		Hispanic	2563	0.88	3.59
		Am. Indian/Alaska N.	180	0.86	3.52
		Other	1086	0.87	3.56
	Gender	Male	20940	0.89	3.56
		Female	19164	0.88	3.55
	Accommodations	No	25424	0.85	3.53
		Yes	14680	0.89	3.57
CA3	Race/Ethnicity	White (not Hispanic)	19668	0.83	3.44
		Asian/Pacific Islander	557	0.83	3.40
		Black (not Hispanic)	3931	0.88	3.64
		Hispanic	1310	0.86	3.55
		Am. Indian/Alaska N.	116	0.88	3.46
		Other	687	0.87	3.53
	Gender	Male	13002	0.86	3.47
		Female	13266	0.86	3.50
	Accommodations	No	25104	0.85	3.48
		Yes	1165	0.89	3.62

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Table 10.23: Grade 8 Science Reliability and SEM by Subgroup

Form	Category	Group	N Count	Cronbach's Alpha	SEM
CA2	Race/Ethnicity	White (not Hispanic)	28116	0.90	3.83
		Asian/Pacific Islander	847	0.93	3.74
		Black (not Hispanic)	6474	0.90	3.66
		Hispanic	2234	0.90	3.79
		Am. Indian/Alaska N.	172	0.89	3.82
		Other	864	0.90	3.81
	Gender	Male	19956	0.91	3.77
		Female	18748	0.90	3.85
	Accommodations	No	27060	0.89	3.85
		Yes	11646	0.91	3.68
CA3	Race/Ethnicity	White (not Hispanic)	20668	0.86	3.78
		Asian/Pacific Islander	559	0.88	3.65
		Black (not Hispanic)	4128	0.88	3.65
		Hispanic	1355	0.87	3.81
		Am. Indian/Alaska N.	113	0.86	3.79
		Other	640	0.89	3.77
	Gender	Male	13544	0.89	3.74
		Female	13922	0.88	3.81
	Accommodations	No	26260	0.88	3.79
		Yes	1205	0.90	3.58

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Appendix A:
Presentation on the Test Administration Manual

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Missouri Assessment Program

Grade-Level Assessments
Test Administration Manual

English Language Arts / Literacy
Grades
3, 4, 5, 6, 7, 8

Mathematics
Grades
3, 4, 5, 6, 7, 8

Science
Grades
5, 8

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Spring 2015
February 27, 2015
2707075

Missouri Department of Elementary and Secondary Education

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This *Test Administration Manual* is NOT a secure document. All administrators should read this manual before administering the test.

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February 27, 2015 (Version 2) Updates

Page 8: Changed ELA PT "sessions" to "parts"
Pages 15 and 17: Moved Spell Check from the Designated Supports table to the Universal Tools table
Page 17: Specified that stac ed translations are in Spanish
Page 23: Added the date the paper-and-pencil tests are available
Pages 26–30: Clarified information and roles regarding test securi y
Page 32: Clarified permitted materials for ELL students
Page 45: Corrected the name of the system that generates the paper-and-pencil tests
Page 57: Added a paper-based assessment name and clarified return shipping instructions
Page 64: Updated the instructions regarding the Missing Test Materials Form

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1.0 OVERVIEW OF IMPORTANT INFORMATION FOR THE MAP GRADE-LEVEL ASSESSMENTS

1.1 This Test Administration Manual

The purpose of this *Test Administration Manual* is to provide detailed instructions for administering the Missouri Assessment Program Grade-Level Assessments. The manual includes instructions for test preparation, scripts for administering the tests (including links to secure listening scripts for accommodated versions of the assessments), and post-test administration procedures. District Test Coordinators (DTCs), School Test Coordinators (STCs), and Test Examiners (TEs) should thoroughly read the manual and attend training before administering the tests.

1.2 Glossary of Terms

Accommodations	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.
Break	Provides an opportunity to pause the test for up to 20 minutes.
Classroom Activity	A short, teacher-led activity designed to introduce students to the context and contextual vocabulary in the performance task (PT) to ensure that students are not disadvantaged in demonstrating the skills the task intends to assess.
Designated Supports	Accessibility features of the assessments available for use by any student for whom the need has been indicated by a team of educators knowledgeable about the student.
eDIRECT	The administrative side of the 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.
Pause	Action taken by a student or Test Examiner (TE) to temporarily halt the test during any part of the test, as needed.
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.

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Performance Task (PT)	A PT is an English Language Arts (ELA) and mathematics item type 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. It is a required portion of the test for grades 5 and 8.
Segment	A part of a test within the test delivery system. Segments separate items from others if the eligible tools are different (i.e., the mathematics test may have two segments—one segment that allows calculator use and another segment that does not).
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 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.

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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. The 2015 assessments will include traditional selected-response and constructed-response items, as well as performance events, performance tasks, and innovative technology enhanced items designed to elicit student evidence in new ways. 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.
- CTB is collaborating with the Data Recognition Corporation (DRC) and DESE to deliver Missouri's Spring 2015 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. CTB will provide handscoring and reporting services. These cooperative efforts and systems comprise a fully integrated assessment platform to meet the needs of DESE staff, educators, students, and other Missouri stakeholders.
- The Spring 2015 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 and Mathematics Assessments for Grades 3–8 include a component containing selected-response, short constructed-response, and technology enhanced items. This component is divided into two sessions that may be administered in two sittings.
- In addition to the first component, the English Language Arts and Mathematics Assessments for Grades 5 and 8 include a second component containing a performance task. The ELA performance task consists of two parts, which is administered in two sessions. The Mathematics performance task is administered in one session. Both ELA and Mathematics performance tasks are preceded by a Classroom Activity, which is administered as an independent session.

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- 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.

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1.4 Schedule of Important Dates for Spring 2015

Precode File Due to DESE	Precode Data Available in eDIRECT	MAP Grade-Level Assessment Test Window
January 30, 2015	March 5, 2015	March 30, 2015–May 22, 2015

Event	Schedule
District Test Coordinators receive welcome email and login information to eDIRECT.	January 7, 2015
District Test Coordinators provide grade-content test windows, purchase order numbers, and Large Print and Braille orders.	Must be provided through eDIRECT Enrollments between January 12, 2015–February 20, 2015. See the eDIRECT User Guide for detailed instructions. The deadline for ordering additional Large Print and Braille testing materials is May 11, 2015. Purchase Orders must be faxed to CTB at 1-888-282-0526 by February 20, 2015.
School Test Coordinators and School Information Technology Coordinators coordinate the installation of INSIGHT on all student workstations and complete a site certification.	Site certification must be completed before the statewide administration window. The Statewide Readiness Test (SRT) window is February 10, 2015–February 27, 2015.
School Test Coordinators verify that all student accommodations and status codes are recorded.	Starting March 5, 2015, indicate through eDIRECT Test Setup any accommodations and designated supports that will be used for each student. All accommodations and designated supports **must** be marked prior to testing. See the eDIRECT User Guide for detailed instructions.
District Test Coordinators contact CTB to schedule pickup of Large Print, Braille, and paper-and-pencil test books.	The deadline is May 26, 2015. Materials must be picked up no later than May 29, 2015.
Test results and Individual Student Reports (ISR) are available online via eDIRECT.	ISRs for ELA and Mathematics are available no later than the close of business on the 10th business day after each district content area testing window closes. ISRs for Science are available July 1, 2015. In future years, ISRs for all content areas will be available 10 business days after the completion of testing.

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1.5 Test Administration Policies

General Rules of Online Testing

Middle school students taking the Algebra I EOC Assessment should not be precoded for or administered the Grade-Level Mathematics Assessment.

Starting in 2015, students in grades 3, 4, 6, and 7 will take online tests for English Language Arts and Mathematics consisting of selected-response (SR), constructed-response (CR), and technology enhanced (TE) items. Students in grades 5 and 8 will also take performance tasks (PTs) for ELA and mathematics, as well as online science tests. The SR, CR, and TE items component and the PT component will be presented as separate tests. Students may not return to a test once it has been completed and submitted. Basic online testing parameters:

- Within each test there may be segments. For example, the grades 6 through 8 mathematics tests include a segment with an embedded calculator available and another segment where the embedded calculator is not allowed and is unavailable for testing. A student may not return to a segment 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 (or segment for tests with segments).

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.

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.

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During the assessments:

- If a test is paused for 20 minutes or more, the student can return to the section and continue entering his or her responses. The student may also review and change previously answered items. The student is not permitted to return to items in a different segment.
- Any highlighted text and sticky notes **will** be saved when a test is paused regardless of how long the assessment is paused.
- In the event of a technical issue (e.g., power outage or network failure), students will be logged out and the test will automatically be paused. Student responses will not be lost, and students may move to a different device. The students will need to log in again upon resuming the test.

Test Timeout (Due to Inactivity)

As a security measure, students are automatically logged out of the test after 20 minutes of inactivity. *Activity* is defined as selecting an answer or navigation option in the assessment (e.g., clicking [Next] or [Back] or using the quick navigation drop-down list to move to another item). Moving the mouse or clicking on an empty space on the screen is not considered activity. Test timeout occurs when the test is not paused.

Any highlighted text and sticky notes will be saved when a test is paused regardless of how long the test is paused.

If a student starts the test near the end of the testing window, the student must finish before the district administration window officially closes. The assessment will automatically end at 8 P.M. on the last day of the scheduled district administration window, even if the student has not finished.

1.6 Scheduling the Tests

The table below lists rough 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.

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These times also do not account for breaks. This information is for scheduling purposes only, as the assessments are **untimed**.

Content Area	Grades	Test Component	Estimated Time hrs : mins
English Language Arts/ Literacy	3, 4, 6, 7	SR, CR, and TE Items (Sessions 1 and 2)*	1:30
	5, 8	SR, CR, and TE Items (Sessions 1 and 2)*	1:30
		Classroom Activity**	:30
		Performance Task (PT) (Parts 1 and 2)**	2:00
Mathematics	3, 4	SR, CR, and TE Items (Sessions 1 and 2)*	1:30
	5	SR, CR, and TE Items (Sessions 1 and 2)*	1:30
		Classroom Activity***	:30
		Performance Task (PT)	1:00
	6, 7	SR, CR, and TE Items (Sessions 1 and 2)*	2:00
	8	SR, CR, and TE Items (Sessions 1 and 2)*	2:00
		Classroom Activity***	:30
		Performance Task (PT)	1:00
Science	5, 8	Session 1	:45–:55
		Session 2	:20–:25
		Session 3	:45–:65

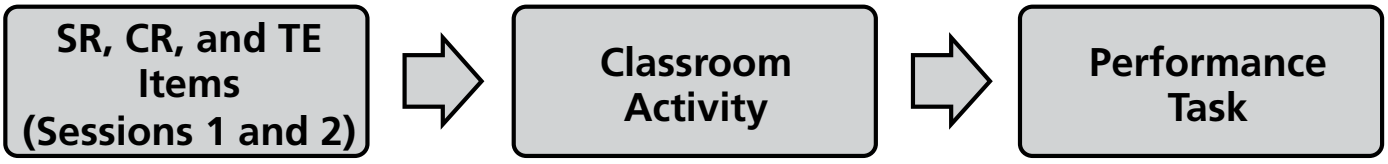
**Testing time for each session is approximately half of the testing time shown (e.g., ELA Sessions 1 and 2 are approximately 45 minutes each).*

***Testing time for each part is approximately one hour.*

****Classroom Activities are administered prior to the performance task and are designed to fit into a thirty-minute window; however, the time within the window will vary due to the complexity of the topic and individual student needs.*

Recommended Order of Test Administration (ELA and Mathematics Grades 5 and 8 Only)

For grades 5 and 8, the ELA and Mathematics Assessments are comprised of two components (tests): SR, CR, and TE items and a PT. All PTs must be preceded by the administration of a Classroom Activity. It is recommended that students take the two components on separate days. It is also recommended that students begin with the SR, CR, and TE items, followed by the Classroom Activity, and then the PT. Districts/Schools may opt to administer in a different order if needed; however, the Classroom Activity, which is designed to introduce the PT, must occur prior to the PT.



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Classroom Activity (ELA and Mathematics Grades 5 and 8 Only)

The purpose of the Classroom Activities is to introduce students to the context of a performance task so they are not disadvantaged in demonstrating the skills the task intends to assess. Classroom Activities do not address content information; instead, they focus on vocabulary and key contextual topics. The Classroom Activity is designed to be an introduction and not an assessment.

Guidelines for administering the Classroom Activity for ELA or Mathematics are as follows:

- Classroom Activities should be administered by a teacher. It is preferable—but not essential—that the teacher or TE administering the Classroom Activity has content knowledge in the area of assessment.
- The teacher/TE should be able to record information—including any tables, graphics, formulas, or other information contained in the Classroom Activity materials—for students to see, such as on a chalkboard or dry-erase board. Computers, projectors, and other technology are allowed, but not required, for the Classroom Activity. Recorded information should not be available when students participate in the PT. When the PT is being administered, content from the Classroom Activity should not be available (i.e., do not put any content from the Classroom Activity on the board, in handouts, etc.).
- Students may take notes during the Classroom Activity, but the notes may not be used during the PT. Notes must be collected before proceeding to the PT and stored in a secure location until securely shredded.
- There should be no more than a three-day lapse between the Classroom Activity and the PT administration. Inadvertently administering the PT before or without the Classroom Activity constitutes a testing irregularity.
- Classroom Activities should only be administered to students once and are designed to be completed in approximately thirty minutes.
- The Classroom Activity should not be supplemented with any other content that the administrator may think is helpful. Supplementing the Classroom Activity may detract from the intended purpose of the Classroom Activity.

The Classroom Activity should not be supplemented with any other content.

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All students in the same grade within a school will receive the same Classroom Activity with one exception. Students taking the Large Print, Braille, or paper-and-pencil edition may be assigned a different Classroom Activity, in which case, scheduling accommodations will have to be made to provide those students the correct Classroom Activity.

- Consider the accommodations that should be provided to students in the class that would normally be provided during instruction. See "Classroom Activity" in Section 5.1 of this manual for information on student resources that can be provided during the Classroom Activity.
- In the event a student is absent during the Classroom Activity, a make-up session must be scheduled. The Classroom Activity may be recorded; however, the make-up session should provide students with an experience similar to that of his or her peers. To the greatest extent possible, the make-up session should provide students an opportunity to interact with the teacher or TE and his or her peers.

Classroom Activities are located on the **Documents** page of eDIRECT, https://mo.drcedirect.com. The Classroom Activity for students taking a paper-based assessment may differ from the Classroom Activity for students taking the online assessment.

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 2015" from the Administration drop-down.
   b. Choose "Classroom Activities" from the Document Type drop-down.
   c. Click "Show Documents." A list of all available Classroom Activities will appear in the grid.

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Duration and Timing Information

The scheduling/rules for each assessment are included in Tables 1, 2, and 3. Note that the duration, timing, break/pause rules, and session recommendations vary for each content area and component.

Table 1: Assessment Sequence—ELA

ELA	SR, CR, and TE Items (all grades)	Classroom Activity (grades 5 and 8)	Performance Task (PT) (grades 5 and 8)
Number and Duration of Sessions	The SR, CR, and TE items are presented in two sessions. **Recommendations:** • Administer in two sessions corresponding to Sessions 1 and 2. Administer in no more than six sessions (rare/extreme). • Session durations range from 40–60 minutes.	**Recommendations:** • Administer in one session. • Approximate session duration: 30 minutes. • Should occur one to three days prior to PT. • Should NOT occur on the same day as the ELA PT.	The PT is presented in two parts (sessions). **Recommendations:** • Administer in two sessions corresponding to Parts 1 and 2 of the PT. • Session durations range from 60–120 minutes.
Breaks Within Sessions	Breaks can be provided during the test sessions 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.	NA	A student can take breaks during Parts 1 and 2. If the test is paused for more than 20 minutes, the student will be able to go back to items on the previous screens within the same session.
Total Duration	• **Recommendation:** Student completes this component within five days of starting.	NA	• **Recommendation:** Students complete Part 1 in one test session and Part 2 the next school day.

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Table 2: Assessment Sequence—Mathematics

Mathematics	SR, CR, and TE Items (all grades)	Classroom Activity (grades 5 and 8)	Performance Task (PT) (grades 5 and 8)
Number and Duration of Sessions	The SR, CR, and TE items are presented in two sessions. **Recommendations:** • Administer in two sessions corresponding to Sessions 1 and 2. • Session durations range from 40–60 minutes.	**Recommendations:** • Administer in one session. • Approximate session duration: 30 minutes. • Should occur as close to the PT as is feasible, and no more than three days prior to the PT. • MAY occur on the same day as the PT.	**Recommendations:** • Administer in one session. • Session duration ranges from 40–120 minutes.
Breaks Within Sessions	Breaks can be provided during the test sessions 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 within the same segment.	NA	A student can take breaks during the PT test sessions. Mathematics PT items are presented on a single screen. Following a break, the student will have access to the same items.
Total Duration	• **Recommendation:** Student completes this component within five days of starting it.	NA	• **Recommendation:** Student completes the PT in one day.

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Table 3: Assessment Sequence—Science

Science	Sessions 1	Session 2	Session 3 (Performance Event)
Number and Duration of Sessions	• Administer in one session. • Session duration ranges from 45–55 minutes.	• Administer in one session. • Session duration ranges from 20–25 minutes.	• Administer in one session. • Session duration ranges from 45–65 minutes.
Breaks Within Sessions	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.	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.	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.
Total Duration	• **Recommendation:** Student completes Session 1 in a single session.	• **Recommendation:** Student completes Session 2 in a single session.	• **Recommendation:** Student completes Session 3 in a single session.

Additional Administration Recommendations

- For the performance tasks, students may be best served by sequential, uninterrupted time that may exceed the time allotted in a student's schedule.
- 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.
- The Classroom Activity must be completed prior to administration of the PT. Administering the PT before the Classroom Activity is considered a testing irregularity.

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1.7 Accommodations and Special Populations

Updated Accommodations Procedures/Codes

The accommodations for the MAP Grade-Level Assessments have changed starting with the Spring 2015 Grade-Level administration. What we previously knew as accommodations has now been split into three areas: Universal Tools, Designated Supports, and Accommodations.

- Universal Tools are available to all students taking a Grade-Level Assessment.
- Designated Supports are available to students when deemed appropriate by a team of educators.
- Accommodations must appear in a student's IEP/504 Plan.

For Special Education students, the IEP team should choose **all** of the designated supports and accommodations that a student will receive.

Some designated supports and accommodations are only for ELL students.

Prior to testing, Test Examiners should log in to eDIRECT to check and set accommodations for students from the Edit Student window. See the eDIRECT User Guide for detailed instructions. It is recommended that districts keep local documentation of Designated Supports.

Table 4: Universal Tools

- The following is a list of universal tools for the Grade-Level Assessments.
- These tools are available to all students.

Tool	Format	Description
Break (Pause)	Online	The system allows all students to pause the assessment for up to 20 minutes. There is no limit on the amount of times a student may use this tool.
	Any	All students may take breaks of up 20 minutes as needed.
Calculator (For calculator-allowed items only)	Online	The system allows all students, on items where calculator use is allowed, to have access to an embedded digital calculator.
	Any	All students may have access, on items where calculator use is allowed, to a physical calculator.
English Dictionary	Online	The system allows all students access to an embedded English dictionary for use on the writing performance task.
	Any	All students may have access to a physical English dictionary for use on the writing performance task.
Glossary (Grades 3–8 Math and ELA only)	Online	The system allows all students to access an embedded glossary, which shows grade- and context-appropriate definitions of specific construct-irrelevant terms. This tool is not available for grades 5 and 8 Science assessments.
Highlighter	Online	The system allows all students to have access to a highlighter for marking desired text, questions, and answers.
	Any	All students may have access to a physical highlighter.

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Table 4: Universal Tools continued

Tool	Format	Description
Keyboard Navigation	Online	The system allows all students to navigate through the text by using the keyboard.
Mark for Review	Online	The system allows all students to mark an item for review.
Notepad (Scratch paper)	Online	The system allows all students to use a digital notepad (called "Sticky Notes") to make notes about an item.
	Paper	All students may have access to physical scratch paper to make notes about an item. Physical scratch paper should be collected and destroyed immediately upon the conclusion of the testing session, except during the ELA and Mathematics performance tasks.
Protractor	Online	The system allows all students to use an embedded protractor on specific items where appropriate.
	Paper	All students may have access to a physical protractor for use on specific items where appropriate.
Ruler	Online	The system allows all students to use an embedded ruler on specific items where appropriate.
	Paper	All students may have access to a physical ruler for use on specific items where appropriate.
Spell Check	Online	The system allows students to use an embedded spell check feature on specific items where appropriate. **NOTE:** This feature must be manually turned on to be activated in the system.
Strikethrough (Called "Cross Off")	Online	The system allows all students to cross out answer options.
Thesaurus	Any	All students may have access to a physical thesaurus during the writing performance task.
Writing Tools	Online	The system allows all students to use selected writing tools on specific items where appropriate. The tools include the ability to bold text, italicize text, create bullets points. There is also an undo/redo feature.
Zoom (Called "Magnifier")	Online	The system allows all students to zoom in or zoom out on text or graphics to make them appear larger or smaller than the default size.
	Paper	All students may have access to devices that allow them to change the size of text, formulas, tables, graphics, etc.

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Table 5: Designated Supports

- The following is a list of designated supports for the Grade-Level Assessments.
- These supports are available to students when deemed appropriate by a team of educators.
- These supports are available to ELL students.

Support	Format	Description	Code
Bilingual Dictionary	Any	ELL students may have access to a physical bilingual dictionary for use on the writing performance task.	S431
Color Contrast	Online	The system allows students to adjust background or font color based on student needs or preferences.	S101
	Paper	Students may have the test presented to them printed in different colors based on student needs or preferences.	S102
Color Overlay	Paper	Students may have a color transparency placed over the test presented to them based on student needs or preferences.	S103
Glossary (Grades 3–8 Math and ELA only)	Paper	All students taking the paper-based, Braille, or Large Print Assessment may have access to a specific glossary, to be included with the assessment. This support is not available for grades 5 and 8 Science assessments.	S104
Magnification	Online—Not Embedded	The system allows students to use assistive technology devices to change the size of text, formulas, tables, graphics, etc., beyond the capabilities of the zoom tool.	S105
Masking	Online	The system allows students to block off content that is not of immediate need or that may be distracting by using an embedded masking tool.	S106
	Paper	Students may use a masking tool to block off content that is not of immediate need or that may be distracting.	S107

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Table 5: Designated Supports continued

Support	Format	Description	Code
Read-Aloud (For all items in any subject, excluding ELA reading passages)	Online	The system allows items in mathematics and English language arts to be read aloud to the student via embedded text-to-speech technology. The student can control the speed and volume of the voice.	S041
	Online—Not Embedded	Students may use assistive technology text-to-speech software to allow all items in any subject, not including ELA reading passages, to be read aloud.	S042
	Any	Students may have items in mathematics, science, and English language arts read aloud to them by a trained reader. Reading aloud of ELA reading passages requires an IEP or 504 Plan.	S043
	Any	ELL students may have items in mathematics, science, and English language arts read aloud to them in their native language by a trained translator. Reading aloud of ELA reading passages requires an IEP or 504 Plan.	S111
Scribe (For all items in any subject, excluding ELA writing)	Any	Students may dictate their responses to a trained scribe, who must follow the administration guidelines. Scribing of ELA writing requires an IEP or 504 Plan.	S351
Separate Setting	Any	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
Translation	Online	The system allows ELL students to use stacked Spanish translations on selected construct-irrelevant math items.	S108
	Any	ELL students may have test directions for math, science, and social studies translated. ELL students may respond to any assessment in their native language. The responses must be translated and then transcribed by a trained scribe, who must follow the administration guidelines. ELL students taking the paper-based, Braille or Large Print assessment may have access to a specific glossary, to be included with the assessment. This glossary can be translated locally.	S109

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Table 6: Accommodations for Students with Disabilities

- The following is a list of accommodations for the Grade-Level Assessments.
- The accommodations must appear in an IEP or a 504 Plan to be allowed.
- These supports are available to ELL students.

Accommodation	Format	Description	Code
Abacus	Any	Students may have access to an abacus.	A391
Alternate Response Options	Any	Students may respond to items using an alternate option, including, but not limited to: Adapted Keyboards, StickyKeys, MouseKeys, FilterKeys, Adapted Mouse, Touch Screen, Head Wand, Switches.	A441
American Sign Language (ASL) (For math and science items and ELA listening items)	Online	The system allows students to access math items and ELA listening items by viewing ASL video.	A051
	Any	Students may have math, science, social studies items and ELA listening items translated into ASL.	A052
Braille	Paper	Students with visual impairments may access the assessment via a Braille version. Tactile overlays and graphics tools may be used to assist the student in accessing the content.	A012
INVALIDATION Calculator GRADE 3 ONLY (For non-calculator-allowed items only) *INVALIDATION*	Any	All students in grade 3 may have access, on items where calculator use is not allowed, to a physical calculator. **NOTE:** Use of this will result in invalidation—Student will receive lowest obtainable scale score (LOSS).	A392
Calculator GRADES 4–8 ONLY (For non-calculator-allowed items only)	Any	All students in grades 4–8 may have access, on items where calculator use is not allowed, to a physical calculator.	A393
Large Print	Paper	Students with visual impairments may access the assessment via a Large Print version.	A021
INVALIDATION Multiplication Table GRADE 3 ONLY *INVALIDATION*	Any	Students in grade 3 may have access to a single-digit multiplication table. **NOTE:** Use of this will result in invalidation—Student will receive lowest obtainable scale score (LOSS).	A394

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Table 6: Accommodations for Students with Disabilities continued

Accommodation	Format	Description	Code
Multiplication Table GRADES 4–8	Any	Students in grades 4–8 may have access to a single-digit multiplication table.	A395
Paper-Based Assessment	Paper	Students may have access to a paper-based version of the assessment.	A102
INVALIDATION Read-Aloud GRADES 3–5 ONLY (ELA reading passages) *INVALIDATION*	Any	Students in grades 3–5 may have English language arts reading passages read aloud to them by a trained reader. **NOTE:** Use of this will result in invalidation—Student will receive lowest obtainable scale score (LOSS).	A041
	Online—Not Embedded	Students in grades 3–5 may use assistive technology text-to-speech software to allow ELA reading passages to be read aloud. **NOTE:** Use of this will result in invalidation—Student will receive lowest obtainable scale score (LOSS).	A042
	Any	ELL students in grades 3–5 may have English language arts reading passages read aloud to them in their native language by a trained translator. **NOTE:** Use of this will result in invalidation—Student will receive lowest obtainable scale score (LOSS).	A111
Read-Aloud GRADES 6–8 ONLY (ELA reading passages)	Online—Not Embedded	Students may use assistive technology text-to-speech software to allow ELA reading passages to be read aloud.	A044
	Any	Students may have English language arts reading passages read aloud to them by a trained reader.	A045
	Any	ELL students may have English language arts reading passages read aloud to them in their native language by a trained translator.	A112
Read-Aloud (ELA reading passages)	Paper	Blind students in any grade who do not yet have adequate Braille skills may have ELA reading passages read aloud.	A046
Scribe (For ELA writing)	Any	Students may dictate their responses to a trained scribe, who must follow the administration guidelines.	A351
Specialized Calculator (For calculator-allowed items only)	Any	Students may have access, on items where calculator use is allowed, to a specialized calculator, including talking calculators or Braille calculators, when appropriate.	A396

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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 device. 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. For more information about the MAP-A, including eligibility criteria, see http://dese.mo.gov/college-career-readiness/assessment/map-a. The IEP team has the responsibility and authority to determine designated supports and 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 designated supports 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.

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 code definitions can be found in this section of the *Test Administration Manual*.

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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.
- **Homeschooled Students:** Homeschooled students may take part in the MAP Grade-Level Assessments at the discretion of the district. Homeschooled 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 homeschooled student is entered into eDIRECT, the "Homeschool" box on the Testing Codes screen must be checked. The MOSIS ID field should be left blank. Individual Student Reports containing the homeschooled student's assessment scores will be created and posted to eDIRECT. District Test Coordinators must collect contact information from the parents of homeschooled 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.

- **Designated Supports and Accommodations:** Prior to testing, be sure to consider any additional planning that may be required to administer the test using students' designated supports and/or accommodations. Designated supports/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 Tables 5 and 6 in this section for the appropriate support/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. Translators for students taking the online assessments will not have the opportunity to read and review the test before test administration. If needed, translators for students taking the Large Print, Braille, or paper-and-pencil edition of 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 5.0 for instructions regarding administering the Large Print, Braille, and paper-and-pencil editions of the tests.

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Additional guidelines for use of a scribe are located on the DESE website at http://dese.mo.gov/sites/default/files/asmt-scribing-guidelines.pdf. Refer to Tables 5 and 6 in this section for appropriate support/accommodation codes for scribing.

- **Use of a Scribe:** Students with an Individualized Education Program (IEP) or Section 504 Plan must have a scribing accommodation specified within the plan if it is to be used for writing items (short text and full-write essay item types) for the English Language Arts portion of Missouri's Grade-Level Assessments. Scribing is considered to be a designated support for all other content areas and item types.

  Scribes may be teachers, teacher aides, teacher assistants, or other school personnel who are appropriately trained and qualified. Translators for ELL students may also act as scribes. Parents, school volunteers, peer tutors, and other students may NOT act as scribes on Missouri's Grade-Level Assessments.

- **Paper-and-Pencil Test Accommodation:** See the Large Print, Braille, and Paper-and-Pencil Forms section in this manual for instructions concerning the paper-and-pencil accommodation procedures.

- **Large Print and Braille:** See the Large Print, Braille, and Paper-and-Pencil Forms section in this manual for instructions concerning Large Print and Braille procedures.

- **Students Testing Out of District:** Students receiving services in off-site placements (other districts, private agencies, correctional facilities, etc.) must be tested. They may be tested in those placements if necessary, or they may come to the school of residence if possible. The DTC from the district where the student resides must make arrangements for the student to test in the serving district/agency.

  Out-of-district students may take the online or the paper-and-pencil edition of the MAP Grade-Level Assessment. If the student takes the paper-and-pencil edition, his or her responses must be transcribed into INSIGHT. The DTC from the district of residence has several responsibilities in this process.

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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 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 5.0 of the manual.

DTCs have access to eDIRECT before the INSIGHT site opens and may securely download and securely print the MAP Grade-Level Assessments as appropriate. Print copies of the assessments will have a barcode. Barcoded printed assessments must be returned to CTB after the tests have been transcribed into the test delivery system (INSIGHT).
NOTE: Paper-and-pencil tests cannot be printed until students are available in the system on March 5th.

1.8 Tutorials and Practice Tests

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 Tutorial 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.

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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.

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. The OTTs also include a comprehensive reflection of embedded universal tools, designated supports, and accommodations. The OTTs should also be provided to students with any non-embedded universal tools, designated supports, 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. Nonaccommodated versions of the OTTs can be publicly accessed using the Google Chrome browser at https://wbte.drcedirect.com/MO/portals/mo.

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 E 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. 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.

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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 the day of 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 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 should know how to use a touchscreen (and/or stylus, if applicable). Touch interfaces are not supported on other devices for Spring 2015. 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. Item types are listed and described in Appendix A.

MAP Grade-Level Assessments are available on the following devices:

- **Desktop Computers**
- **Laptops**
- **Netbooks**
- **Chromebooks**
- **iPads**

Students should be familiar with the device on which they will be taking the assessment prior to testing.

2.2 User Roles

The District Test Coordinator (DTC) is responsible for training all School Test Coordinators (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:

- Attend all trainings provided by DESE and CTB.
- Stay abreast of all communication regarding the MAP Grade-Level Assessments.

DTCs must train all STCs, Test Examiners, and other responsible district and/or school staff.

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The DTC is responsible for updating the district's testing schedule if it changes.

- Train all STCs, Test Examiners, and other responsible district and/or school staff.
- Maintain the district's testing schedule and be prepared to provide it to DESE upon request. If the district's testing schedule changes in any way, the DTC is responsible for updating this information in eDIRECT until February 20, 2015, 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 B in this manual for instructions on how to handle student transfers.

CTB's dedicated MAP Service Line
1-800-544-9868
7:30 A.M. to 6:30 P.M. Central Time, Monday–Friday

- Communicate with CTB 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 CTB's dedicated MAP Service Line.
- Ensure the DTC's email account allows receipt of all communication from DESE's, CTB's, and DRC's email domains (@dese.mo.gov, @ctb.com, and @datarecognitioncorp.com).
- Verify with the STCs that INSIGHT has been installed and certified on all applicable workstations for the current statewide window.

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).

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School Test Coordinator Responsibilities

All STCs are responsible for the following:

- Attend all trainings provided by the DTC, DESE, and CTB.

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- Stay abreast of all communication from the DTC regarding the MAP Grade-Level Assessments.
- Train all Test Examiners 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 District Technology Coordinator (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).
- Provide login information to Test Examiners as soon as possible to allow the Test Examiners adequate time to prepare for administering the tests.
- Ensure that each Test Examiner has the following:
    - eDIRECT login information
    - Student Test Tickets for each test session
    - Classroom Activity materials
    - 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 Administration Manual*. Printed copies of the manual should be destroyed at the building level after the final district content testing window has closed.

STCs must train all Test Examiners on MAP Grade-Level Assessment procedures.

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Test Examiners must ensure that all grade-level testing materials are secure at all times. Although this manual is not considered secure, it contains links to secure test materials.

Both written and verbal discussion of specific MAP Grade-Level Assessment items breach the security and integrity of the test.

NOTE: Students may use their own calculators if the calculators meet the "permitted materials" guidelines (page 32), or the DTC may provide calculators per district practice.

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.

Test Examiner Responsibilities

All Test Examiners are responsible for the following:

- Ensure **all** grade-level testing materials are secure at all times. **Both written and verbal discussion of specific MAP Grade-Level Assessment items breach the security and integrity of the test**. Discussion between Test Examiners, proctors, translators, or any district staff regarding test items is not permitted.
- Ensure any ancillary testing materials or tools are available or provided, such as:
  - a dictionary and a thesaurus for the full-write essay portion of an ELA performance task
  - scratch and graph paper
  - calculators for the calculator-allowed portions of the mathematics assessments
  - Braille paper (if provided)
- After testing is complete
  - Check that tests have been submitted.
  - Check that tests are closed in the system.
  - Collect the Large Print, Braille, and/or paper-and-pencil materials from the students, and prepare materials for return to the STC.
  - Transcribe Large Print, Braille, and paper-and-pencil edition responses into INSIGHT.
  - Contact the STC for guidance regarding the handling of any contaminated test materials. (See Appendix C in this manual.)
  - Collect all draft, scratch, grid, graph, or Braille paper and return all used materials to the DTC/STC for secure shredding.

2.3 Test Security

Test security and ethical testing practices continue to be of PARAMOUNT 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

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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.

Preparing for computer-based testing includes determining the layout of the physical computer lab, training for the teachers and staff, and preparing the students. Although DESE does not provide specific requirements for a computer lab, the lab must be set up with test security in mind. Workstations must have adequate space between them so that students are not able to view one another's screens.

Instructional materials must be removed or covered, including, but not limited to, information that might assist students in answering questions that is displayed on bulletin boards, chalkboards or dry-erase boards, or on charts (e.g., wall charts that contain literary definitions, maps, mathematics formulas, etc.).

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-and-pencil editions of the tests must be transcribed into INSIGHT and shipped back to CTB following the procedures in Section 5.3 in this manual once testing is complete.

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 Administration Manual* is also available on the **Documents** page of eDIRECT.

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.

Large Print, Braille, and paper-and-pencil editions of the tests must be transcribed into INSIGHT and shipped back to CTB following the procedures in Section 5.3 in this manual once testing is complete.

Only this *Test Administration Manual* may be reviewed before testing, NOT the secure tests. Only translators may review secure test material prior to test administration.

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eDIRECT hosts the Missouri Assessment Portal, https://mo.drcedirect.com.

The **Documents** page of eDIRECT contains manuals, trainings, and secure administration materials. Secure materials require login to access, while non-secure materials are publicly available. To access the page, click **Documents** under the General Information menu in the upper left portion of the eDIRECT Home Page. Click the Show Documents button to display the available materials.

INSIGHT is the test engine for the MAP Grade-Level Assessments.

2.4 eDIRECT and INSIGHT

Two online systems support the MAP Grade-Level Assessments: eDIRECT and INSIGHT.

eDIRECT hosts the Missouri Assessment Portal. Through this system, Missouri educators are able to:

- Review documentation and training for the MAP Grade-Level Assessments.
- Download secure materials for administering the MAP Grade-Level Assessments.
- Download software for administering the MAP Grade-Level Assessments.
- Provide enrollment information, including orders for Large Print and Braille test books.
- View and update student data prior to testing, including indicating any accommodations or designated supports that will be used.
- Place students into test sessions and print Student Test Tickets.

Details are provided in the eDIRECT User Guide, which is available on the **Documents** page of eDIRECT.

INSIGHT is the secure browser-based test engine through which students take the MAP Grade-Level Assessments and that provides students with an engaging test experience. Technology coordinators download the INSIGHT client software to the devices that will be used for testing.

Details are provided in the DRC INSIGHT Technology User Guide, which is available on the **Documents** page of eDIRECT.

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.

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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.
- Student Test Tickets
- The resources in Tables 7 and 8

Table 7: Additional Required Resources for ELA and Mathematics

Content Area	SR, CR, and TE Items	Classroom Activity	Performance Task (PT)
ELA	• Headphones are required for the listening portion of the ELA assessment for all grade levels and for students requiring text-to-speech. • Scratch paper should be provided for note taking if necessary.	NA	• Headphones are required for some performance tasks and for students requiring text-to-speech. • Scratch paper should be provided for note taking if necessary.
Mathematics	• Headphones are required for students requiring text-to-speech and for students requiring Audio Glossaries. • Scratch paper is required for all grades. • Graph paper is also required for grades 6 and above. • An embedded calculator will be available for some mathematics items in grades 6 and above.	NA	• Headphones are required for students requiring text-to-speech. • Graph paper is also required for grades 6 and above. • Scratch paper is required for all grades. • An embedded calculator will be available for all mathematics PT items in grade 8.

Table 8: Additional Required Resources for Science

Content Area	Sessions 1 and 3	Session 2
Science	• Headphones are required for students requiring text-to-speech. • Graph paper is required. • Scratch paper is required.	• Headphones are required for students requiring text-to-speech. • Scratch paper is required.

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Permitted Materials for Accommodations, Universal Tools, and Designated Supports

- 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 full-write essay portion (Part 2) of an ELA performance task. ELL students may use an English, a non-English, and a bilingual dictionary and thesaurus as needed during Part 2 of an ELA performance task.
- 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. (This type of calculator is permitted for grades 3–5 as an accommodation only, as the assessments include no calculator-allowed items.)
  - 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.

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.

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Assessment Materials and Training for Test Examiners

- *Test Administration Manual*
- Test Examiner training provided online by DESE
- Student logins (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 graph paper
- Classroom Activity materials

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 in the boxes in bold 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 or designated support.

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" and are in boxes 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.

RECOMMENDATION: Consider printing this section to be used on the day of testing for each portion of each content area test. Remember that the SR, CR, and TE items component and PT component are considered two unique tests and, as such, adherence to the process that follows is needed when initiating both tests.

The TE should adhere strictly to the script for administering the test.

Except for single words, no test items can be read to any student for any content area, unless specified as an accommodation as listed in the Usability, Accessibility, and Accommodations Guidelines.
The TE may pronounce one word in a sentence for a student upon request.

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If students are beginning Part 2 of the ELA performance task, the TE should distribute the students' notes retained from Part 1. If students are resuming the Mathematics performance task, the TE should distribute the students' notes and grid/graph paper retained from the previous testing session of the same component.

Any time a student logs in to the testing system, the TE should follow this script. This includes logging in to complete either session of the SR, CR, and TE items, the PT, or any session of the Science Assessment.

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:

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

If students are resuming a session:

☐ **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.

☐ **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.

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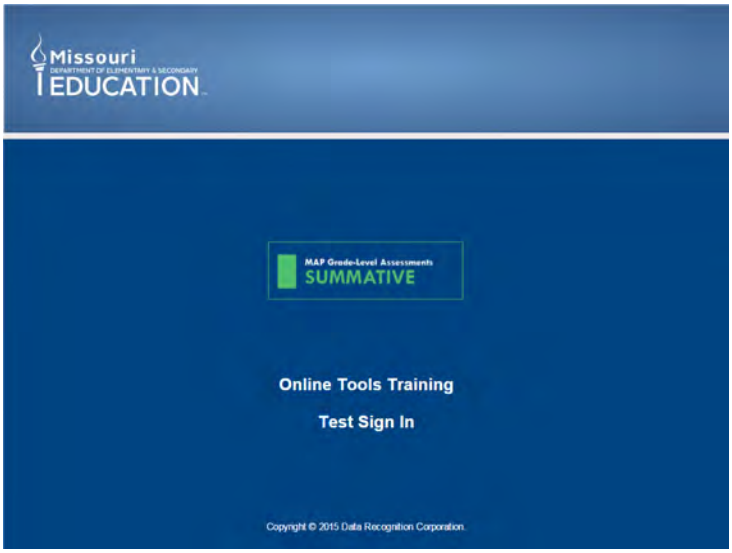
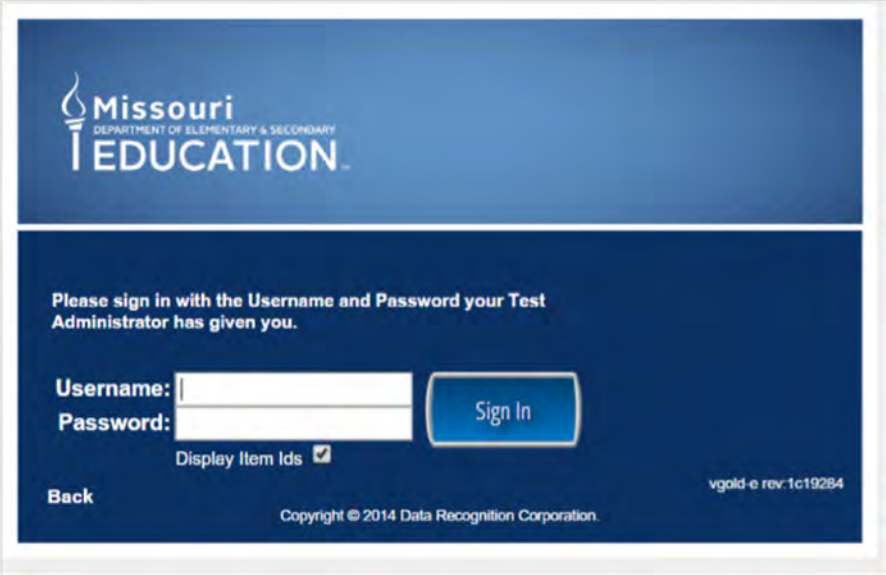
3. The TE instructs students to log in.

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."



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.

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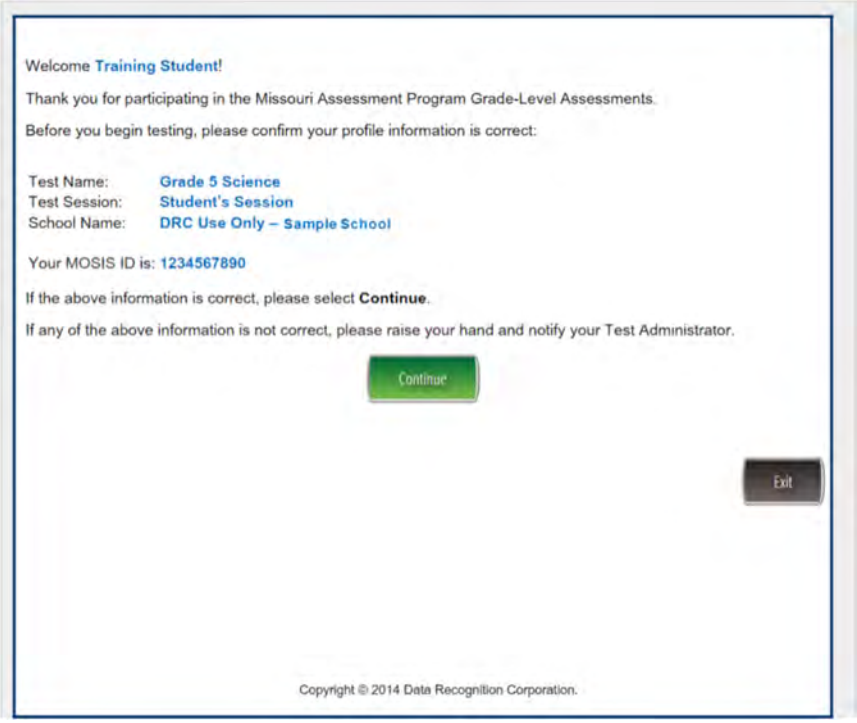
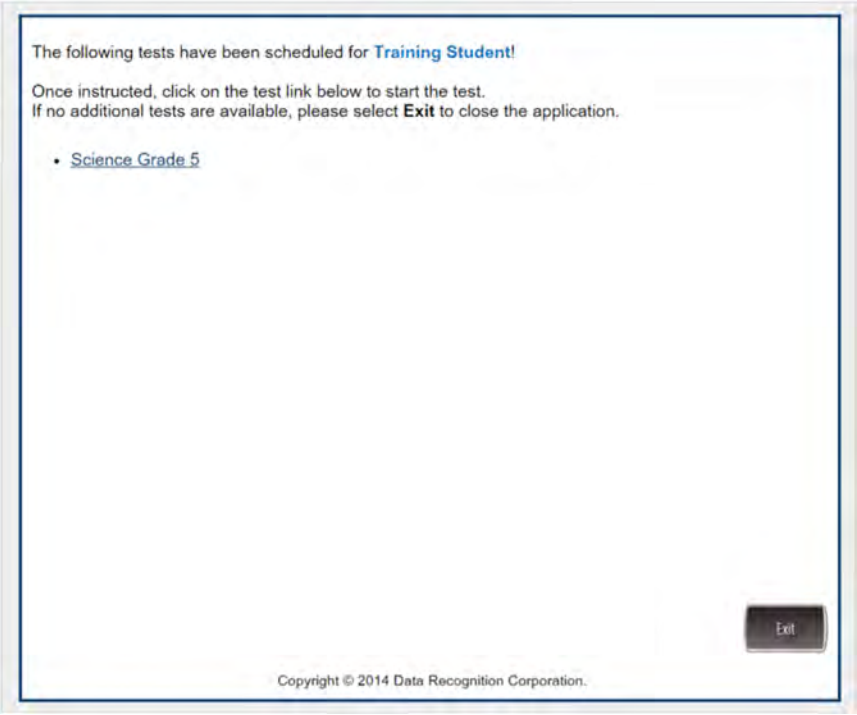
This is the Welcome screen. Please check that your name appears at the top of the screen. Check that the test name is [Test Name]. Then check that your school, MOSIS ID, and other information are correct. If everything is correct, select "Continue." If your information is not correct, please raise your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

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



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.



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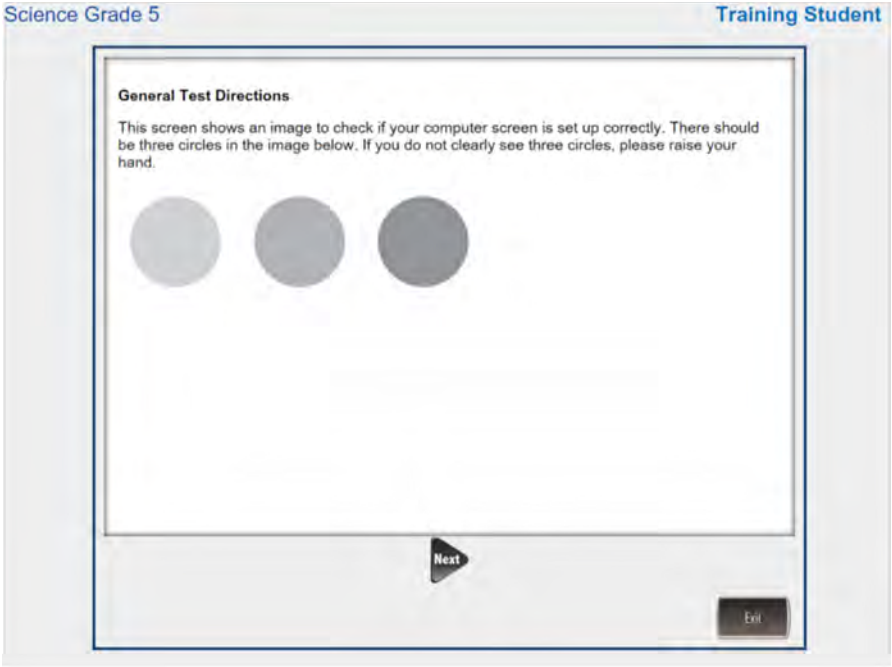
Select the NEXT arrow to continue.



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.

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.

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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.

Session 1 of a grade 6, 7, or 8 Mathematics SR, CR, and TE items component contains two segments. The first segment contains items that do not allow calculators. The second segment contains calculator-allowed items. Students may have access to physical calculators after they have submitted the first segment.

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

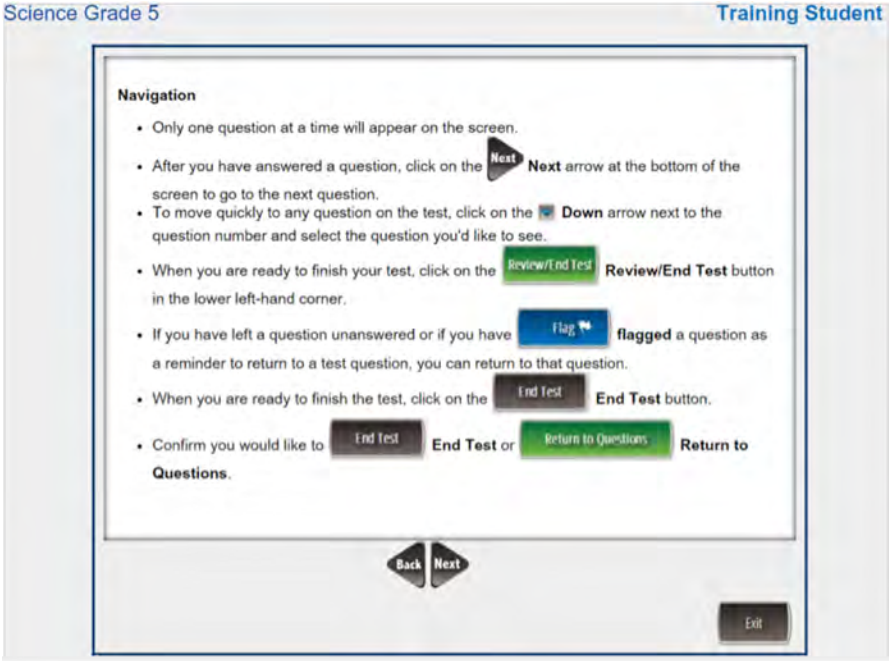
Read aloud the following paragraph if students are taking Session 1 of a grade 6, 7, or 8 Mathematics SR, CR, and TE items component.

Please keep in mind that this test is divided into two segments. When you get to the end of a segment, you will be prompted to submit your answers before moving on. Once you submit your answers and move on to the next segment, you will not be able to return to the previous segment. After you have submitted the first segment, you may begin using a calculator.

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

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.

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



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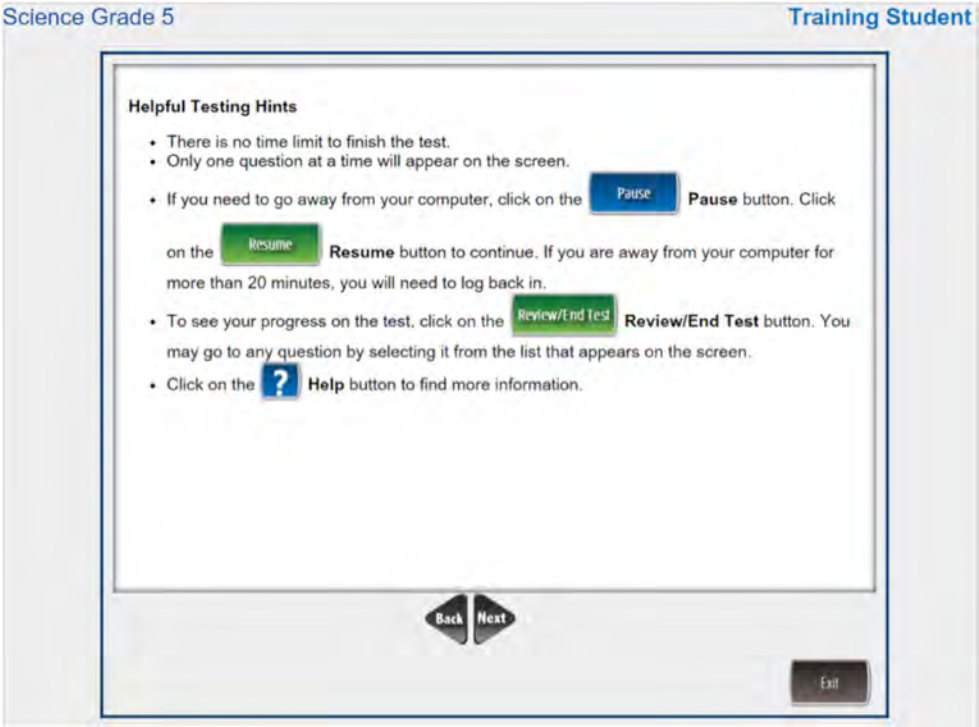

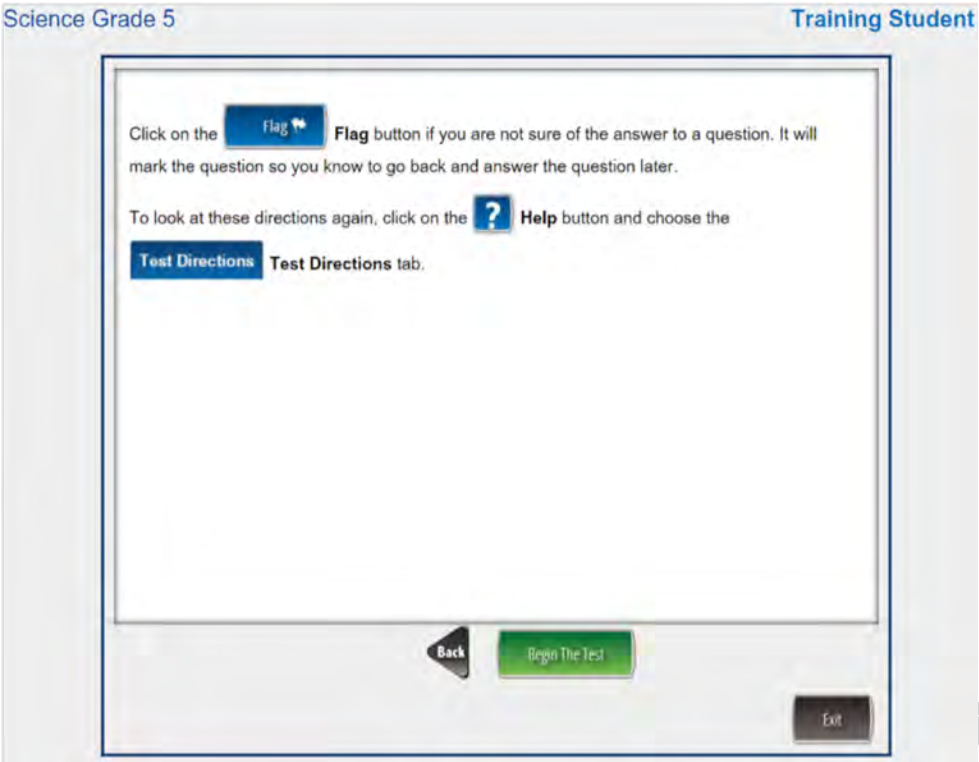

4. The TE monitors student progress.

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.

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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.

☐ **It is important that you do your best. Do you need to pause the test and take a break?**

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.

☐ **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.

5. 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:

☐ **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:

☐ **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:

☐ **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 items, or can press End Test to submit the test. 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.

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This test session is now over. When you have finished, click END TEST. I will now collect any scratch paper or other material.

TEs should collect any scratch paper (and graph paper for grades 6 and above).

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. It is recommended that the ELA PT be administered in two sessions corresponding with Part 1 and Part 2. Each part requires a separate Test Ticket. Students can be provided breaks within each part; however, once a student begins Part 2, he or she will not be able to review or revise items in Part 1. For this reason, it is recommended that students complete Part 1 in one test session; Part 2 would ideally be delivered the next school day. For the Mathematics PT, it is recommended that it be administered in one test session of 40–120 minutes.

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. Students will receive a notification when they reach the end of a segment within Session 1 of the grades 6–8 Mathematics SR, CR, and TE items component.

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.

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4.0 AFTER ONLINE TESTING

4.1 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 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 CTB'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.

4.2 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 Accountability Data at 573-522-6384.
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.

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4.3 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 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.)

4.4 Securely Destroy Materials

Federal law—the Family Educational Rights and Privacy Act—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 Administration Manual* should be destroyed after the final district content testing window has closed.
- Classroom Activity materials should be destroyed after the applicable grade and content area testing window has closed. Electronic files must be deleted.
- Large Print, Braille, and paper-and-pencil administration materials (i.e., manuals, printed pages from manuals, and glossary resource sheets) should be destroyed after the final district content testing window has closed. Electronic files must be deleted.

Scratch paper and 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 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. DO NOT keep scratch paper for future test sessions except as noted below for performance tasks (PTs).

Use of Scratch Paper on Performance Tasks

The only exception to the requirement governing the destruction of printed materials and scratch paper is when notes are used during the ELA and Mathematics PTs.

During the ELA PT, students **must** use scratch paper to take notes during Part 1 in order for those notes to be available during Part 2. During Part 2, students are not able to return to the items in Part 1 or to the notes on the embedded universal tool, Sticky Notes, taken during Part 1. TEs should tell students to write their names (or some appropriate identifying information) on each piece of scratch paper, collect the scratch paper at the completion of Part 1 of the ELA PT, and securely store it for students' use during Part 2 of the ELA PT.

Likewise, the Mathematics PT may extend beyond one test session. When this happens, TEs should tell students to write their names on the scratch paper (and graph paper), collect the paper used in the first session, and securely store it for students' use in the subsequent test session.

The retention of scratch paper is only allowed during the PTs. Following the conclusion of the PT, all scratch paper and graph paper must be collected and inventoried and then given to the School Test Coordinator to securely destroy.

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4.5 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 ELA and Mathematics are available no later than the close of business on the tenth business day after each district content area testing window closes. ISRs for Science are available July 1, 2015.

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5.0 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 2015 testing. Large Print and Braille forms may be ordered online via eDIRECT during the enrollment period January 12, 2015, to February 20, 2015. Paper-and-pencil editions can be generated from eDIRECT (after students are registered for such an accommodation). Unique identification numbers will be used to produce barcodes that will be imprinted 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 CTB for processing and storage.

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. Also, see http://dese.mo.gov/college-career-readiness/assessment/grade-level.

5.1 Before Testing

Paper-and-Pencil Materials

For special circumstances that require students to test on paper, a paper-and-pencil edition print feature 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.

For specific instructions regarding how to generate a paper-and-pencil edition, see the Test Setup section of the eDIRECT User Guide, available on the **Documents** page of eDIRECT, https://mo.drcedirect.com.

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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.

Once the PDF downloads, it is available for printing on the local network printer.

A Test Examiner may print a paper-and-pencil edition to administer an oral reading accommodation or to transcribe Braille responses into the paper-and-pencil edition test book. It must be printed for a specific student.

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.

Large Print and Braille Materials

Large Print and Braille forms can be ordered online via eDIRECT. Material orders must be placed between January 12, 2015, and February 20, 2015. DTCs should order all Large Print and Braille materials through the Enrollments tab in eDIRECT. See the eDIRECT User Guide 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 (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.

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District Test Coordinator

For every building administering a Large Print, Braille, or paper-and-pencil assessment, the DTC needs to make one copy of the Test Book Accountability Form for the STC. The Test Book Accountability Form is included in the District Test Coordinator Kit (TCK) and can be copied from Appendix D of this manual or printed from the **Documents** page of eDIRECT. Complete the following steps for each building before distributing copies to the STC:

1. Confirm the box count of the Large Print and Braille testing materials shipment from CTB (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 and printed on the Test Book Accountability Form.
4. Report any discrepancies to CTB'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 Test Book Accountability Form 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 Test Book Accountability Form, following the directions on the form.
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 CTB.
8. Follow the procedures in Appendix C of this manual for any contaminated test materials.
9. Maintain the Test Book Accountability Form during the test administration, retain a copy for school records, and return the original with the testing materials to the DTC.

Test Examiner

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.

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Duration and Timing Information

The scheduling/rules for each component of the Large Print and Braille assessments are included in Tables 9, 10, and 11. 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.

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Table 9: Assessment Sequence for Large Print Braille*, and Paper-and-Pencil—ELA

ELA	Session 1 (all grades)	Session 2 (all grades)	Classroom Activity (grades 5 and 8)	Session 3 (PT) (grades 5 and 8)
Number and Duration of Sessions	**Recommendations:** • Administer in one session. • Approximate session duration: 90–120 minutes.	**Recommendations:** • Administer in one session. • Approximate session duration: 15–30 minutes.	**Recommendations:** • Administer in one session. • Approximate session duration: 30 minutes or less. • Should occur one to three days prior to the PT. • Should NOT occur on the same day as the PT.	The Performance Task is presented in two parts. **Recommendations:** • Administer in two sessions corresponding to Parts 1 and 2 of the PT. • Approximate session durations: 35–40 minutes for Part 1 and 70–85 minutes for Part 2.
Breaks Within Sessions	A student may be provided breaks within a test session as needed.	A student may be provided breaks within a test session as needed.	NA	The PT is presented in two parts. Students can take breaks between Parts 1 and 2; however, once a student moves to Part 2, he or she will be unable to review or revise items in Part 1.
Total Duration	90–120 minutes	15–30 minutes	30 minutes or less	Approximate session durations: 35–40 minutes for Part 1 and 70–85 minutes for Part 2.

*Braille administration times will likely be longer than the times indicated here.

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Table 10: Assessment Sequence for Large Print Braille*, and Paper-and-Pencil—Mathematics

Mathematics	Session 1 (all grades)	Session 2 (all grades)	Classroom Activity (grades 5 and 8)	Session 3 (PT) (grades 5 and 8)
Number and Duration of Sessions	**Recommendations:** • Administer in one session. • Approximate session duration: 15–90 minutes.	**Recommendations:** • Administer in one session. • Approximate session duration: 15–90 minutes.	**Recommendations:** • Administer in one session. • Approximate session duration: 30 minutes. • Should occur as close to the PT as is feasible, and no more than three days prior to the PT. • MAY occur on the same day as the PT.	**Recommendations:** • Administer in one session. • Approximate session duration: 15–90 minutes.
Breaks Within Sessions	A student may be provided breaks within a test session as needed.	A student may be provided breaks within a test session as needed.	NA	A student may be provided breaks within a test session as needed.
Total Duration	15–90 minutes	15–90 minutes	Less than 30 minutes	**Recommendation:** • Student completes the PT in one day.

*Braille administration times will likely be longer than the times indicated here.

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Table 11: Assessment Sequence for Large Print Braille*, and Paper-and-Pencil—Science

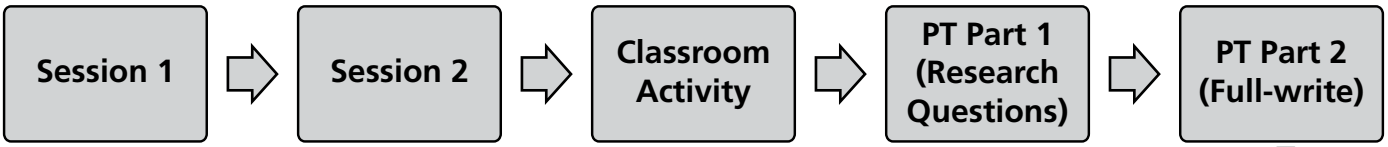
Science	Session 1	Session 2	Session 3 (Performance Event)
Number and Duration of Sessions	**Recommendations:** • Administer in one session. • Approximate session duration: 45–55 minutes.	**Recommendations:** • Administer in one session. • Approximate session duration: 20–25 minutes.	**Recommendations:** • Administer in one session. • Approximate session duration: 45–65 minutes.
Breaks Within Sessions	A student may be provided breaks within a test session as needed.	A student may be provided breaks within a test session as needed.	A student may be provided breaks within a test session as needed.
Total Duration	45–55 minutes	20–25 minutes	45–65 minutes

*Braille administration times will likely be longer than the times indicated here.

Recommended Order of Test Administration

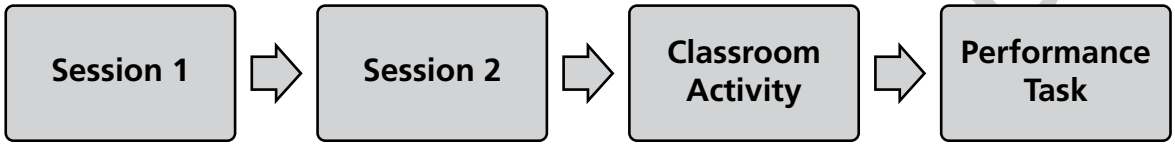
The assessments are comprised of two sessions for grades 3, 4, 6, and 7. The assessments are comprised of three sessions for each content area for grades 5 and 8. The third session for grades 5 and 8 is the performance task (PT) or performance event (PE). The ELA PT consists of two parts. The Mathematics PT and the Science PE each consist of one part. All ELA and Mathematics PTs must be preceded by the administration of a Classroom Activity.

Recommended Order of Test Administration for ELA



Students may take the non-PT portions of the test (Sessions 1 and 2) and Parts 1 and 2 of PT on separate days. For ELA, the order of administration should be Session 1 and Session 2, followed by the Classroom Activity, PT Part 1, and then PT Part 2. Districts/Schools may opt to administer in a different order if needed; however, the Classroom Activity, which is designed to introduce the PT, **must** occur prior to the PT.

Recommended Order of Test Administration for Mathematics



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Students may take the non-PT portions of the test (Sessions 1 and 2) and PT portion of the test on separate days. For mathematics, the order of administration should be Session 1 and Session 2, followed by the Classroom Activity, and then the PT. Districts/Schools may opt to administer in a different order if needed; however, the Classroom Activity, which is designed to introduce the PT, **must** occur prior to the PT.

Recommended Order of Test Administration for Science

Classroom Activity

The purpose of the Classroom Activities is to introduce students to the context of a performance task so they are not disadvantaged in demonstrating the skills the task intends to assess. Classroom Activities do not address content information; instead, they focus on vocabulary and key contextual topics. The Classroom Activity is designed to be an introduction and not an assessment.

Students with designated IEPs are allowed to have accommodations, and English learners should have access to language supports that they regularly use during classroom instruction. The information noted in Table 13 provides Test Examiners with options that may be implemented during the activity as needed for students to have appropriate access to the information included in the Classroom Activity.

Overall Strategies for the Classroom Activity are as follows:

- Test Examiners may employ the same strategies for the Classroom Activity that they use during classroom instruction to attend to the diversity of their individual student needs.
- Test Examiners can employ formative practices and professional judgment to determine whether or not individual students require additional support or scaffolding to meet the objectives of the Classroom Activity.
- Test Examiners can read and reread aloud any text included in the Classroom Activity.
- Test Examiners may employ assistive technologies that are typically available during classroom instruction.
- The additional supports and strategies described in Table 13 may be made available to any student based on the student's individual needs and are not limited to particular impairments or to students who have Individualized Education Programs (IEPs) or 504 Plans.
- Test Examiners may adjust any Classroom Activity to allow for different instructional settings (e.g., individual student make-up activity, remote learning environment).
- Test Examiners may employ more than one suggested strategy listed in Table 13 to meet individual student's needs.
- These strategies are not mutually exclusive.

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Table 13: Accessibility Guidelines for Classroom Activities

Student Need Category	Guidance for Accessibility
Visual Impairments	• Reading Materials: All materials that are required to be read by a student may be read aloud to the student. • Pictures, Figures, Drawings, and Photographs: Descriptions may be read to students. In addition, teachers can provide students with further explanation of the descriptions. These explanations may clarify the description without adding additional content. • Graphs: Further descriptions or repetition of descriptions may be read if necessary for a student. These explanations may clarify the description without adding additional content. • Venn Diagrams: Venn diagrams may be described to the student. In addition, a teacher may use a different chart, diagram format, or graphic organizer.
Reading Impairments	• Reading Materials: All materials that are required to be read by students may be read aloud to the student. • Writing Activities: All activities that require the student to write may allow for an oral response or the use of technology usually used by the student in a classroom environment.
Physical Impairments	• Kinesthetic Activities: If a student cannot participate in a kinesthetic activity, the student may be asked to describe the activity orally. • Activities Requiring Movement: Tasks such as moving around the room or coming up to the board can be modified to allow the teacher or other students to interact with the student or allow for the student to respond orally. • Writing Activities: If helpful to a student, all activities that require the student to write may allow for an oral response or the use of technology usually used by the student in a classroom environment.
Hearing Impairments	• Activities Requiring Listening: Listening activities may be presented in American Sign Language (ASL). For activities that require students to describe sounds, such as those from a thunderstorm, a sound may be described by the student to respond to how it feels and looks. • Activities Requiring Oral Responses: Oral responses may be provided via sign language or in writing.
Expressive Language Impairments	• Activities Requiring Oral Responses: Oral responses may be provided in writing, using a communication device, or any other means that the student uses to communicate.

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Table 13: Accessibility Guidelines for Classroom Activities continued

Student Need Category	Guidance for Accessibility
English Language Learners	• Reading Materials: All materials that are required to be read by students may be read aloud to the student. • Writing Activities: All activities that require the student to write may allow for an oral response. • Visual Supports: If helpful to a student, vocabulary and key contextual topics may be supplemented with visual supports. • Flexible Grouping: Teachers may administer the Classroom Activity in flexible groups based on English language proficiency. • Activities Requiring Oral Responses: Oral responses may be provided in writing. • Students may use an English, a non-English, and a bilingual dictionary and thesaurus as needed.
Separate Setting	• Group activities may be tailored to occur between a single student and his or her educator where the educator and student share discussion and work. • Activities between student(s) and an educator may be conducted online or via a telephone connection. • All student-facing information included in a Classroom Activity should be presented to students working in a separate setting.

Classroom Activities are located on the **Documents** page of eDIRECT, https://mo.drcedirect.com. Also on the **Documents** page is a lookup table indicating which Classroom Activity should be administered for the Large Print, Braille, and paper-and-pencil editions.

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 2015" from the Administration drop-down.
   b. Choose "Classroom Activities" from the Document Type drop-down.
   c. Click "Show Documents." A list of all available Classroom Activities and the lookup table will appear in the grid.

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-and-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

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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
- Blank grid/graph paper for all Science Assessments and for the Mathematics Assessments for grades 6 and above
- An English dictionary and a thesaurus for the full-write essay portion (Part 2) of an ELA performance task
- Any additional materials appropriate for the student that are noted as "Any" or "Paper" in Tables 4, 5, and 6 of this manual
- A calculator for the calculator-allowed portion of the Mathematics Assessment (Calculators must meet the guidelines below.)
    - For grade 6 Mathematics Assessments, a four-function calculator with square root and percentage functions is permitted. (This type of calculator is permitted for grades 3–5 as an accommodation only, as the assessments include no calculator-allowed items.)
    - For grades 7 and 8 Mathematics Assessments, a scientific calculator with exponents, trigonometry, and logarithmic functionalities is permitted.
    - 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.

NOTE: If students are allowed to bring cell phones into the testing room, the cell phones must be collected and kept in a central area until testing is completed.

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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:

- References to specific page numbers in the student test book may be incorrect for the Braille version. To supply the correct page numbers and other references, Test Examiners should review—prior to testing—all test materials that accompany the Braille test book.
- The student's name, Test Examiners, school, and system 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-and-Pencil Editions

The specific scripts for administering the Large Print, Braille, and paper-and-pencil editions of each assessment are located on the **Documents** page of eDIRECT, https://mo.drcedirect.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 2015" 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-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

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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
   d. Non-Accommodation Special Case—Paper-Based Assessment
2. In eDIRECT Test Setup, assign the student to a test session and print their 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 test machine that has the INSIGHT client software installed and use the student's Test Ticket to log into 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 CTB

All secure Large Print, Braille, and paper-and-pencil test books must be returned to CTB via FedEx. Shipping Return labels are provided in the District Test Coordinator Kit (TCK). If the DTC does not have shipping labels or shipping boxes, please contact the MAP Service Line at 1-800-544-9868.

CTB 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.

NOTE: DTCs MUST use CTB boxes to return Large Print, Braille, and Paper-and-Pencil test books. 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 call for boxes and shipping labels to return the paper-and-pencil test books.

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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 CTB boxes with aqua shading. Reuse the boxes in which the Large Print and Braille testing materials arrived. If the DTC does not have CTB boxes or needs additional boxes, please contact the MAP Service Line at 1-800-544-9868.

   Prior to packing test materials, securely tape the bottom of each box to prevent breakage. Reinforce all bottom seams, following an "H" pattern.

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 **white shipping labels** to the boxes. Labels should be placed on the side of the box in the white space marked "PLACE CTB BARCODE RETURN LABEL HERE." Do not place the label on the top of the box.
   - **Number each set of boxes separately for each school** (e.g., "1 of X," "2 of X," etc., where "X" is the total number of boxes per school).
   - Complete all of the information requested on the labels.

   Return shipping labels are scannable and cannot be photocopied. If more return shipping labels are needed, contact the CTB dedicated MAP Service Line at 1-800-544-9868.

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 Administration Manual*.

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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 CTB:

- *Test Administration Manuals*
- Classroom Activity materials (must be **securely** destroyed by district)
- test administration scripts and glossary resource sheets 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 Appendix C in this manual)
- unused return shipping labels
- Test Book Accountability forms (keep for your records)

Check all materials from the STCs to ensure they have correctly followed the procedure 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 with packing tape to reinforce the top and side seams of the boxes. This will prevent damage to the boxes and subsequent loss of test materials.

3. **Schedule Testing Material Pickup**

   The DTC will schedule the pickup of MAP Grade-Level Assessment testing materials through a secure ctb.com pickup site. Contact CTB via the ctb.com site no later than May 26, 2015, 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 May 29, 2015.

   Test materials must be returned via the secure ctb.com pickup site in order to ensure secure tracking of materials.

   Materials must be returned in a single shipment unless prior arrangements are made with CTB.

   Instructions for scheduling the pickup of MAP Grade-Level Assessment testing materials:

   1. Go to http://programs.ctb.com/MAP.
   2. Enter your district number, contact name, and email address.
   3. Verify the pickup address and enter the number of boxes to be picked up.
   4. Click submit.

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5. Print the FedEx shipping PDF label from the Confirmation page on standard 8.5 x 11 paper.
6. Fold the shipping label in half and securely tape it to your box in the location marked Carrier label. You will receive a pickup confirmation email. The email contains the pickup confirmation number and FedEx phone number.

If you have any questions regarding the pickup of materials, call FedEx at the number provided on your confirmation email for assistance.

Store boxes in a protected area while waiting for FedEx pickup.

4. Fax Test Book Accountability Forms to CTB

After you have confirmed that you have received completed, signed Test Book Accountability Forms from each school, fax them to CTB at the fax number listed on the form.

5. Questions

For answers to any questions regarding the return procedures described in this manual, call the CTB dedicated MAP Service Line at 1-800-544-9868.

Securely Destroy Other Materials

See Section 4.4 and Appendix C in this manual for details regarding the destruction of materials not returned to CTB.

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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 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/drop objects into table cells.
ELA Only	Two-part multiple choice, with evidence-based 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.
	Essay	Respond via keyboard entry using text formatting buttons. This item type offers the ability to edit previously entered text.

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Content Area	Type of Item	Brief Description of How to Respond
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.

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Appendix B: Handling Student Transfers and Changes in Testing Status

Students Who Move Before or During the MAP Grade-Level Assessment Administration

If…	*then…*
a student needs to be moved into a different test session in the same school:	Edit the student's profile by moving the student to a new test session.*
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:	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.*

*See the eDIRECT User Guide, available on the **Documents** page of eDIRECT, https://mo.drcedirect.com.

Please contact the CTB dedicated MAP Service Line at 1-800-544-9868 if there are any questions regarding moving a student within a school or district.

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Appendix C: 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. A Missing Test Materials Form must be completed and faxed to CTB and DESE to account for the contaminated test materials. The form may be accessed on the **Documents** page of eDIRECT, https://mo.drcedirect.com, or on the DESE website at http://dese.mo.gov/college-career-readiness/assessment/grade-level.

The STC should provide the DTC with the following information for inclusion on the form:

- an explanation of what happened to the test book
- security barcode number (write or cut-and-paste it onto the letter). This is the code beginning with two letters, followed by six numbers, printed vertically below the barcode on the front book cover. Be sure to use this number and not the number from the student barcode label.
- school name
- school code
- student's name
- grade level
- test book edition (Large Print, Braille, or paper-and-pencil)

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MAP 2015 GRADE-LEVEL ASSESSMENTS – TEST BOOK ACCOUNTABILITY FORM

District Name: _____ **District #:** _____

School Name: _____ **School #:** _____

This form provides start-to-finish accountability for the Grade-Level test materials assigned to your school.

School Coordinator:

1. Complete the table below, providing any additional information on the back as required. Be sure to sign at the bottom of the page.
2. Retain a copy of this form for your own records, along with a photocopy of the security barcode ranges printed on the test book packages and printed PDF tests.
3. Return the completed form to your District Coordinator.

District Coordinator:

4. Complete a copy of this form for District Overage, providing any additional information on the back as required.
5. Fax the forms for all schools in your district to CTB - **Fax # 866-405-4086**. CTB may contact you to clarify any discrepancies on your schools' forms.

	TEST BOOKS RECEIVED or PRINTED						
		GR 3	**GR 4**	**GR 5**	**GR 6**	**GR 7**	**GR 8**
(1)	Number of LP/Braille test books listed on packing list	+	+	+	+	+	+
(2)	LP/Braille test books missing from shipment (Fill out A on back)	–	–	–	–	–	–
(3)	Extra LP/Braille books received in shipment (Fill out B on back)	+	+	+	+	+	+
(4)	Additional LP/Braille books from district office (Fill out C on back)	+	+	+	+	+	+
(5)	Printed PDF tests (Fill out D on back)	+	+	+	+	+	+
(6)	**Total test books received and printed (Add lines 1, 3, 4 and 5; then subtract line 2)**						
	TEST BOOKS and PRINTED PDF TESTS RETURNED						
		GR 3	**GR 4**	**GR 5**	**GR 6**	**GR 7**	**GR 8**
(7)	Number of LP/Braille tests administered	+	+	+	+	+	+
(8)	Number of unused LP/Braille test books	+	+	+	+	+	+
(9)	Number of printed PDF tests	+	+	+	+	+	+
(10)	**Total test books returned and printed (Sum of lines 7–9)**						
	TEST BOOKS and PRINTED PDF TESTS NOT RETURNED						
		GR 3	**GR 4**	**GR 5**	**GR 6**	**GR 7**	**GR 8**
(11)	LP/ Braille test books securely destroyed (Fill out E on back)	+	+	+	+	+	+
(12)	LP/Braille test books unaccounted for (Fill out E on back)	+	+	+	+	+	+
(13)	Printed PDF tests unaccounted for (Fill out E on back)	+	+	+	+	+	+
(14)	**Total test books and printed PDF tests not returned (Sum of lines 11–13)**						

I confirm that Line 6 = Line 10 + Line 14.

School Test Coordinator: _____ Date Faxed: _____

Print Name: _____

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A. Security barcode numbers of LP/Braille test books missing from shipment	B. Security barcode numbers of extra LP/Braille test books (not on packing list) received in shipment	C. Security barcode numbers of additional LP/Braille test books from district office

D. Security barcode numbers of printed PDF tests	E. Security barcode numbers of lost or securely destroyed LP/Braille test books or printed PDF tests	Explanation

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Appendix E: 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 Shortcut		
	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
Selects the highlighted test question from the Review/End Test page Selects the Sign In button after a Username and Password are entered Selects Continue from the Student Verification Page Selects the Go To Page number within the quick navigation drop-down menu	Enter	N/A	N/A
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

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Appendix E: INSIGHT Keyboard Shortcuts and Icons continued

INSIGHT Function	Keyboard Shortcut		
	Desktop	Chromebook	iPad
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
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	N/A

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Appendix E: INSIGHT Keyboard Shortcuts and Icons continued

INSIGHT Calculator Function	Keyboard Shortcut		
	Desktop	Chromebook	iPad
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	
Works as a delete function on all calculators	Delete	N/A	
Works as a shortcut to take a number to a specific power on the Scientific Calculator/ Graphing Tool	^	^	
Works as the negate key on the Basic Calculator	,	,	

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INSIGHT Audio (TTS) Function	Keyboard Shortcut		
	Desktop	Chromebook	iPad
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
Writing Tools			
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
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

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Appendix E: INSIGHT Keyboard Shortcuts and Icons continued

Writing Tools	Keyboard Shortcut		
	Desktop	Chromebook	iPad
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 + Up 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

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Tool Icon	Tool Name	Tool Definition
	Pointer	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. The **Pointer** will change to a pencil head when moved over a multiple-choice answer bubble. Use it to select your answer. 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.
	Cross-Off	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.
	Highlighter	The **Highlighter** tool is used to highlight important information.
	Sticky Note	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.
	Magnifier	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.
Line Guide	**Line Guide**	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.
	Measurement Tools	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.

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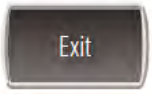
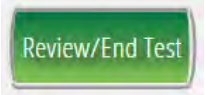
Appendix E: INSIGHT Keyboard Shortcuts and Icons continued

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**	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. Click on the **Next** button to move forward to the next question or page. Click on the **Back** button to move backward to the previous question or page.
	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**	The **Exit** button appears on the Pause Page. Click on **Exit** to close the test. WARNING: If a student exits a test using this button, the test remains incomplete. The student must log in again to complete the test.
	Flag	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. To unflag a test question, use the **Pointer** tool to click the button again.
	**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.

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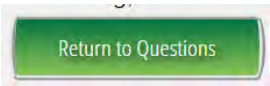
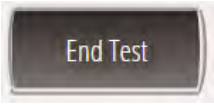
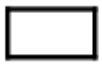
Appendix E: INSIGHT Keyboard Shortcuts and Icons continued

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 (text has been entered into the response box)
	Flagged item
S	Scenario indicator for Science; example (S1)
P	Passage indicator for ELA; example (P1)

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CTB/McGraw-Hill
20 Ryan Ranch Road
Monterey, California 93940-5703
800.538.9547 | www.ctb.com

Appendix B:
Item Analysis Results for Transcribed Forms and Mathematics Spanish Version Forms

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Table B1: Item Statistics Form CT1: English Language Arts/Literacy Grade 3

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT1	1	1	0.61	0.36	0.96	206
CT1	1	2	0.54	0.20	0.96	206
CT1	1	3	0.17	0.35	0.00	206
CT1	1	4	0.58	0.37	1.44	205
CT1	1	5	0.32	0.16	0.96	206
CT1	1	6	0.49	0.43	0.96	206
CT1	1	7	0.11	0.32	0.00	206
CT1	1	8	0.22	0.49	0.00	206
CT1	1	9	0.38	0.38	0.96	206
CT1	1	10	0.61	0.53	1.92	204
CT1	1	11	0.14	0.43	0.97	204
CT1	1	12	0.37	0.44	2.40	203
CT1	1	13	0.25	0.43	0.49	205
CT1	1	14	0.32	0.29	2.40	203
CT1	1	15	0.22	0.50	5.83	170
CT1	1	16	0.46	0.37	1.92	204
CT1	1	18	0.55	0.49	2.40	203
CT1	1	19	0.38	0.45	2.88	202
CT1	1	20	0.16	0.30	6.80	168
CT1	1	21	0.54	0.27	2.88	202
CT1	1	22	0.27	0.23	3.37	201
CT1	1	23	0.33	0.39	0.49	205
CT1	1	24	0.53	0.37	1.92	204
CT1	1	25	0.33	0.36	0.49	205
CT1	1	26	0.42	0.22	2.88	202
CT1	1	27	0.34	0.45	0.49	205
CT1	1	28	0.45	0.25	1.92	204
CT1	1	29	0.40	0.13	1.44	205
CT1	1	30	0.16	0.51	5.34	174
CT1	1	31	0.34	0.35	2.40	203
CT1	1	32	0.37	0.24	2.88	202
CT1	1	33	0.33	0.52	1.46	203
CT1	1	34	0.22	0.46	0.97	204
CT1	1	35	0.49	0.34	1.92	204
CT1	1	36	0.47	0.44	2.40	203

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Table B1: Item Statistics Form CT1: ELA English Language Arts/Literacy 3 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT1	1	37	0.52	0.40	2.40	203
CT1	1	38	0.43	0.32	2.40	203
CT1	2	1	0.29	0.31	0.96	206
CT1	2	2	0.19	0.25	0.00	206
CT1	2	3	0.25	0.39	0.49	205
CT1	2	4	0.31	0.52	0.00	206
CT1	2	5	0.45	0.34	0.96	206
CT1	2	6	0.36	0.28	0.96	206
CT1	2	7	0.24	0.24	0.00	206
CT1	2	8	0.23	0.37	0.49	205
CT1	2	9	0.44	0.21	1.44	205

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Table B2: Item Statistics Form CT1: English Language Arts/Literacy Grade 4

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT1	1	1	0.44	0.23	0.00	225
CT1	1	2	0.22	0.49	0.44	224
CT1	1	3	0.22	0.31	0.89	223
CT1	1	4	0.28	0.04	2.17	225
CT1	1	5	0.40	0.05	2.17	225
CT1	1	6	0.28	0.12	3.04	223
CT1	1	7	0.18	0.19	0.89	223
CT1	1	8	0.37	0.25	2.17	225
CT1	1	9	0.17	0.53	0.89	223
CT1	1	10	0.14	0.45	3.11	214
CT1	1	11	0.51	0.35	2.61	224
CT1	1	12	0.46	0.47	2.17	225
CT1	1	13	0.55	0.52	2.17	225
CT1	1	14	0.58	0.36	2.61	224
CT1	1	15	0.40	0.34	2.61	224
CT1	1	16	0.19	0.52	2.22	214
CT1	1	17	0.14	0.33	1.33	222
CT1	1	18	0.22	-0.02	3.04	223
CT1	1	19	0.63	0.51	2.61	224
CT1	1	20	0.16	0.21	0.44	224
CT1	1	21	0.31	0.28	2.61	224
CT1	1	22	0.33	0.26	3.04	223
CT1	1	23	0.38	0.32	2.61	224
CT1	1	24	0.61	0.50	5.22	218
CT1	1	25	0.48	0.16	2.61	224
CT1	1	26	0.52	0.32	3.04	223
CT1	1	27	0.43	0.07	2.61	224
CT1	1	28	0.66	0.21	2.61	224
CT1	1	29	0.23	0.14	3.04	223
CT1	1	30	0.22	0.55	3.11	202
CT1	1	31	0.37	0.34	2.61	224
CT1	1	32	0.23	0.20	3.04	223
CT1	1	33	0.47	0.27	2.61	224
CT1	1	34	0.48	0.42	2.61	224
CT1	1	35	0.37	0.34	3.04	223

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Table B2: Item Statistics Form CT1: English Language Arts/Literacy Grade 4 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT1	1	36	0.49	0.33	2.61	224
CT1	1	37	0.30	0.37	3.04	223
CT1	2	1	0.19	0.07	0.89	223
CT1	2	2	0.21	0.24	3.48	222
CT1	2	3	0.35	0.25	1.33	222
CT1	2	4	0.43	0.26	3.48	222
CT1	2	5	0.36	0.48	1.33	222
CT1	2	6	0.56	0.46	1.78	221
CT1	2	7	0.48	0.40	3.04	223
CT1	2	8	0.22	0.21	3.04	223
CT1	2	9	0.12	0.22	1.33	222

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Table B3: Item Statistics Form CT1PT1: English Language Arts/Literacy Grade 5

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT1	1	1	0.38	0.50	0.43	233
CT1	1	2	0.30	0.25	2.53	231
CT1	1	3	0.41	0.23	1.69	233
CT1	1	4	0.14	0.22	0.85	232
CT1	1	5	0.07	0.22	1.71	230
CT1	1	6	0.44	0.40	4.64	226
CT1	1	7	0.27	0.25	3.38	229
CT1	1	9	0.13	0.31	1.28	231
CT1	1	10	0.13	0.53	9.83	204
CT1	1	11	0.52	0.58	2.53	231
CT1	1	12	0.55	0.49	3.38	229
CT1	1	13	0.36	0.18	3.38	229
CT1	1	14	0.15	0.39	1.71	230
CT1	1	15	0.58	0.46	2.11	232
CT1	1	16	0.31	0.42	0.85	232
CT1	1	17	0.31	0.10	2.53	231
CT1	1	18	0.19	0.39	0.85	232
CT1	1	19	0.21	0.36	1.28	231
CT1	1	20	0.24	0.63	6.84	204
CT1	1	21	0.70	0.51	4.64	226
CT1	1	22	0.63	0.40	2.11	232
CT1	1	23	0.67	0.48	2.11	232
CT1	1	24	0.59	0.27	2.53	231
CT1	1	25	0.44	0.30	3.80	228
CT1	1	26	0.32	0.58	2.56	228
CT1	1	27	0.13	0.24	1.28	231
CT1	1	28	0.04	0.25	1.71	230
CT1	1	29	0.40	0.41	3.38	229
CT1	1	30	0.17	0.55	5.13	215
CT1	1	31	0.51	0.38	3.38	229
CT1	1	32	0.43	0.43	2.53	231
CT1	1	33	0.48	0.47	3.38	229
CT1	1	34	0.33	0.28	2.95	230
CT1	1	35	0.28	0.26	3.38	229
CT1	1	36	0.26	0.05	2.95	230

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Table B3: Item Statistics Form CT1PT1: English Language Arts/Literacy Grade 5 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT1	1	37	0.15	0.41	1.71	230
CT1	1	38	0.13	0.42	1.71	230
CT1	2	1	0.48	0.47	4.29	223
CT1	2	2	0.21	0.31	2.15	228
CT1	2	3	0.24	0.18	2.95	230
CT1	2	4	0.40	0.36	2.95	230
CT1	2	5	0.31	0.47	3.38	229
CT1	2	6	0.21	0.23	1.29	230
CT1	2	7	0.53	0.46	2.95	230
CT1	2	8	0.53	0.35	2.95	230
CT1	2	9	0.28	0.50	3.00	226
PT1	1	1	0.21	0.56	4.29	215
PT1	1	2	0.11	0.45	6.87	210
PT1	1	3	0.05	0.26	5.58	220
PT1	2	1	0.37	0.54	3.90	185

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Table B4: Item Statistics Form CT1: English Language Arts/Literacy Grade 6

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT1	1	1	0.59	0.44	0.50	200
CT1	1	2	0.37	0.35	1.00	199
CT1	1	3	0.17	0.37	0.00	200
CT1	1	4	0.42	0.32	1.99	197
CT1	1	5	0.21	0.44	5.50	177
CT1	1	6	0.10	0.18	0.50	199
CT1	1	7	0.43	0.16	0.50	200
CT1	1	8	0.12	0.24	1.00	198
CT1	1	9	0.41	0.35	1.49	198
CT1	1	10	0.51	0.38	1.00	199
CT1	1	11	0.27	0.48	0.50	199
CT1	1	12	0.69	0.47	1.49	198
CT1	1	13	0.42	0.39	1.49	198
CT1	1	14	0.33	0.24	1.49	198
CT1	1	15	0.44	0.36	1.00	199
CT1	1	16	0.39	0.22	1.49	198
CT1	1	17	0.51	0.47	1.00	199
CT1	1	18	0.34	0.44	0.00	200
CT1	1	19	0.09	0.07	0.00	200
CT1	1	20	0.14	0.25	0.50	199
CT1	1	21	0.17	0.52	8.50	168
CT1	1	22	0.62	0.39	1.49	198
CT1	1	23	0.53	0.35	1.99	197
CT1	1	24	0.44	0.47	1.00	199
CT1	1	25	0.44	0.48	1.99	197
CT1	1	26	0.46	0.39	1.00	199
CT1	1	27	0.13	0.42	2.50	195
CT1	1	28	0.61	0.34	2.49	196
CT1	1	29	0.29	0.41	0.00	200
CT1	1	30	0.37	0.16	0.50	200
CT1	1	31	0.17	0.42	8.00	177
CT1	1	32	0.50	0.45	1.99	197
CT1	1	33	0.31	0.23	1.49	198
CT1	1	34	0.22	0.52	0.00	200
CT1	1	35	0.38	0.26	1.00	199

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Table B4: Item Statistics Form CT1: English Language Arts/Literacy A Grade 6 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT1	1	36	0.24	0.52	1.00	198
CT1	1	37	0.40	0.09	1.49	198
CT1	1	38	0.49	0.25	1.49	198
CT1	1	39	0.36	0.58	1.50	197
CT1	2	1	0.53	0.21	0.00	201
CT1	2	3	0.13	0.39	0.00	201
CT1	2	4	0.28	0.33	3.48	194
CT1	2	5	0.39	0.16	0.50	200
CT1	2	6	0.51	0.31	1.49	198
CT1	2	7	0.52	0.37	0.50	200
CT1	2	8	0.36	0.49	0.00	201
CT1	2	9	0.47	0.41	1.00	199

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Table B5: Item Statistics Form CT1: English Language Arts/Literacy Grade 7

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT1	1	1	0.35	0.53	0.51	197
CT1	1	2	0.70	0.31	0.51	197
CT1	1	3	0.16	0.16	1.52	195
CT1	1	4	0.38	0.50	1.52	195
CT1	1	5	0.31	0.34	1.52	195
CT1	1	6	0.59	0.44	1.52	195
CT1	1	7	0.28	0.52	1.52	195
CT1	1	8	0.53	0.38	1.52	195
CT1	1	9	0.37	0.48	2.02	194
CT1	1	10	0.15	0.28	2.02	194
CT1	1	11	0.21	0.47	2.53	193
CT1	1	12	0.23	0.40	7.07	181
CT1	1	13	0.42	0.17	2.02	194
CT1	1	14	0.69	0.50	2.53	193
CT1	1	15	0.29	0.27	2.53	193
CT1	1	16	0.38	0.34	2.53	193
CT1	1	17	0.46	0.35	2.53	193
CT1	1	18	0.44	0.41	2.53	193
CT1	1	19	0.18	0.36	2.02	194
CT1	1	21	0.26	0.60	8.59	179
CT1	1	22	0.18	0.41	3.03	192
CT1	1	23	0.36	0.23	2.53	193
CT1	1	24	0.35	0.50	2.02	194
CT1	1	25	0.21	0.30	3.03	192
CT1	1	26	0.32	0.47	2.02	194
CT1	1	27	0.43	0.35	4.55	189
CT1	1	28	0.22	0.26	2.02	194
CT1	1	29	0.11	0.30	2.02	194
CT1	1	30	0.12	0.20	2.02	194
CT1	1	31	0.35	0.44	8.59	171
CT1	1	32	0.37	0.20	3.54	191
CT1	1	33	0.38	0.36	3.03	192
CT1	1	34	0.04	0.19	3.03	192
CT1	1	35	0.48	0.34	3.03	192
CT1	1	36	0.12	0.47	2.53	193

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Table B5: Item Statistics Form CT1: English Language Arts/Literacy Grade 7 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT1	1	37	0.20	0.11	3.54	191
CT1	1	38	0.36	0.06	2.53	193
CT1	1	39	0.31	0.21	3.54	191
CT1	2	1	0.29	0.13	3.03	192
CT1	2	2	0.29	0.44	1.03	192
CT1	2	3	0.19	0.52	1.55	191
CT1	2	4	0.53	0.37	3.03	192
CT1	2	5	0.64	0.33	7.73	179
CT1	2	6	0.32	0.51	1.03	192
CT1	2	7	0.24	0.30	1.03	192
CT1	2	8	0.54	0.50	3.54	191
CT1	2	9	0.40	0.52	1.03	192

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Table B6: Item Statistics Form CT1PT1: English Language Arts/Literacy Grade 8

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT1	1	1	0.50	0.43	0.00	226
CT1	1	2	0.26	0.46	0.44	225
CT1	1	3	0.29	0.42	0.88	224
CT1	1	4	0.48	0.27	0.00	226
CT1	1	5	0.14	0.43	0.88	224
CT1	1	6	0.19	0.58	8.41	197
CT1	1	7	0.66	0.42	2.21	221
CT1	1	8	0.52	0.37	2.21	221
CT1	1	9	0.54	0.35	2.21	221
CT1	1	10	0.27	0.38	1.77	222
CT1	1	11	0.49	0.50	2.21	221
CT1	1	12	0.18	0.50	1.77	222
CT1	1	13	0.51	0.34	2.65	220
CT1	1	14	0.27	0.52	2.21	221
CT1	1	15	0.27	0.19	3.10	219
CT1	1	16	0.17	0.62	12.83	190
CT1	1	17	0.42	0.19	3.54	218
CT1	1	18	0.47	0.27	3.10	219
CT1	1	19	0.53	0.42	2.21	221
CT1	1	20	0.11	0.35	2.21	221
CT1	1	21	0.14	0.47	3.10	219
CT1	1	22	0.63	0.29	3.10	219
CT1	1	23	0.48	0.43	2.65	220
CT1	1	24	0.27	0.18	2.21	221
CT1	1	25	0.14	0.39	3.10	219
CT1	1	26	0.23	0.40	2.21	221
CT1	1	27	0.37	0.50	10.62	197
CT1	1	28	0.16	0.39	3.54	218
CT1	1	29	0.44	0.34	3.98	217
CT1	1	30	0.82	0.38	2.65	220
CT1	1	31	0.41	0.34	1.77	222
CT1	1	32	0.46	0.48	1.77	222
CT1	1	33	0.35	0.27	2.21	221
CT1	1	34	0.26	0.16	2.21	221
CT1	1	35	0.54	0.43	2.65	220

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Table B6: Item Statistics Form CT1PT1: English Language Arts/Literacy Grade 8 (cont.)

English Language Arts/Literacy						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT1	1	36	0.27	0.49	2.21	221
CT1	1	37	0.43	0.46	2.21	221
CT1	1	38	0.35	0.31	1.77	222
CT1	1	39	0.33	0.18	2.21	221
CT1	2	1	0.24	0.19	2.21	221
CT1	2	2	0.45	0.36	2.21	221
CT1	2	3	0.35	0.14	3.10	219
CT1	2	4	0.34	0.29	2.65	220
CT1	2	5	0.34	0.45	3.10	219
CT1	2	6	0.13	0.35	0.90	221
CT1	2	7	0.46	0.31	2.65	220
CT1	2	8	0.38	0.21	3.10	219
CT1	2	9	0.14	0.36	0.90	221
PT1	1	1	0.18	0.48	8.60	199
PT1	1	3	0.04	0.15	4.98	210
PT1	2	1	0.37	0.62	10.91	165

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Table B7: Item Statistics Spanish Version Form CS1: Mathematics Grade 3

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CS1	1	1	0.85	0.17	0.00	47
CS1	1	2	0.49	0.51	0.00	47
CS1	1	3	0.28	0.36	0.00	47
CS1	1	4	0.09	0.39	0.00	47
CS1	1	5	0.79	0.42	0.00	47
CS1	1	6	0.15	0.32	0.00	47
CS1	1	7	0.53	0.55	0.00	47
CS1	1	8	0.43	0.45	0.00	47
CS1	1	9	0.21	0.35	0.00	47
CS1	1	10	0.43	0.46	0.00	47
CS1	1	11	0.79	0.34	0.00	47
CS1	1	12	0.02	-0.15	0.00	47
CS1	1	13	0.02	0.34	0.00	47
CS1	1	14	0.30	0.56	0.00	47
CS1	1	15	0.28	0.36	0.00	47
CS1	2	1	0.47	0.63	0.00	47
CS1	2	2	0.68	0.41	0.00	47
CS1	2	3	0.32	0.53	0.00	47
CS1	2	4	0.09	0.39	0.00	47
CS1	2	5	0.89	0.40	0.00	47
CS1	2	6	0.38	0.29	0.00	47
CS1	2	7	0.64	0.58	0.00	47
CS1	2	8	0.26	0.28	0.00	47
CS1	2	9	0.51	0.36	0.00	47
CS1	2	10	0.17	0.59	0.00	47
CS1	2	11	0.28	0.46	0.00	47
CS1	2	12	0.28	0.15	2.13	46
CS1	2	13	0.17	0.42	0.00	47
CS1	2	14	0.40	0.68	0.00	47
CS1	2	15	0.70	0.02	0.00	47
CS1	2	16	0.32	0.79	0.00	47

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Table B7: Item Statistics Form CT1: Mathematics Grade 3 (cont.)

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT1	1	1	0.82	0.27	2.04	240
CT1	1	2	0.61	0.26	0.00	241
CT1	1	3	0.60	0.47	2.86	238
CT1	1	4	0.51	0.32	0.41	240
CT1	1	5	0.60	0.55	0.83	236
CT1	1	6	0.44	0.46	2.49	235
CT1	1	7	0.42	0.52	2.49	235
CT1	1	8	0.30	0.16	2.45	239
CT1	1	9	0.61	0.42	1.63	241
CT1	1	10	0.45	0.14	2.04	240
CT1	1	11	0.09	0.11	0.00	241
CT1	1	12	0.04	0.25	0.83	238
CT1	1	13	0.56	0.51	1.24	237
CT1	1	14	0.54	0.52	0.83	239
CT1	1	15	0.09	0.28	0.83	239
CT1	1	16	0.64	0.42	2.45	239
CT1	1	17	0.58	0.46	2.86	238
CT1	1	18	0.10	0.27	0.83	239
CT1	2	1	0.45	0.58	1.66	237
CT1	2	2	0.56	0.51	1.66	237
CT1	2	3	0.34	0.57	1.66	237
CT1	2	4	0.30	0.31	2.45	239
CT1	2	5	0.58	0.30	2.04	240
CT1	2	6	0.32	0.17	2.04	240
CT1	2	7	0.67	0.47	0.83	239
CT1	2	8	0.61	0.56	2.07	236
CT1	2	9	0.53	0.61	2.07	236
CT1	2	10	0.60	0.41	2.04	240
CT1	2	11	0.16	0.13	1.63	241
CT1	2	12	0.15	0.33	0.83	239
CT1	2	13	0.24	0.17	0.00	241
CT1	2	14	0.75	0.60	0.00	241
CT1	2	15	0.59	0.44	4.98	229
CT1	2	16	0.14	0.25	1.24	238
CT1	2	17	0.67	0.30	6.22	226

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Table B8: Item Statistics Form CS1: Mathematics Grade 4

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CS1	1	1	0.61	0.56	0.00	46
CS1	1	2	0.28	0.50	0.00	46
CS1	1	3	0.04	0.34	0.00	46
CS1	1	4	0.09	0.32	0.00	46
CS1	1	5	0.38	0.51	2.17	45
CS1	1	6	0.04	0.05	2.17	45
CS1	1	7	0.39	0.20	0.00	46
CS1	1	8	0.33	0.50	0.00	46
CS1	1	9	0.20	0.34	0.00	46
CS1	1	10	0.16	0.40	2.17	45
CS1	1	11	0.46	0.11	0.00	46
CS1	1	12	0.37	0.51	0.00	46
CS1	1	13	0.18	0.47	0.00	46
CS1	1	14	0.59	0.63	0.00	46
CS1	1	15	0.36	0.60	2.17	45
CS1	2	1	0.61	0.46	0.00	46
CS1	2	2	0.39	0.49	0.00	46
CS1	2	3	0.28	0.36	0.00	46
CS1	2	4	0.35	0.23	0.00	46
CS1	2	5	0.63	0.67	0.00	46
CS1	2	6	0.09	0.35	0.00	46
CS1	2	7	0.50	0.63	0.00	46
CS1	2	8	0.20	0.52	0.00	46
CS1	2	9	0.43	0.63	0.00	46
CS1	2	10	0.08	0.49	0.00	46
CS1	2	11	0.17	0.52	0.00	46
CS1	2	12	0.72	0.47	0.00	46
CS1	2	13	0.30	0.54	0.00	46
CS1	2	14	0.13	0.60	0.00	46
CS1	2	15	0.72	0.49	0.00	46
CS1	2	16	0.17	0.22	0.00	46

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Table B8: Item Statistics Form CT1: Mathematics Grade 4 (cont.)

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT1	1	1	0.69	0.40	0.37	271
CT1	1	2	0.63	0.33	0.37	271
CT1	1	3	0.40	0.54	0.00	272
CT1	1	4	0.33	-0.02	0.37	271
CT1	1	5	0.23	0.34	0.00	272
CT1	1	6	0.36	0.42	0.37	271
CT1	1	7	0.89	0.27	0.37	271
CT1	1	8	0.26	0.42	0.74	269
CT1	1	9	0.37	0.33	0.00	272
CT1	1	10	0.39	0.40	0.00	272
CT1	1	11	0.42	0.36	0.00	272
CT1	1	12	0.54	0.38	0.00	272
CT1	1	13	0.29	0.20	0.74	270
CT1	1	14	0.28	0.34	0.37	271
CT1	1	15	0.38	0.37	1.10	269
CT1	1	16	0.60	0.43	0.74	269
CT1	2	1	0.69	0.41	1.47	268
CT1	2	2	0.38	0.49	2.21	266
CT1	2	3	0.24	0.31	0.00	272
CT1	2	4	0.32	0.37	0.37	271
CT1	2	5	0.33	0.57	0.00	272
CT1	2	6	0.21	0.05	0.00	272
CT1	2	7	0.05	0.37	1.84	267
CT1	2	8	0.43	0.57	0.37	271
CT1	2	9	0.30	0.36	0.37	271
CT1	2	10	0.36	0.17	2.94	264
CT1	2	11	0.13	0.44	0.37	271
CT1	2	12	0.38	0.06	0.00	272
CT1	2	13	0.47	0.31	0.74	270
CT1	2	14	0.40	0.30	0.74	270
CT1	2	15	0.41	0.48	0.74	270
CT1	2	16	0.51	0.56	0.37	271
CT1	2	17	0.14	0.50	1.47	267
CT1	2	18	0.30	0.56	0.37	270
CT1	2	19	0.34	0.41	2.57	265

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Table B9: Item Statistics Form CS1PS1: Mathematics Grade 5

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CS1	1	1	0.67	0.31	1.82	54
CS1	1	2	0.64	0.32	0.00	55
CS1	1	3	0.13	0.32	1.82	54
CS1	1	4	0.00	.	0.00	55
CS1	1	5	0.51	0.29	0.00	55
CS1	1	6	0.11	0.39	0.00	55
CS1	1	7	0.27	0.28	0.00	55
CS1	1	8	0.29	0.29	0.00	55
CS1	1	9	0.20	-0.08	0.00	55
CS1	1	10	0.13	-0.04	0.00	55
CS1	1	11	0.58	0.26	0.00	55
CS1	1	12	0.51	0.30	0.00	55
CS1	1	13	0.04	-0.20	0.00	55
CS1	1	14	0.44	0.16	0.00	55
CS1	1	15	0.11	0.25	0.00	55
CS1	2	1	0.55	0.14	0.00	55
CS1	2	2	0.38	0.51	0.00	55
CS1	2	3	0.02	0.34	0.00	55
CS1	2	4	0.35	0.26	0.00	55
CS1	2	5	0.24	0.29	0.00	55
CS1	2	6	0.32	0.39	0.00	55
CS1	2	7	0.09	-0.01	0.00	55
CS1	2	8	0.18	0.63	0.00	55
CS1	2	9	0.42	0.51	0.00	55
CS1	2	10	0.36	0.25	0.00	55
CS1	2	11	0.38	0.26	0.00	55
CS1	2	12	0.56	0.32	0.00	55
CS1	2	13	0.40	-0.18	0.00	55
CS1	2	14	0.29	0.51	0.00	55
CS1	2	15	0.42	0.54	0.00	55
CS1	2	16	0.05	0.22	0.00	55
PS1	1	1	0.11	0.34	0.00	55
PS1	1	2	0.11	0.54	0.00	55
PS1	1	3	0.35	0.70	0.00	55
PS1	1	4	0.24	0.67	0.00	49
PS1	1	5	0.08	0.48	0.00	48
PS1	1	6	0.22	0.51	0.00	47

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Table B9: Item Statistics Form CT1PT1: Mathematics Grade 5 (cont.)

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT1	1	1	0.56	0.30	0.00	270
CT1	1	2	0.52	0.28	0.37	269
CT1	1	3	0.37	0.32	0.00	270
CT1	1	4	0.38	0.23	0.00	270
CT1	1	5	0.26	0.33	0.00	270
CT1	1	6	0.19	0.43	1.85	265
CT1	1	7	0.22	0.33	0.37	269
CT1	1	8	0.44	0.32	0.37	269
CT1	1	9	0.53	0.29	0.00	270
CT1	1	10	0.46	0.26	0.37	269
CT1	1	11	0.42	0.24	1.11	267
CT1	1	12	0.55	0.39	0.74	268
CT1	1	13	0.41	0.55	1.85	265
CT1	1	14	0.22	0.38	0.00	270
CT1	1	15	0.26	0.12	0.00	270
CT1	1	16	0.11	0.56	2.59	263
CT1	1	17	0.16	0.48	1.85	265
CT1	2	1	0.38	0.43	0.74	268
CT1	2	2	0.21	0.23	0.00	270
CT1	2	3	0.34	0.30	0.00	270
CT1	2	4	0.32	0.22	0.37	269
CT1	2	5	0.36	0.56	5.56	255
CT1	2	6	0.38	0.47	1.85	265
CT1	2	7	0.21	0.57	1.85	264
CT1	2	8	0.50	0.25	0.74	268
CT1	2	9	0.22	0.21	1.11	267
CT1	2	10	0.39	0.23	1.11	267
CT1	2	11	0.33	0.43	0.00	270
CT1	2	12	0.23	0.38	0.00	270
CT1	2	13	0.32	0.29	0.00	270
CT1	2	14	0.05	0.34	0.00	270
CT1	2	15	0.34	0.35	3.33	261
CT1	2	16	0.16	0.35	2.22	264
CT1	2	17	0.07	0.56	2.22	264
CT1	2	18	0.04	0.38	2.22	264
PT1	1	1	0.56	0.23	0.74	268
PT1	1	2	0.15	0.51	2.23	263
PT1	1	3	0.03	0.41	4.83	253
PT1	1	4	0.17	0.29	6.32	247
PT1	1	5	0.10	0.24	4.83	253
PT1	1	6	0.16	0.50	1.86	264

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Table B10: Item Statistics Form CS1: Mathematics Grade 6

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CS1	1	1	0.62	0.45	0.00	39
CS1	1	2	0.21	0.44	0.00	39
CS1	1	3	0.44	0.26	0.00	39
CS1	1	4	0.13	0.37	2.56	38
CS1	1	5	0.15	0.47	0.00	39
CS1	1	6	0.47	0.19	2.56	38
CS1	1	7	0.37	0.52	2.56	38
CS1	1	8	0.54	0.59	0.00	39
CS1	1	9	0.47	0.49	2.56	38
CS1	1	10	0.21	0.53	2.56	38
CS1	1	11	0.42	0.56	2.56	38
CS1	1	12	0.08	0.42	0.00	39
CS1	1	13	0.32	0.55	2.56	38
CS1	2	1	0.00	.	0.00	39
CS1	2	2	0.08	0.24	2.56	38
CS1	2	3	0.05	0.53	2.56	38
CS1	2	4	0.37	0.52	2.56	38
CS1	2	5	0.15	0.61	0.00	39
CS1	2	6	0.08	0.50	5.13	37
CS1	2	7	0.29	0.41	2.56	38
CS1	2	8	0.19	0.31	5.13	37
CS1	2	9	0.05	0.19	2.56	38
CS1	2	10	0.26	0.03	2.56	38
CS1	2	11	0.23	0.11	0.00	39
CS1	2	12	0.13	0.53	2.56	38
CS1	2	13	0.57	0.40	5.13	37
CS1	2	14	0.08	0.37	5.13	37
CS1	2	15	0.03	-0.10	5.13	37
CS1	2	16	0.89	0.12	5.13	37
CS1	2	17	0.11	0.07	5.13	37

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Table B10: Item Statistics Form CT1: Mathematics Grade 6 (cont.)

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT1	1	1	0.39	0.37	1.34	221
CT1	1	2	0.26	0.52	0.45	223
CT1	1	3	0.20	0.54	1.34	221
CT1	1	4	0.19	0.39	1.34	221
CT1	1	5	0.34	0.58	3.13	217
CT1	1	6	0.40	0.41	2.68	218
CT1	1	7	0.37	0.26	3.13	217
CT1	1	8	0.15	0.35	1.34	221
CT1	1	9	0.06	0.20	0.89	222
CT1	1	10	0.27	0.19	0.89	222
CT1	1	11	0.11	0.36	0.89	222
CT1	1	12	0.35	0.40	17.86	184
CT1	1	13	0.26	0.54	7.14	208
CT1	2	1	0.32	0.68	1.34	221
CT1	2	2	0.23	0.64	2.23	217
CT1	2	3	0.11	0.50	1.34	221
CT1	2	4	0.18	0.62	0.89	222
CT1	2	5	0.18	0.28	1.34	221
CT1	2	6	0.12	0.35	1.79	220
CT1	2	7	0.17	0.54	1.34	221
CT1	2	8	0.06	0.26	3.13	217
CT1	2	9	0.09	0.41	2.68	218
CT1	2	10	0.17	0.45	1.34	221
CT1	2	11	0.11	0.31	0.45	223
CT1	2	12	0.27	0.08	1.34	221
CT1	2	13	0.04	0.28	0.45	223
CT1	2	14	0.01	0.17	2.68	218
CT1	2	15	0.01	0.23	2.68	218
CT1	2	16	0.31	0.53	2.23	219
CT1	2	17	0.23	0.55	2.23	218
CT1	2	18	0.34	0.58	3.13	217
CT1	2	19	0.01	0.23	3.57	216
CT1	2	20	0.07	0.60	6.70	209
CT1	2	21	0.10	0.32	10.71	200

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Table B11: Item Statistics Form CS1: Mathematics Grade 7

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CS1	1	1	0.00	.	0.00	36
CS1	1	2	0.36	0.21	0.00	36
CS1	1	3	0.28	0.44	0.00	36
CS1	1	4	0.11	0.47	0.00	36
CS1	1	5	0.08	0.61	0.00	36
CS1	1	6	0.06	0.02	0.00	36
CS1	1	7	0.26	0.51	2.78	35
CS1	1	8	0.14	0.31	0.00	36
CS1	1	9	0.00	.	0.00	36
CS1	2	1	0.64	0.49	0.00	36
CS1	2	2	0.03	-0.09	2.78	35
CS1	2	3	0.34	0.17	2.78	35
CS1	2	4	0.14	0.55	2.78	35
CS1	2	5	0.00	.	2.78	35
CS1	2	6	0.20	0.63	2.78	35
CS1	2	7	0.37	-0.05	2.78	35
CS1	2	8	0.34	0.27	2.78	35
CS1	2	9	0.13	0.51	11.11	28
CS1	2	10	0.46	0.50	2.78	35
CS1	2	11	0.03	0.11	2.78	35
CS1	2	12	0.09	0.72	2.78	35
CS1	2	13	0.31	0.20	2.78	35
CS1	2	14	0.03	0.27	2.78	35
CS1	2	15	0.34	0.26	2.78	35
CS1	2	16	0.11	0.67	2.78	35
CS1	2	17	0.11	0.47	2.78	35
CS1	2	18	0.54	0.31	2.78	35
CS1	2	19	0.06	0.69	2.78	35
CS1	2	20	0.60	-0.13	2.78	35
CS1	2	21	0.03	0.67	2.78	35
CS1	2	22	0.06	0.45	2.78	35

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Table B11: Item Statistics Form CT1: Mathematics Grade 7 (cont.)

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT1	1	1	0.83	0.26	0.43	232
CT1	1	2	0.09	0.40	0.86	231
CT1	1	3	0.12	0.35	0.86	231
CT1	1	4	0.04	0.07	0.43	232
CT1	1	5	0.22	0.31	1.29	230
CT1	1	6	0.11	0.26	1.29	230
CT1	1	7	0.10	0.35	3.00	226
CT1	1	8	0.28	0.52	4.29	223
CT1	1	9	0.05	0.31	4.29	223
CT1	1	10	0.05	0.23	3.86	224
CT1	2	1	0.42	0.26	3.00	226
CT1	2	2	0.30	0.14	3.00	226
CT1	2	3	0.16	0.32	3.43	225
CT1	2	4	0.11	0.42	5.15	221
CT1	2	5	0.21	0.54	3.43	225
CT1	2	6	0.09	0.51	4.29	223
CT1	2	7	0.33	0.18	1.72	229
CT1	2	8	0.11	0.49	2.15	228
CT1	2	9	0.10	0.06	3.00	226
CT1	2	10	0.08	0.55	3.86	224
CT1	2	11	0.06	0.22	6.44	218
CT1	2	12	0.57	0.47	2.15	228
CT1	2	13	0.14	0.48	0.86	231
CT1	2	14	0.25	0.03	2.58	227
CT1	2	15	0.23	0.22	1.29	230
CT1	2	16	0.22	0.36	1.72	229
CT1	2	17	0.02	0.30	2.58	227
CT1	2	18	0.19	0.52	3.43	224
CT1	2	19	0.19	0.55	4.72	222
CT1	2	20	0.23	0.65	4.72	222
CT1	2	21	0.07	0.60	4.29	223
CT1	2	22	0.14	0.62	4.72	222
CT1	2	23	0.02	0.45	3.86	224
CT1	2	24	0.12	0.44	2.15	228
CT1	2	25	0.06	0.53	4.29	222

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Table B12: Item Statistics Form CS1PS1: Mathematics Grade 8

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CS1	1	1	0.61	0.28	0.00	28
CS1	1	2	0.39	0.25	0.00	28
CS1	1	3	0.57	-0.11	0.00	28
CS1	1	4	0.15	0.35	3.57	27
CS1	1	5	0.32	0.37	0.00	28
CS1	1	6	0.32	0.19	0.00	28
CS1	1	7	0.57	0.21	0.00	28
CS1	2	1	0.02	0.16	0.00	28
CS1	2	2	0.64	0.29	0.00	28
CS1	2	3	0.00	.	0.00	28
CS1	2	4	0.29	-0.29	0.00	28
CS1	2	5	0.33	0.43	3.57	27
CS1	2	6	0.00	.	3.57	20
CS1	2	7	0.54	0.45	0.00	28
CS1	2	8	0.04	-0.13	0.00	28
CS1	2	9	0.11	0.37	0.00	28
CS1	2	10	0.07	0.31	3.57	27
CS1	2	11	0.00	.	0.00	28
CS1	2	12	0.00	.	0.00	28
CS1	2	13	0.29	0.10	0.00	28
CS1	2	14	0.18	0.01	0.00	28
CS1	2	15	0.29	-0.15	0.00	28
CS1	2	16	0.20	0.06	0.00	28
CS1	2	17	0.00	.	0.00	28
CS1	2	18	0.25	-0.08	0.00	28
CS1	2	19	0.39	0.49	0.00	28
CS1	2	20	0.02	-0.07	0.00	28
CS1	2	21	0.00	.	0.00	28
CS1	2	22	0.32	0.39	0.00	28
CS1	2	23	0.18	0.33	0.00	28
CS1	2	24	0.11	0.33	0.00	28
PS1	1	1	0.14	0.33	0.00	28
PS1	1	2	0.00	.	0.00	28
PS1	1	3	0.05	0.14	7.14	21
PS1	1	4	0.04	0.22	0.00	28
PS1	1	5	0.02	0.11	0.00	25
PS1	1	6	0.03	-0.32	3.57	20

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Table B12: Item Statistics Form CT1PT1: Mathematics Grade 8 (cont.)

Mathematics						
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT1	1	1	0.45	0.35	0.00	239
CT1	1	2	0.08	0.36	0.00	239
CT1	1	3	0.21	-0.05	1.67	235
CT1	1	4	0.37	0.13	0.00	239
CT1	1	5	0.24	0.23	5.86	225
CT1	1	6	0.04	0.20	5.86	225
CT1	1	7	0.05	0.08	0.84	237
CT1	1	8	0.33	0.18	0.42	238
CT1	1	9	0.17	0.20	2.93	232
CT1	1	10	0.22	0.21	1.26	236
CT1	1	11	0.42	0.31	6.28	224
CT1	1	12	0.40	0.42	5.44	226
CT1	2	1	0.24	0.12	5.02	227
CT1	2	2	0.06	0.19	1.26	236
CT1	2	3	0.06	-0.10	0.84	237
CT1	2	4	0.39	0.08	2.51	233
CT1	2	5	0.00	.	7.11	222
CT1	2	6	0.08	0.12	6.28	224
CT1	2	7	0.07	0.35	6.28	224
CT1	2	8	0.11	0.39	2.51	233
CT1	2	9	0.29	0.22	2.09	234
CT1	2	10	0.06	0.42	8.79	218
CT1	2	11	0.11	0.14	6.28	223
CT1	2	12	0.18	0.24	5.86	225
CT1	2	13	0.06	0.21	7.11	222
CT1	2	15	0.20	0.30	2.93	232
CT1	2	16	0.13	0.13	2.51	233
CT1	2	17	0.07	0.46	10.46	214
CT1	2	18	0.02	0.09	9.21	217
CT1	2	19	0.13	0.31	2.93	232
CT1	2	20	0.17	0.12	4.60	228
CT1	2	21	0.09	0.33	3.35	231
CT1	2	22	0.06	0.44	13.81	205
CT1	2	23	0.04	0.29	6.69	223
PT1	1	2	0.04	0.36	5.93	221
PT1	1	3	0.03	0.38	10.17	209
PT1	1	4	0.19	0.50	6.78	220
PT1	1	5	0.12	0.48	7.20	204
PT1	1	6	0.02	0.37	10.59	211

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Table B13: Item Statistics Form CT2: Science Grade 8

			Science			
Form	**Session**	**Item**	***p*-value**	**R_{it}**	**Omit Rate**	**Adj. N**
CT2	1	1	0.51	0.43	3.16	245
CT2	1	2	0.27	0.37	5.14	239
CT2	1	3	0.23	0.29	3.56	244
CT2	1	4	0.57	0.43	6.72	233
CT2	1	5	0.23	0.55	2.77	243
CT2	1	6	0.29	0.57	3.56	242
CT2	1	7	0.26	0.55	3.95	241
CT2	1	8	0.20	0.44	7.91	232
CT2	1	9	0.23	0.58	7.11	234
CT2	1	10	0.27	0.50	5.53	235
CT2	1	11	0.13	0.55	4.74	240
CT2	1	12	0.25	0.30	3.95	243
CT2	1	13	0.59	0.44	5.93	235
CT2	1	14	0.44	0.56	4.35	241
CT2	2	1	0.32	0.28	0.79	251
CT2	2	2	0.43	0.16	0.79	251
CT2	2	3	0.40	0.40	1.19	250
CT2	2	4	0.53	0.32	0.40	252
CT2	2	5	0.58	0.31	0.40	252
CT2	2	6	0.45	0.34	0.40	252
CT2	2	7	0.44	0.44	0.40	252
CT2	2	8	0.48	0.34	0.40	252
CT2	2	9	0.53	0.34	0.40	252
CT2	2	10	0.32	0.48	0.40	252
CT2	2	11	0.36	0.25	0.40	252
CT2	2	12	0.48	0.36	0.40	252
CT2	2	13	0.41	0.14	0.40	252
CT2	2	14	0.38	0.21	0.40	252
CT2	2	15	0.41	0.26	0.40	252
CT2	2	16	0.38	0.12	0.40	252
CT2	3	1	0.38	0.54	5.14	231
CT2	3	2	0.16	0.50	5.93	238
CT2	3	3	0.18	0.44	4.74	235
CT2	3	4	0.69	0.35	5.93	238
CT2	3	5	0.39	0.49	13.04	219
CT2	3	6	0.28	0.62	11.07	224
CT2	3	7	0.15	0.41	8.30	230
CT2	3	8	0.24	0.42	11.07	221
CT2	3	9	0.25	0.47	20.55	198

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Appendix C:
Item Evaluation Study Results: English Language Arts/Literacy and Mathematics

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Purpose of the Study

The goal of the ELA and Mathematics item evaluation was to examine the item-level performance to verify that the items, which were field-tested in several different states, were performing as expected when administered to Missouri students. This study was limited to the Grades 3 through 8 ELA and Mathematics items included in core (CA) and performance event (PA) forms on 2015 MAP test administration.

Sampling and census data

Because the scored census data were not available during the time of the initial data analysis in June 2015, samples from each of the test forms that mirrored the expected 2015 demographic distribution of examinees using gender and ethnicity were selected. Grade 8 ELA and Mathematics IRT data analyses were initially performed only on CA forms as, at the time of conducting the item evaluation study, DRC/CTB Research did not acquire sufficient representative samples of students who took both CA and PA forms to include PA forms in calibration and equating. These analyses were repeated on both forms on the census data available in July 2015. The same methodology that was implemented for the original data analysis was used in the final Grade 8 ELA and Grade 8 Mathematics analyses. Both sample and census data summaries for Grade 8 ELA and Mathematics are presented in this section.

Tables C1 and C2 examine the representativeness of the data samples compared to the census data for ELA and Mathematics, respectively. These tables demonstrate that the samples used for analyses were representative of the state.

Classical Item Analysis

Item statistics, including *p*-value, item-total test correlation, point-biserial correlation on a distractor for multiple-choice items, and item omit rates, were computed and evaluated for each item included in regular test forms by grade for ELA and Mathematics. The following criteria were used to flag items for further review:

1. Classical item difficulty, *p*-values ≤ 0.20 or ≥ 0.90 (The item was flagged for review for being too difficult or too easy.)
2. Omit rates ≥ 5%
3. Low point-biserial correlations, pt. bis ≤ 0.10
4. Positive point-biserial correlations on a distractor

Tables C3 and C4 show the number of items flagged in classical item analysis for ELA and Mathematics, respectively. Form reliabilities range from 0.86 to 0.92 for ELA and from 0.87 to 0.92 for Mathematics. These values are well within the accepted range for high-stakes assessments.

Data Calibration

For the purpose of item evaluation, the item parameters for the items contained in ELA and Mathematics regular test forms were calibrated and the parameters were re-estimated. The 3PL/2PPC IRT models were used to estimate item parameters for ELA and Mathematics. The same calibration criteria that were used for Science were also used for

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ELA and Mathematics (refer to Section 6.4.1: *Data Calibration* of this report). The concurrent calibrations of all items contained in all test forms calibrations were conducted for each grade level and content area.

Recall that the original SBAC's CR and TE item parameters for ELA and Mathematics were in GPC model metric (see Section 6.2. *Item Response Theory* of this report). There is a linear relationship between the GPC and 2PPC metrics expressed mathematically as follows:
A-parameter in 2PPC metric = *A-parameter* in GPC metric * 1.7
B- parameter in 2PPC metric = *A-parameter* in GPC metric * *B-parameter* in GPC metric * 1.7
Because originally the SBAC's MC item parameters for ELA and Mathematics were in 2PL model metric, the *c*-parameter for these items was set to 0 in the calibration process.

The calibration results were evaluated and item model fit was examined for all items. Details about item fit evaluation can be found in Section 6.4.2: *Model Fit* of this report. The number of items flagged for poor fit ranged from 4 in Grade 6 to 13 in Grade 3 for ELA and ranged from 5 in Grade 6 to 9 in Grade 7 for Mathematics. Items flagged for poor fit are listed in Tables C5 and C6 for ELA and Mathematics, respectively. The total number of items with poor fit for each grade and content area is shown in Tables C7 and C8.

Equating and Anchor Evaluation

Much like in anchor item evaluation, we compared the item parameter estimates from SBAC to the transformed estimates from the current administration for all items on ELA and Mathematics regular forms using Stocking and Lord's (1983) test characteristic curve (TCC) method. The TCC method determines the scaling constants by minimizing the quadratic loss function (F). Using this method, outlying items were 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 square difference were flagged (for details on the Stocking and Lord procedure, refer also to Section 6.4.3: *Linking Methods* of this report).

Additionally, we examined the differences between the item characteristic regression curves using the parameter estimates from SBAC and those from the current calibration. The differences between the curves are evaluated using the following statistics (also listed in Section 6.4.4: *Anchor Items* of this report).

- UnWtd Mean = Average signed difference in estimated probability
- UnWtd Mean Abs Difference = Average absolute (unsigned) difference in estimated probability
- UnWtd RMSD = Root mean square difference
- Wtd Mean = Weighted average signed difference in estimated probability
- Wtd Mean Abs Difference= Weighted average absolute (unsigned) difference in estimated probability

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- WtdRMSD = Weighted root mean square difference

For the six statistics listed above, differences greater than +.10 are considered large, and differences between +.07 and .10 are considered moderate. Additionally, the maximum absolute difference (MaxAbsDif) will be identified. For MaxAbsDif, large differences are those greater than +.15, and moderate differences are all differences between +.125 and .15. These seven statistics are considered when examining the differences between the IRT regression curves.

Items flagged for large differences on four or more of the seven statistics listed above were examined for further review. Tables C7 and C8 contain the summary results of TCC and IRT regression methods, including number of iterations, value of F function, correlations between *A*-parameter input and estimates, correlations between *B*-parameter input and estimates, and the number of outliers in TCC method, as well as the number of items flagged using IRT regression method. Tables C9 and C10 show the statistics for items flagged for large differences on four of the seven IRT regression criteria. All items flagged on multiple statistical criteria were reviewed by content experts; it was verified that the key was correctly identified and that the scoring rules implemented were also correct.

Summary and Recommendations

Typically, for both ELA and Math, items flagged for *p*-values had similar values to what was observed during form selection. In cases of items with a positive point biserial on a distractor, the value of the point biserial was generally close to 0 and in no case higher than the point-biserial correlation for a correct answer. When model fit was examined, it was observed that a misfit was typically in the areas where there were few students at a certain part of the ability distribution. None of these issues are uncommon, and these issues were expected given the depth of the item pool used for selection.

The DRC/CTB Content team checked items of most concern and found no reason for their suppression. Consequently, no items were recommended for suppression in 2015 MAP ELA and Mathematics assessments.

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Table C1: Summary of Calibration and Census Data: English Language Arts/Literacy

	Calibration Sample		Census Data		Diff
	N	%	N	%	(Calib % - Census %)
English Language Arts/Literacy, Grade 3					
All Students	4999		68003		
Gender					
Male	2553	51.07%	34889	51.31%	-0.24%
Female	2446	48.93%	33114	48.69%	0.24%
Race/Ethnicity					
White	3603	72.07%	48285	71.00%	1.07%
Black	809	16.18%	11206	16.48%	-0.30%
Hispanic	299	5.98%	4338	6.38%	-0.40%
Asian/Pacific Islander	112	2.24%	1474	2.17%	0.07%
Native American/Alaskan	23	0.46%	234	0.34%	0.12%
Other	153	3.06%	2466	3.63%	-0.57%
English Language Arts/Literacy, Grade 4					
All Students	4998		67015		
Gender					
Male	2562	51.26%	34247	51.10%	0.16%
Female	2436	48.74%	32768	48.90%	-0.16%
Race/Ethnicity					
White	3641	72.85%	48249	72.00%	0.85%
Black	818	16.37%	10736	16.02%	0.35%
Hispanic	282	5.64%	4130	6.16%	-0.52%
Asian/Pacific Islander	111	2.22%	1481	2.21%	0.01%
Native American/Alaskan	24	0.48%	269	0.40%	0.08%
Other	122	2.44%	2150	3.21%	-0.77%
English Language Arts/Literacy, Grade 5					
All Students	4999		66419		
Gender					
Male	2561	51.23%	33974	51.15%	0.08%
Female	2438	48.77%	32445	48.85%	-0.08%
Race/Ethnicity					
White	3659	73.19%	48309	72.73%	0.46%
Black	809	16.18%	10702	16.11%	0.07%
Hispanic	275	5.50%	3858	5.81%	-0.31%
Asian/Pacific Islander	115	2.30%	1478	2.23%	0.07%
Native American/Alaskan	21	0.42%	298	0.45%	-0.03%
Other	120	2.40%	1774	2.67%	-0.27%

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Table C1: Summary of Calibration and Census Data: English Language Arts/Literacy (cont.)

	Calibration Sample		Census Data		Diff
	N	%	N	%	(Calib % - Census %)
English Language Arts/Literacy, Grade 6					
All Students	4990		66062		
Gender					
Male	2561	51.32%	33832	51.21%	0.11%
Female	2429	48.68%	32230	48.79%	-0.11%
Race/Ethnicity					
White	3660	73.35%	48279	73.08%	0.27%
Black	816	16.35%	10621	16.08%	0.27%
Hispanic	273	5.47%	3732	5.65%	-0.18%
Asian/Pacific Islander	105	2.10%	1453	2.20%	-0.10%
Native American/Alaskan	22	0.44%	269	0.41%	0.03%
Other	114	2.28%	1708	2.59%	-0.31%
English Language Arts/Literacy, Grade 7					
All Students	4929		66000		
Gender					
Male	2497	50.66%	33941	51.43%	-0.77%
Female	2432	49.34%	32059	48.57%	0.77%
Race/Ethnicity					
White	3634	73.73%	48218	73.06%	0.67%
Black	808	16.39%	10698	16.21%	0.18%
Hispanic	261	5.30%	3722	5.64%	-0.34%
Asian/Pacific Islander	98	1.99%	1443	2.19%	-0.20%
Native American/Alaskan	20	0.41%	292	0.44%	-0.03%
Other	108	2.19%	1627	2.47%	-0.28%
English Language Arts/Literacy, Grade 8					
All Students	4178		66528		
Gender					
Male	2206	52.80%	33728	50.70%	2.10%
Female	1972	47.20%	32800	49.30%	-2.10%
Race/Ethnicity					
White	3048	72.95%	49019	73.68%	-0.73%
Black	722	17.28%	10696	16.08%	1.20%
Hispanic	205	4.91%	3600	5.41%	-0.50%
Asian/Pacific Islander	93	2.23%	1411	2.12%	0.10%
Native American/Alaskan	20	0.48%	286	0.43%	0.05%
Other	90	2.15%	1516	2.28%	-0.13%

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Table C2: Summary of Calibration and Census Data: Mathematics

	Calibration Sample		Census Data		Diff
	N	%	N	%	(Calib % - Census %)
Mathematics, Grade 3					
All Students	4999		68017		
Gender					
Male	2553	51.07%	34893	51.30%	-0.23%
Female	2446	48.93%	33124	48.70%	0.23%
Race/Ethnicity					
White	3603	72.07%	48279	70.98%	1.09%
Black	809	16.18%	11202	16.47%	-0.29%
Hispanic	299	5.98%	4354	6.40%	-0.42%
Asian/Pacific Islander	112	2.24%	1484	2.18%	0.06%
Native American/Alaskan	23	0.46%	233	0.34%	0.12%
Other	153	3.06%	2465	3.62%	-0.56%
Mathematics, Grade 4					
All Students	4999		67029		
Gender					
Male	2563	51.27%	34253	51.10%	0.17%
Female	2436	48.73%	32776	48.90%	-0.17%
Race/Ethnicity					
White	3641	72.83%	48246	71.98%	0.85%
Black	819	16.38%	10728	16.01%	0.37%
Hispanic	282	5.64%	4146	6.19%	-0.55%
Asian/Pacific Islander	111	2.22%	1492	2.23%	-0.01%
Native American/Alaskan	24	0.48%	269	0.40%	0.08%
Other	122	2.44%	2148	3.20%	-0.76%
Mathematics, Grade 5					
All Students	4999		66431		
Gender					
Male	2561	51.23%	33978	51.15%	0.08%
Female	2438	48.77%	32453	48.85%	-0.08%
Race/Ethnicity					
White	3659	73.19%	48298	72.70%	0.49%
Black	809	16.18%	10697	16.10%	0.08%
Hispanic	275	5.50%	3873	5.83%	-0.33%
Asian/Pacific Islander	115	2.30%	1490	2.24%	0.06%
Native American/Alaskan	21	0.42%	298	0.45%	-0.03%
Other	120	2.40%	1775	2.67%	-0.27%

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Table C2: Summary of Calibration and Census Data: Mathematics (cont.)

	Calibration Sample		Census Data		Diff
	N	%	N	%	(Calib % - Census %)
Mathematics, Grade 6					
All Students	4993		66019		
Gender					
Male	2562	51.31%	33793	51.19%	0.12%
Female	2431	48.69%	32226	48.81%	-0.12%
Race/Ethnicity					
White	3660	73.30%	48245	73.08%	0.22%
Black	816	16.34%	10612	16.07%	0.27%
Hispanic	273	5.47%	3754	5.69%	-0.22%
Asian/Pacific Islander	108	2.16%	1433	2.17%	-0.01%
Native American/Alaskan	22	0.44%	270	0.41%	0.03%
Other	114	2.28%	1705	2.58%	-0.30%
Mathematics, Grade 7					
All Students	4947		65038		
Gender					
Male	2506	50.66%	33427	51.40%	-0.74%
Female	2441	49.34%	31611	48.60%	0.74%
Race/Ethnicity					
White	3661	74.00%	47484	73.01%	0.99%
Black	805	16.27%	10655	16.38%	-0.11%
Hispanic	257	5.20%	3709	5.70%	-0.50%
Asian/Pacific Islander	97	1.96%	1292	1.99%	-0.03%
Native American/Alaskan	19	0.38%	288	0.44%	-0.06%
Other	108	2.18%	1610	2.48%	-0.30%
Mathematics, Grade 8					
All Students	4302		52842		
Gender					
Male	2276	52.91%	27288	51.64%	1.27%
Female	2026	47.09%	25554	48.36%	-1.27%
Race/Ethnicity					
White	3156	73.36%	38107	72.11%	1.25%
Black	725	16.85%	9453	17.89%	-1.04%
Hispanic	212	4.93%	2935	5.55%	-0.62%
Asian/Pacific Islander	94	2.19%	857	1.62%	0.57%
Native American/Alaskan	19	0.44%	242	0.46%	-0.02%
Other	96	2.23%	1248	2.36%	-0.13%

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Table C3: Number of Items Flagged in Classical Item Analysis: English Language Arts/Literacy

Grade	# Items	Number of Flagged Items				
		p-value ≤ 0.20	*p*-value ≥ 0.90	$R_{it} \leq 0.10$	Positive pt.bis on distractor	Omit ≥ 5%
3	101	3	0	0	2	0
4	97	4	1	0	2	0
5	115	4	4	0	5	0
6	102	7	0	0	7	0
7	103	0	1	0	1	0
8	117 (Sample)	10	1	0	4	0
8	117 (Census)	8	1	0	5	0

Table C4: Number of Items Flagged in Classical Item Analysis: Mathematics

Grade	# Items	Number of Flagged Items				
		p-value ≤ 0.20	*p*-value ≥ 0.90	$R_{it} \leq 0.10$	Positive pt.bis on distractor	Omit ≥ 5%
3	65	3	2	0	0	0
4	67	8	3	0	1	0
5	81	11	1	0	7	0
6	66	15	1	1	1	0
7	62	8	0	0	2	0
8	76 (Sample)	17	0	0	4	3
8	76 (Census)	20	0	0	7	3

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Table C5: Item-Fit Statistics for Misfitting Items: English Language Arts/Literacy

Grade	Item Position	Item ID	Chi-Square	DF	Total N	Z	Ob-served	Pre-dicted	Obs-Pred
3	13	718469	62.8	7	1967	14.91	0.483	0.483	-0.0006
3	14	718471	36.73	7	1967	7.95	0.665	0.664	0.0013
3	16	718470	31.45	7	1967	6.53	0.536	0.536	0.0006
3	17	718427	30.04	7	1967	6.16	0.381	0.383	-0.0019
3	25	721239	44.00	8	1967	9.00	0.668	0.665	0.0033
3	51	718526	34.71	7	1557	7.41	0.729	0.727	0.0022
3	53	718481	25.78	7	1557	5.02	0.485	0.487	-0.0019
3	56	721253	44.90	8	1557	9.22	0.369	0.373	-0.0034
3	61	718425	29.69	7	1557	6.07	0.546	0.547	-0.0006
3	77	718472	29.73	7	1475	6.08	0.635	0.636	-0.0010
3	84	718449	23.19	7	1475	4.33	0.657	0.657	0.0003
3	87	718447	46.80	7	1475	10.64	0.443	0.447	-0.0041
3	93	718366	25.19	7	1475	4.86	0.385	0.390	-0.0047
4	1	719904	34.19	7	1368	7.27	0.565	0.560	0.0047
4	3	719764	46.23	7	1368	10.49	0.315	0.315	0.0002
4	15	719664	51.93	7	3413	12.01	0.375	0.377	-0.0019
4	17	719980	67.17	7	3413	16.08	0.592	0.590	0.0022
4	18	721284	28.97	8	1368	5.24	0.589	0.580	0.0083
4	32	719534	26.94	7	1368	5.33	0.534	0.530	0.0043
4	46	719722	45.89	7	2045	10.39	0.409	0.412	-0.0028
4	47	717234	36.25	8	2045	7.06	0.456	0.458	-0.0018
4	80	717247	34.67	8	1585	6.67	0.136	0.140	-0.0043
5	20	719440	28.10	7	1465	5.64	0.612	0.610	0.0019
5	23	719234	130.49	7	4999	33.00	0.431	0.435	-0.0032
5	35	721287	24.61	8	1465	4.15	0.651	0.649	0.0020
5	37	718810	85.02	7	4999	20.85	0.914	0.910	0.0045
5	40	718825	70.80	7	4999	17.05	0.548	0.550	-0.0016
5	54	719373	28.05	7	1344	5.63	0.563	0.564	-0.0010
5	81	718789	52.11	7	2190	12.06	0.585	0.587	-0.0016
5	88	721292	43.48	8	2190	8.87	0.341	0.345	-0.0047
5	92	719363	29.72	7	2190	6.07	0.700	0.700	-0.0002
5	100	721288	65.33	17	2190	8.29	0.601	0.603	-0.0020

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Table C5: Item-Fit Statistics for Misfitting Items: English Language Arts/Literacy (cont.)

Grade	Item Position	Item ID	Chi-Square	DF	Total N	Z	Ob-served	Pre-dicted	Obs-Pred
6	23	721337	96.45	7	4990	23.91	0.632	0.631	0.0012
6	56	721392	28.12	7	888	5.65	0.485	0.484	0.0015
6	59	721368	25.00	7	888	4.81	0.481	0.479	0.0020
6	63	721338	20.49	7	888	3.61	0.580	0.576	0.0036
7	11	721489	68.46	7	4929	16.43	0.633	0.631	0.0023
7	18	721479	29.90	7	2051	6.12	0.488	0.486	0.0017
7	37	721502	31.93	7	2051	6.66	0.297	0.298	-0.0013
7	58	721446	25.45	8	1471	4.36	0.688	0.688	0.0004
7	71	721503	38.71	7	1471	8.47	0.485	0.490	-0.0042
7	75	721462	26.82	8	1407	4.71	0.879	0.877	0.0013
7	83	721508	34.19	8	1407	6.55	0.592	0.594	-0.0015
7	89	721467	27.83	8	1407	4.96	0.736	0.735	0.0013
7	99	721437	90.88	7	1407	22.42	0.395	0.399	-0.0050
8 (CA)*	5	721552	91.26	7	4232	22.52	0.536	0.536	0.0006
8 (CA)*	8	721602	74.79	8	4232	16.7	0.183	0.191	-0.0078
8 (CA)*	10	721567	34.23	7	1888	7.28	0.645	0.640	0.005
8 (CA)*	11	730263	30.84	8	1888	5.71	0.268	0.270	-0.0025
8 (CA)*	14	721577	46.18	8	1888	9.54	0.774	0.762	0.0123
8 (CA)*	17	717762	64.36	8	1888	14.09	0.426	0.425	0.0012
8 (CA)*	20	721587	30.31	7	1888	6.23	0.537	0.533	0.0041
8 (CA)*	26	721540	40.77	8	1888	8.19	0.379	0.379	0.0005
8 (CA)*	29	721517	27.03	7	1888	5.35	0.586	0.582	0.0043
8 (CA)*	32	721523	100.42	7	4232	24.97	0.353	0.355	-0.0017
8 (CA)*	33	717728	29.17	8	1888	5.29	0.533	0.529	0.0037
8 (CA)*	40	721595	84.91	17	4232	11.65	0.577	0.577	0.0007
8 (CA)*	79	721561	39.74	8	1186	7.94	0.594	0.595	-0.0006
8 (CA)*	93	730262	19.16	7	1186	3.25	0.546	0.548	-0.0014
8	5	721552	860.10	7	66123	228.00	0.568	0.567	0.0008
8	17	717762	518.92	8	28825	127.73	0.470	0.469	0.0013
8	26	721540	399.93	8	28825	97.98	0.403	0.403	0.0002
8	32	721523	1296.03	7	66123	344.51	0.351	0.353	-0.0013
8	57	721580	209.51	7	18559	54.12	0.618	0.618	-0.0003

*Preliminary results based on sample data, CA forms only.

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Table C6: Item-Fit Statistics for Misfitting Items: Mathematics

Grade	Item Position	Item ID	Chi-Square	DF	Total N	Z	Ob-served	Pre-dicted	Obs-Pred
3	10	719913	82.67	7	4973	20.22	0.468	0.469	-0.0013
3	22	721920	52.56	8	2391	11.14	0.658	0.651	0.0074
3	23	721897	101.30	8	2391	23.33	0.417	0.416	0.0013
3	27	719874	108.10	7	2391	27.02	0.290	0.290	-0.0002
3	41	721906	37.93	17	1247	3.59	0.594	0.596	-0.0017
3	44	721888	22.51	8	1247	3.63	0.646	0.646	0.0000
3	50	721911	24.06	8	1335	4.01	0.849	0.846	0.0040
3	64	721894	23.25	8	1335	3.81	0.276	0.285	-0.0093
4	13	721994	144.97	17	2478	21.95	0.310	0.312	-0.0017
4	31	720923	66.99	7	2478	16.03	0.403	0.402	0.0013
4	44	720980	23.97	7	1233	4.54	0.383	0.388	-0.0047
4	49	722006	21.31	8	1233	3.33	0.381	0.387	-0.0055
4	66	721998	64.11	8	1272	14.03	0.370	0.376	-0.0053
5	10	722089	89.98	8	4992	20.50	0.315	0.317	-0.0026
5	21	722077	64.40	17	2335	8.13	0.444	0.440	0.0038
5	22	720641	168.36	7	2335	43.13	0.330	0.328	0.0015
5	35	722079	45.59	17	1300	4.90	0.505	0.506	-0.0006
5	38	720224	44.77	7	1300	10.09	0.572	0.571	0.0009
5	39	722084	75.17	8	1300	16.79	0.189	0.191	-0.0028
5	49	722098	22.29	8	1300	3.57	0.599	0.597	0.0017
5	73	721803	81.01	17	3090	10.98	0.288	0.290	-0.0020
6	13	722183	96.96	8	4983	22.24	0.456	0.455	0.0009
6	21	722166	38.28	8	2284	7.57	0.481	0.474	0.0070
6	30	723857	39.92	7	2284	8.80	0.220	0.222	-0.0020
6	52	722147	23.34	8	1347	3.84	0.108	0.114	-0.0059
6	59	723829	20.45	7	1347	3.60	0.744	0.742	0.0022

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Table C6: Item-Fit Statistics for Misfitting Items: Mathematics (cont.)

Grade	Item Position	Item ID	Chi-Square	DF	Total N	Z	Ob-served	Pre-dicted	Obs-Pred
7	2	723602	35.88	7	1430	7.72	0.348	0.346	0.0027
7	16	723642	97.27	7	3872	24.12	0.515	0.511	0.0040
7	22	722269	30.70	8	1430	5.68	0.430	0.426	0.0045
7	35	723596	18.09	7	1056	2.96	0.313	0.317	-0.0045
7	45	722276	50.83	8	3498	10.71	0.469	0.469	0.0001
7	47	723654	19.20	7	1056	3.26	0.538	0.540	-0.0017
7	50	722292	50.83	8	2442	10.71	0.419	0.418	0.0011
7	51	735542	42.40	8	2442	8.60	0.362	0.362	0.0005
7	60	722273	34.07	8	2442	6.52	0.356	0.356	-0.0002
8 (CA)*	5	722347	67.91	8	2865	14.98	0.575	0.569	0.0056
8 (CA)*	21	722363	52.77	8	4191	11.19	0.218	0.221	-0.0031
8 (CA)*	22	722350	181.36	26	1735	21.54	0.356	0.356	0.0009
8 (CA)*	23	722364	124.85	17	4191	18.5	0.415	0.413	0.0018
8 (CA)*	25	723242	136.04	7	1735	34.49	0.330	0.328	0.0024
8 (CA)*	32	723236	24.04	7	1130	4.55	0.379	0.381	-0.0022
8 (CA)*	35	723213	42.28	7	1130	9.43	0.255	0.258	-0.0032
8 (CA)*	37	722383	97.6	26	2456	9.93	0.537	0.538	-0.0009
8 (CA)*	39	722366	34.87	17	1130	3.06	0.407	0.409	-0.0022
8 (CA)*	46	722360	29.52	8	1130	5.38	0.642	0.639	0.0022
8 (CA)*	56	722381	37.44	8	1326	7.36	0.244	0.248	-0.0044
8 (CA)*	57	723329	29.53	7	1326	6.02	0.539	0.539	-0.0002
8 (CA)*	60	723290	38.09	7	1326	8.31	0.307	0.309	-0.0022
8 (CA)*	62	722379	46.03	17	1326	4.98	0.415	0.416	-0.0008
8 (CA)*	64	722386	28.99	8	1326	5.25	0.493	0.491	0.0027
8	2	723212	287.10	7	23877	74.86	0.425	0.419	0.0059
8	15	723256	461.47	7	23877	121.50	0.340	0.337	0.0035
8	22	722350	1633.50	26	23870	222.90	0.335	0.334	0.0013
8	25	723242	1149.60	7	23877	305.40	0.284	0.282	0.0022
8	49	722383	615.86	26	28566	81.80	0.501	0.501	0.0000
8	74	722379	369.73	17	14311	60.49	0.386	0.384	0.0021

*Preliminary results based on sample data, CA forms only

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Table C7: Equating Evaluation Results: English Language Arts/Literacy

Grade	# Items Flagged for Poor Fit	Stocking and Lord TCC Method Results						IRT Regres-sion Method
		TCC Results		Parameter Comparison Statistics				
				A-Parameter		B-Parameter		
		# Itera-tions	F Value	Corr	# RMSD Outliers	Corr	# RMSD Outliers	# Flagged Items
3	13	5	0.112020	0.75	3	0.78	5	6
4	9	5	0.284726	0.80	2	0.93	3	9
5	10	8	0.442081	0.81	1	0.87	2	7
6	4	4	0.379465	0.88	2	0.89	4	4
7	9	7	0.161390	0.74	1	0.87	1	14
8 (CA)*	14	3	0.122972	0.86	5	0.85	1	6
8	5	3	0.193209	0.90	4	0.88	2	6

*Preliminary results based on sample data, CA forms only.

Table C8: Equating Evaluation Results: Mathematics

Grade	# Items Flagged for Poor Fit	Stocking and Lord TCC Method Results						IRT Regres-sion Method
		TCC Results		Parameters Comparison Statistics				
				A Parameter		B Parameter		
		# Itera-tions	F Value	Corr	# RMSD Outliers	Corr	# RMSD Outliers	# Flagged Items
3	8	4	0.080611	0.96	0	0.99	0	3
4	5	7	0.118830	0.85	1	0.98	0	1
5	8	7	0.501404	0.91	1	0.94	0	1
6	5	7	0.384639	0.91	1	0.95	1	1
7	9	10	0.109970	0.93	0	0.97	1	2
8 (CA)*	15	14	0.098783	0.89	1	0.93	3	4
8	6	25	0.639081	0.95	1	0.98	1	4

*Preliminary results based on sample data, CA forms only

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Table C9: Statistics Comparing IRT Item-Ability Regression Curves for Flagged Items: English Language Arts/Literacy

Grade	Anchor Item Position	ItemId	UnWtd RMSD	UnWtd Mean Abs Difference	Max AbsDif	UnWtd Mean	Wtd RMSD	Wtd Mean Abs Difference	Wtd Mean
3	4	718413	0.1259	0.0922	0.2319	0.0890	0.1277	0.1001	0.0994
3	6	721240	0.0816	0.0623	0.1575	0.0590	0.1165	0.1096	0.1095
3	39	718297	0.1571	0.1338	0.2619	-0.1338	0.2182	0.2124	-0.2124
3	51	718526	0.1272	0.1086	0.2068	0.1086	0.1774	0.1741	0.1741
3	53	718481	0.0901	0.0725	0.1527	-0.0684	0.1126	0.1023	-0.1021
3	63	718344	0.1338	0.1048	0.2257	0.0896	0.1246	0.1000	0.0957
4	18	721284	0.0820	0.0641	0.1621	0.0496	0.1187	0.1068	0.1034
4	33	721257	0.1266	0.1039	0.2212	-0.1039	0.1780	0.1712	-0.1712
4	39	719563	0.1227	0.0841	0.2655	-0.0841	0.1842	0.1670	-0.1670
4	44	721261	0.1454	0.1289	0.2258	-0.0556	0.1097	0.0908	-0.0530
4	45	721279	0.1519	0.1032	0.3300	0.1032	0.2245	0.1996	0.1996
4	47	717234	0.1360	0.1244	0.1981	-0.0386	0.1010	0.0854	-0.0427
4	51	721268	0.0949	0.0799	0.1595	0.0799	0.1249	0.1190	0.1190
4	58	721264	0.0860	0.0659	0.1650	0.0659	0.1252	0.1180	0.1180
4	92	719554	0.1394	0.1140	0.2445	-0.1061	0.2010	0.1938	-0.1937
5	3	721313	0.0927	0.0685	0.1843	0.0685	0.1419	0.1341	0.1341
5	11	721326	0.1470	0.1112	0.2819	-0.1112	0.2065	0.1888	-0.1888
5	35	721287	0.0994	0.0802	0.1764	-0.0802	0.1254	0.1163	-0.1163
5	47	721297	0.1236	0.1008	0.1992	0.0861	0.1240	0.1062	0.1044
5	73	721305	0.1422	0.1122	0.2510	0.1119	0.1862	0.1728	0.1728
5	81	718789	0.1135	0.1062	0.1606	-0.0440	0.1174	0.1062	-0.0928
5	82	718790	0.1852	0.1569	0.2782	-0.1516	0.2209	0.2092	-0.2091
6	30	721355	0.1217	0.1060	0.1705	0.1004	0.1352	0.1295	0.1294
6	31	721345	0.1650	0.1426	0.2678	-0.1426	0.2160	0.2081	-0.2081
6	56	721392	0.1103	0.0938	0.1731	-0.0921	0.1450	0.1399	-0.1399
6	80	721404	0.1197	0.0962	0.2170	0.0962	0.1730	0.1659	0.1659

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Table C9: Statistics Comparing IRT Item-Ability Regression Curves for Flagged Items: English Language Arts/Literacy (cont.)

Grade	Anchor Item Position	ItemId	UnWtd RMSD	UnWtd Mean Abs Difference	Max AbsDif	UnWtd Mean	Wtd RMSD	Wtd Mean Abs Difference	Wtd Mean
7	6	721453	0.0783	0.0609	0.1515	0.0519	0.1165	0.1092	0.1085
7	20	721483	0.1692	0.1491	0.2423	-0.1412	0.2071	0.2009	-0.2008
7	25	721420	0.1057	0.0851	0.1770	-0.0800	0.1281	0.1154	-0.1152
7	29	721429	0.1482	0.1166	0.2423	0.1138	0.1533	0.1341	0.1340
7	34	721426	0.0951	0.0829	0.1660	0.0525	0.1290	0.1193	0.1143
7	40	721487	0.0917	0.0686	0.1803	-0.0686	0.1378	0.1292	-0.1292
7	45	721499	0.0951	0.0811	0.1639	-0.0811	0.1301	0.1261	-0.1261
7	72	721436	0.0944	0.0770	0.1667	-0.0770	0.1321	0.1258	-0.1258
7	75	721462	0.4296	0.3987	0.5953	0.3987	0.5138	0.5057	0.5057
7	77	721505	0.0902	0.0749	0.1556	0.0749	0.1282	0.1238	0.1238
7	79	721506	0.0763	0.0559	0.1521	0.0559	0.1147	0.1066	0.1066
7	94	721458	0.0905	0.0666	0.1818	0.0666	0.1282	0.1173	0.1173
7	95	717597	0.1634	0.1267	0.2782	-0.0980	0.1188	0.0917	-0.0799
7	99	721437	0.0950	0.0811	0.1579	-0.0811	0.1306	0.1264	-0.1264
8 (CA)*	4	721601	0.1587	0.1049	0.3542	0.1049	0.2101	0.1727	0.1727
8 (CA)*	14	721577	0.1470	0.1080	0.3174	0.0845	0.2269	0.2067	0.2036
8 (CA)*	25	721515	0.0788	0.0577	0.1587	-0.0577	0.112	0.1025	-0.1025
8 (CA)*	37	721597	0.0947	0.0672	0.1946	-0.0663	0.1445	0.1334	-0.1334
8 (CA)*	48	721599	0.1430	0.1145	0.2353	-0.1019	0.1478	0.1260	-0.1245
8 (CA)*	59	721582	0.1312	0.1039	0.2257	0.1039	0.1834	0.1758	0.1758
8	4	721601	0.1387	0.0942	0.3016	0.0942	0.1712	0.1408	0.1408
8	14	721577	0.1557	0.1190	0.3239	0.0903	0.2355	0.2184	0.2154
8	37	721597	0.1033	0.0760	0.2030	-0.0749	0.1524	0.1415	-0.1415
8	48	721599	0.1726	0.1432	0.2718	-0.1119	0.1611	0.1371	-0.1310
8	59	721582	0.1103	0.0883	0.1937	0.0883	0.1459	0.1377	0.1377
8	111	721662C	0.1194	0.0794	0.2721	0.0722	0.1585	0.1228	0.1176

*Preliminary results based on sample data, CA forms only.

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Table C10: Statistics Comparing IRT Item-Ability Regression Curves for Flagged Items: Mathematics

Grade	Anchor Item Position	ItemId	UnWtd RMSD	UnWtd Mean Abs Difference	Max AbsDif	UnWtd Mean	Wtd RMSD	Wtd Mean Abs Difference	Wtd Mean
3	3	721932	0.0821	0.0638	0.1580	0.0554	0.1164	0.1051	0.1038
3	51	721893	0.0793	0.0573	0.1631	0.0573	0.1219	0.1134	0.1134
3	52	721907	0.0933	0.0694	0.1878	0.0694	0.1425	0.1334	0.1334
4	55	722016	0.1048	0.0738	0.2127	0.0730	0.1323	0.1098	0.1097
5	42	722071	0.1991	0.1621	0.3524	0.1621	0.2878	0.2790	0.2790
6	26	723891	0.1172	0.0985	0.2005	-0.0985	0.1636	0.1581	-0.1581
7	9	733207	0.1080	0.0736	0.2341	0.0716	0.1660	0.1514	0.1514
7	43	722271	0.0985	0.0568	0.2547	0.0568	0.1527	0.1252	0.1252
8 (CA)*	4	722353	0.0902	0.0600	0.1981	-0.0593	0.1233	0.1033	-0.1033
8 (CA)*	17	722354	0.0772	0.0459	0.193	-0.0459	0.1209	0.1035	-0.1035
8 (CA)*	28	722349	0.0925	0.0584	0.2184	-0.0584	0.1241	0.1014	-0.1014
8 (CA)*	42	722371	0.0892	0.0675	0.1746	0.0675	0.1348	0.1278	0.1278
8	17	722354	0.0874	0.0586	0.1923	-0.0586	0.1333	0.1201	-0.1201
8	26	722370	0.1238	0.1056	0.2176	-0.0466	0.1019	0.0845	-0.0218
8	28	722349	0.1034	0.0736	0.2137	-0.0736	0.1276	0.1084	-0.1084
8	54	722371	0.1011	0.0762	0.1891	0.0740	0.1298	0.1142	0.1140

*Preliminary results based on sample data, CA forms only.

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Appendix D:
Smarter Balanced Scoring Specifications

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Smarter Balanced Scoring Specification

2014–2015 Administration

Summative and Interim Assessments:
ELA Grades 3–8, 11
Mathematics Grades 3–8, 11

Version 7

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1. INTRODUCTION

This document mainly describes the scoring methods of the Smarter Balanced summative assessments designed for accountability purposes during the 2014–2015 test administration. Table 1 lists all summative assessments administered in 2014–2015. Scoring rules for all interim tests are provided at the end of the document.

Table 1. Assessments Administered in 2014–2015

Subject and Grade	Online Administration		Paper Administration	
	Equating Mode	Overall Scoring	Equating Mode	Overall Scoring
ELA 3–8, 11	Pre	MLE	Post	MLE
Math 3–8, 11	Pre	MLE	Post	MLE

Note: MLE = maximum likelihood estimation

2. RULES FOR ESTIMATING STUDENT ABILITY

2.1 Maximum Likelihood Estimation Theta Score

The maximum likelihood estimation (MLE) is used to construct the theta score. Indexing items by *i*, the likelihood function based on the *j*th person's score pattern for k_i items is

$$L_j(\theta \mid \mathrm{z_j}, \mathbf{a}_j, \mathbf{b'}_{1,j}, \ldots \mathbf{b'}_{k_j,j}) = \prod_{i=1}^{k_i} p_i(z_{ji} \mid \theta, a_{i,j}, b_{i,1}^j, \ldots, b_{i,m_i^j}^j),$$

where $\mathbf{b'}_i^j = (b_{i,1}^j, \ldots, b_{i,m_i^j}^j)$ are the *i*th item's step parameters and m_i^j is the possible score of this item, $a_{i,j}$ is the discrimination parameter. Depending on the item type, the probability $p_i(z_{ji} \mid \theta, a_{i,j}, b_{i,1}^j, \ldots, b_{i,m_i^j}^j)$ takes either the form of a two-parameter logistic (2PL) model for multiple-choice (MC) items or the form based on the generalized partial credit model for polytomous items.

In the case of MC items, we have

$$p_i(z_{ji} \mid \theta, a_{i,j}, b_{i,1}^j, \ldots, b_{i,m_i^j}^j) = \begin{cases} \dfrac{\exp Da_{i,j}(\theta - b_i^j)}{1 + \exp Da_{i,j}(\theta - b_i^j)} = p_i & \text{if } z_{ji} = 1 \\ \dfrac{1}{1 + \exp Da_{i,j}(\theta - b_i^j)} = 1 - p_i & \text{if } z_{ji} = 0 \end{cases};$$

in the case of constructed-response (CR) items,

$$p_i(z_{ji} \mid \theta, a_{i,j}, b_{i,1}^j, \ldots, b_{i,m_i^j}^j) = \begin{cases} \dfrac{\exp Da_{i,j}(\sum_{r=1}^{z_{ji}}(\theta - b_{i,r}^j))}{s_i(\theta, b_{i,1}^j, \ldots, b_{i,m_i^j}^j)} & \textit{if } z_{ji} > 0 \\ \dfrac{1}{s_i(\theta, b_{i,1}^j, \ldots, b_{i,m_i^j}^j)} & \textit{if } z_{ji} = 0 \end{cases},$$

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where $s_i(\theta, a_{i,j}, b_{i,1}^j, \ldots, b_{i,m_i^j}^j) = 1 + \sum_{l=1}^{m_i^j} \exp(\sum_{r=1}^{l} Da_{i,j}(\theta - b_{i,r}^j))$, $D = 1.7$.

Thus, we have $SE\left(\hat{\theta}\right) = \sqrt{Var\left(\hat{\theta}\right)}$.

2.2 Scoring All Correct and All Incorrect Cases

In item response theory (IRT) maximum likelihood (ML) ability estimation methods, zero and perfect scores are assigned the ability of minus and plus infinity. To handle such cases, AIR proposed several options. The method below has been agreed on by both Smarter Balanced and AIR.

For all correct and all incorrect cases, assign the highest obtainable scores (HOT and HOSS) or the lowest obtainable scores (LOT and LOSS) presented in Table 4.

3. SCORING INCOMPLETE TESTS

3.1 Overview

Sometimes students fail to complete their tests. This section covers three specifications:

- When a test is considered attempted
- When a test is scored
- How incomplete tests are scored when they are scored

3.1.1 Attemptedness/Participation

If a student logged onto both the CAT and the Performance Task parts of the test, the student is considered as participated, even if no items are answered. These tests will be included in the data file, but no scores will be computed.

3.1.2 When to Score an Incomplete Test

All attempted tests get scored if the tests meet the rules of attemptedness.
All tests with at least one CAT item and one performance task item answered are considered attempted. For the interim assessment blocks (IABs), a block with at least one item answered is considered attempted.

Attemptedness rules for CAT items:

- N (not attempted) = responded to zero item
- Y (attempted) = responded to one item or more

Attemptedness rules for performance task items:

- N (not attempted) = responded to zero item

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- Y (attempted) = responded to one item or more

Attemptedness rules for Block items (IAB):
- N (not attempted) = responded to zero item
- Y (attempted) = responded to one item or more

For Summative and ICA, report scores the following occurs:
- CAT (non-performance task part) attemptedness = Y; AND
- Performance task attemptedness = Y

For Interim Assessment Blocks (IABs), report scores the following occurs:
- Block attemptedness = Y

<u>Attemptedness Flag in the data file</u>

The attemptedness flag will include three values for Summative and ICA (N, P, and Y) and two values (P and Y) for IAB.

N = non-participant (a student who only had activity on a single part of the test – CAT or PT, but not both)

P = participant (a student who logged into both parts of the test but didn't respond to anything on at least one part of the test)

Y = attempted (a student who logged into both parts of the test and responded to at least one item on both)

3.1.3 Assigning Scores to Incomplete Tests

Tests are considered "complete" if students respond to the minimum number of operational items specified in the blueprint for the CAT and all items in the performance task form. Otherwise, the tests are "incomplete." MLE is used to score the incomplete tests counting unanswered items as incorrect. If a student completes a test, but did not submit the test, TDS marks the test as completed. If TDS allowed the student to submit his/her test it will be considered "complete".

3.1.3.1 Online Summative Tests

Online Summative Tests include both the CAT and the performance task parts. The performance task part includes a fixed form test. For the performance task items, unanswered items will be treated as incorrect.

For the CAT items, the specific unanswered items are unknown; thus, simulated items are used in place of administered items. Simulated items are generated with the following rules:

- Minimum of the CAT operational test length is used to determine the test length of the incomplete tests.

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- It is assumed that all unanswered operational items are MC items. The item parameters of all unanswered operational items are equal to the average values of the on-grade items for discrimination and difficulty parameters in the summative item pool, respectively. See Table 2 for the average discrimination and difficulty parameters.
- All unanswered operational items are scored as "incorrect."

Table 2. Average Discrimination (a) and Difficulty (b) Parameters

Grade	ELA		Math	
	a	b	a	b
3	0.67	-0.42	0.85	-0.81
4	0.59	0.13	0.81	-0.06
5	0.61	0.51	0.77	0.68
6	0.54	1.01	0.70	1.06
7	0.54	1.11	0.71	1.79
8	0.53	1.30	0.61	2.29
HS	0.50	1.69	0.53	2.71

For the summative online test, if the CAT part is incomplete, only a total score will be reported, but not subscores because the claim information for the unanswered CAT items is unknown.

3.1.3.2 Fixed Form Tests

For fixed form tests, including the paper summative tests, ICAs and IABs, unanswered items will be treated as incorrect. For summative fixed form tests and ICAs, both total and subscores will be computed.

3.1.3.3 Merging Online and Paper Tests

This testing program provides both online and paper tests. Therefore, there will be cases where a student takes part of the test online and part of the test on paper. For these tests, the items administered online and paper will be combined before generating total and subscores. In some cases, a student will take the same part (performance task or CAT) online and on paper. If one version is complete and the other is not complete, the complete version will be chosen. If multiple incomplete tests exist, the most complete test will be used. Otherwise, the online version will always be chosen for scoring purposes. No attempt will be made to merge multiple incomplete attempts into a single test event. If multiple complete tests with the same administration mode exist for a student, the most recent version will be used.

3.2 Hand Scoring Rules

Scoring rules for hand scoring items:

- Any condition code will be recoded to zero.
- Evidence, purpose, and conventions are the scoring dimensions for the writing essays. Scores for evidence and purpose dimensions will be averaged, and the average will be rounded up.

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3.3 Reporting Rules

Scores will be reported for all tests that meet the attemptedness rule in Section 3.1.2.

4. RULES FOR TRANSFORMING THETA TO VERTICAL SCALE SCORES

The IRT vertical scale is formed by linking across grades using common items in adjacent grades. The vertical scale score is the linear transformation of the post-vertically scaled IRT ability estimate.

$$SS = a * \theta + b$$

The scaling constants *a* and *b* are provided by Smarter Balanced. Table 3 lists the scaling constants for each subject for the theta-to-scaled score linear transformation. Scale scores will be rounded to an integer.

Table 3. Vertical Scaling Constants on the Reporting Metric

Subject	Grade	Slope (a)	Intercept (b)
ELA	3-8, HS	85.8	2508.2
Math	3-8, HS	79.3	2514.9

4.1 Lowest/Highest Obtainable Scores

Extreme unreliable student ability estimates will be truncated. Table 4 presents the lowest and the highest obtainable scores in both theta and scale score metrics. Estimated theta's lower than LOT or higher than HOT will be truncated to the LOT and HOT values, and assign LOSS and HOSS associated with the LOT and HOT. LOT and HOT will be applied to all tests (Summative, ICA, and IAB) and all scores (total and subscores).

The standard error for LOT and HOT will be computed using the LOT and HOT ability estimates given the administered items. For example, in the formula in Section 5.1, $\hat{\theta}$=LOT or HOT, a and b are for the administered items.

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Table 4. Lowest and Highest Obtainable Scores

Subject	Grade	Theta Metric		Scale Score Metric	
		LOT	HOT	LOSS	HOSS
ELA	3	-4.5941	1.3374	2114	2623
ELA	4	-4.3962	1.8014	2131	2663
ELA	5	-3.5763	2.2498	2201	2701
ELA	6	-3.4785	2.5140	2210	2724
ELA	7	-2.9114	2.7547	2258	2745
ELA	8	-2.5677	3.0430	2288	2769
ELA	HS	-2.4375	3.3392	2299	2795
Math	3	-4.1132	1.3335	2189	2621
Math	4	-3.9204	1.8191	2204	2659
Math	5	-3.7276	2.3290	2219	2700
Math	6	-3.5348	2.9455	2235	2748
Math	7	-3.3420	3.3238	2250	2778
Math	8	-3.1492	3.6254	2265	2802
Math	HS	-2.9564	4.3804	2280	2862

5. CALCULATING MEASUREMENT ERROR

5.1 Standard Error of Measurement

With MLE estimation, the standard error (SE) for student *i* is:

$$SE(\theta_i) = \frac{1}{\sqrt{I(\theta_i)}}$$

where $I(\theta_i)$ is the test information for student *i*, calculated as:

$$I(\theta_i) = \sum_{j=1}^{I} D^2 a_j^2 \left(\frac{\sum_{l=1}^{m_j} l^2 Exp\left(\sum_{k=1}^{l} Da_j(\theta_i - b_{jk})\right)}{1 + \sum_{l=1}^{m_j} Exp\left(\sum_{k=1}^{l} Da_j(\theta_i - b_{jk})\right)} - \left(\frac{\sum_{l=1}^{m_j} lExp\left(\sum_{k=1}^{l} Da_j(\theta_i - b_{jk})\right)}{1 + \sum_{l=1}^{m_j} Exp\left(\sum_{k=1}^{l} Da_j(\theta_i - b_{jk})\right)} \right)^2 \right)$$

where m_j is the maximum possible score point (starting from 0) for the *j*th item, D is the scale factor, 1.7.

SE is calculated based only on the answered item(s) for both complete and incomplete tests. The upper bound of SE is set to 2.5 on theta metric. Any value larger than 2.5 is truncated at 2.5 on theta metric.

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5.2 Standard Error Transformation

Standard errors of the MLEs are transformed to be placed onto the reporting scale. This transformation is:

$$SE_{vs} = a * SE_{\theta_i}$$

where SE_θ is the standard error of the ability estimate on the θ scale and a is the slope of the scaling constants that transform θ to the reporting scale.

6. RULES FOR CALCULATING CLAIM SCORES (SUBSCORES)

6.1 MLE Scoring for Claim Scores

Claim scores will be calculated using MLE, as described in Section 2.1; however, the scores are based on the items contained in a particular claim.

In ELA, claim scores will be computed for each claim. In math, claim scores will be computed for Claim 1, Claim 2 and 4 combined, and Claim 3.

6.2 Scoring All Correct and All Incorrect Cases

Apply the rule in Section 2.2 to each Claim.

6.3 Rules for Calculating Achievement Levels for Claims (Reporting Categories)

AIR will report relative strengths and weaknesses for each student at the reporting category (claim) level in addition to scaled scores. If the difference between the proficiency cut score and the claim score is greater (or less) than 1.5 standard error of the claim, a plus or minus indicator will appear on the student's score report.

For IAB and Summative, the specific rules are as follows:

- Below Standard (Code=1): if $round(SS_{rc} + 1.5 * SE(SS_{rc}),0) < SS_p$
- At/Near Standard (Code=2) : if $round(SS_{rc} + 1.5 * SE(SS_{rc}),0) \geq SS_p$ and $round(SS_{rc} - 1.5 * SE(SS),0) < SS_p$, a strength or weakness is indeterminable
- Above Standard (Code=3): if $round(SS_{rc} - 1.5 * SE(SS_{rc}),0) \geq SS_p$

where SS_{rc} is the student's scale score on a reporting category; SS_p is the proficiency scale score cut (Level 3 cut); and $SE(SS_{rc})$ is the standard error of the student's scale score on the reporting category. For all correct cases, assign Level 3. For all incorrect cases, assign Level 1.

For ICA, the rules for calculating achievement levels are as follows:

- Below Standard (Code=1): if $a * (\theta_{rc} + 1.5 * SE(\theta_{rc})) + b < SS_p$

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- At/Near Standard (Code=2) : if $[a * (\theta_{rc} + 1.5 * SE(\theta_{rc})) + b] \geq SS_p$ and $[b * (\theta_{rc} - 1.5 * SE(\theta_{rc})) + a] < SS_p$, a strength or weakness is indeterminable
- Above Standard (Code=3): if $[a * (\theta_{rc} - 1.5 * SE(\theta_{rc}) + b]) \geq SS_p$

where θ_{rc} is the student's theta score on a reporting category. SS_p is the proficiency scale score cut (Level 3 cut). $SE(\theta_{rc})$ is the standard error of the student's score on the reporting category. *a* and *b* are the scaling constants.

[Note: The difference in the two rules is in the rounding rule. Because a rounding rule was updated after ICA was deployed, ICA has a different rule.]

7. RULES FOR CALCULATING ACHIEVEMENT LEVELS

Overall scale scores for Smarter Balanced are mapped into four performance levels per grade/course. The performance level designations are level 1, level 2, level 3, and level 4. The definition of these levels is defined after standard setting.

7.1 Threshold Scale Scores for Four Achievement Levels

Tables 5 and 6 show the theta cut scores and reported scaled scores (SS) for the ELA assessments and the math assessments, respectively.

Table 5. ELA Theta Cut Scores and Reported Scaled Scores

Grade	Theta Cut between Levels 1 and 2	SS Cut between Levels 1 and 2	Theta Cut between Levels 2 and 3	SS Cut between Levels 2 and 3	Theta Cut between Levels 3 and 4	SS Cut between Levels 3 and 4
3	-1.646	2367	-0.888	2432	-0.212	2490
4	-1.075	2416	-0.410	2473	0.289	2533
5	-0.772	2442	-0.072	2502	0.860	2582
6	-0.597	2457	0.266	2531	1.280	2618
7	-0.340	2479	0.510	2552	1.641	2649
8	-0.247	2487	0.685	2567	1.862	2668
HS	-0.177	2493	0.872	2583	2.026	2682

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Table 6. Math Theta Cut Scores and Reported Scaled Scores

Grade	Theta Cut between Levels 1 and 2	SS Cut between Levels 1 and 2	Theta Cut between Levels 2 and 3	SS Cut between Levels 2 and 3	Theta Cut between Levels 3 and 4	SS Cut between Levels 3 and 4
3	-1.689	2381	-0.995	2436	-0.175	2501
4	-1.310	2411	-0.377	2485	0.430	2549
5	-0.755	2455	0.165	2528	0.808	2579
6	-0.528	2473	0.468	2552	1.199	2610
7	-0.390	2484	0.657	2567	1.515	2635
8	-0.137	2504	0.897	2586	1.741	2653
HS	0.354	2543	1.426	2628	2.561	2718

8. RULES FOR INTERIM TESTS

This year all interim tests are fixed-form tests. Interim ICAs will be scored in the same way as the summative tests.

For the Interim Assessment Blocks (IABs), the test results per grade and subject will be merged into a single result, and the block scores will be calculated as reporting category scores on the combined result. At the overall level for the combined result, number of blocks attempted and number of blocks proficient will be computed for reporting purposes in the Online Reporting System as following:

- Number of blocks attempted: Count the Blocks with Block attemptedness=Y
- Number of block proficient: Count the Blocks with performance “Above Starndard”.

In addition, the IAB test results will also be scored individually (independently from the combined test). There will be overall scores on each IAB test (attemptedness, scale score, and proficiency level) that use the same calculation rules (and are the same) as the reporting category scores for the blocks represented in the combined test. But these will be used to produce open source scoring configuration packages and for delivery of results and scores to other clients and vendors.

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Appendix E:
MAP Sample Reports and GRF Layout

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Figure E1. Student Roster

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Figure E2. Individual Student Report

Missouri Grade-Level Assessment Program

2015 Individual Student Report - *Final*

Student Report for:

Name: WEBBER, PEGGY
Student ID: 1234567890
Birthdate: MMDDYYYY
Grade: Grade 3
School: SALEM ELEM.
District: S. CENTRAL DISTRICT

Overview of Performance

Scale Score: 2452

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) 735-2966, fax (573) 526-4903, email civilrights@dese.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.

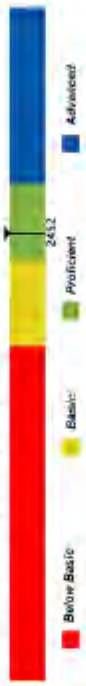
For more resources, go to
http://dese.mo.gov/

How did your child perform in English/Language Arts?

Your child received a score of 2452.

One way to measure performance is by achievement levels, which are based on scale scores. Achievement levels describe what your child's score means.

Your child's achievement level is Proficient.



What does a level of "Proficient" mean?
The student has met the achievement standard and demonstrates progress toward mastery of the knowledge and skills in English language arts/literacy needed for likely success in future coursework.

Advanced
Scores at 2490 and above demonstrate a thorough understanding of the content at this grade level.

Proficient
Scores at 2432-2489 demonstrate an understanding of the content expected at this grade level.

Basic
Scores at 2367-2431 demonstrate a partial understanding of the content expected at this grade level.

Below Basic
Scores at 2366 and below do not demonstrate an understanding of the content expected at this grade level.

Reading	Writing	Listening	Research
Above Standard	Above Standard	Above Standard	Above Standard
Students can read closely and analytically to comprehend a range of increasingly complex literary and informational texts.	Students can produce effective and well-grounded writing for a range of purposes and audiences.	Students can employ effective speaking and listening skills for a range of purposes and audiences.	Students can engage in research and inquiry to investigate topics, and to analyze, integrate, and present information.

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03/16/2015

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Figure 3. Student Label

MISSOURI ASSESSMENT PROGRAM

WEBBER, PEGGY

Grade: **Grade 8**
Test Date: **MM/DD/YY**
DOB: **MM/DD/YY**
MOSIS State ID: **0123456789**

Content Area	English Language Arts
Achievement Level	**Advanced**
MAP Scale Score	**2731**

MISSOURI ASSESSMENT PROGRAM

WEBBER, PEGGY

Grade: **Grade 8**
Test Date: **MM/DD/YY**
DOB: **MM/DD/YY**
MOSIS State ID: **0123456789**

Content Area	Mathematics
Achievement Level	**Level Not Determined**
MAP Scale Score	

MISSOURI ASSESSMENT PROGRAM

WEBBER, PEGGY

Grade: **Grade 8**
Test Date: **MM/DD/YY**
DOB: **MM/DD/YY**
MOSIS State ID: **0123456789**

Content Area	Science
Achievement Level	**Below Basic**
MAP Scale Score	**777**

MISSOURI ASSESSMENT PROGRAM

Grade:
Test Date:
DOB:
MOSIS State ID:

Content Area
Achievement Level
MAP Scale Score

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MO MAP Spring 2015 GRF - *Final*

Start	End	Len	Field	Values	Remarks
		0	Hierarchical Information		
1	2	2	StateCode	MO	Missouri
3	15	13	Test type	MAPSMTSPR2015	Represents the assessment the student will be taking. MAPSMTSPR2015 is MAP Grade-Level Assessment spring Summative.
16	43	28	District Name		Data will come from Node file, not Precode file.
44	49	6	DistCd	0-9, DESE-Assigned Unique 6 digit code representing the district in which the school is located.	Reporting District Code
50	77	28	School Name		Data will come from Node file, not Precode file.
78	81	4	ScCd	0-9; Four digit school code	Reporting School Code
82	83	2	Grade	Grade level as of the time data is being submitted unless otherwise specified. 03 - 08, Must include 2 characters (leading zeros when applicable).	Grade
84	113	30	City	Any character, blank	This is the "SHIP_TO_CITY" in Node file.
114	117	4	Current School Year	YYYY	2015
118	167	50	Blank for Future Use	Filler	Reserved for future use
			Student BIO Information		
168	179	12	CTB Use Only (Unique System-generated ID)	0-11	Unique ID CTB Specific
180	189	10	DRC Student ID (Unique System-generated)	0-9	Unique record number per student assessment instance. This is an INSIGHT internal number that uniquely identifies each student test across multiple administrations in a given contract year.
190	209	20	Local Student ID	0-9	
210	219	10	StateID	0-9; blank State assigned student identifier. See http://dese.mo.gov/MOSIS for more information.	MOSIS ID
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

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Start	End	Len	Field	Values	Remarks
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	
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	Blank	Filler	Data in this field is blanked-out and not included in the GRF file to DESE
423	423	1	Blank	Filler	Data in this field is blanked-out and not included in the GRF file to DESE
424	424	1	State Use 1	Y if marked, Blank if not marked.	
425	425	1	State Use 2	Y if marked, Blank if not marked.	
426	426	1	State Use 3	Y if marked, Blank if not marked.	
427	427	1	State Use 4	Y if marked, Blank if not marked.	
428	428	1	State Use 5	Y if marked, Blank if not marked.	
429	429	1	State Use 6	Y if marked, Blank if not marked.	
430	430	1	State Use 7	Y if marked, Blank if not marked.	
431	431	1	State Use 8	Y if marked, Blank if not marked.	
432	432	1	State Use 9	Y if marked, Blank if not marked.	
433	433	1	State Use 10	Y if marked, Blank if not marked.	
434	435	2	Period	01-10, blank	(Because Fall spans two calendar years, the YY of the two years are used - example Fall 15-16 and Spring 2015).
			CONTENT AREA INFORMATON		

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Start	End	Len	Field	Values	Remarks
436	437	2	Content Code	01 = English Language Arts, 02 = Mathematics, 03 = Science	
438	440	3	Content Form	CA1,CA2,CA3,CS1,CT1,CT2, Blank	Form is at the Content level. First character: C= core Second character: A=regular form, S=Spanish, T=Transcription Third character: Numeric identifier
441	443	3	PT Content Form	PA1,PA2, PA3,PS1,PT1, Blank	Form is at the Content level. First character: P= performance task Second character: A=regular form, S=Spanish, T=Transcription Third character: Numeric identifier
444	503	60	EducatorFirstName	Supported Characters : A-Z, a-z, 0-9, "-", "_", " ' ", ".", space	From field in Precode File "Educator" is also known as "Examiner".
504	563	60	EducatorLastName	Supported Characters : A-Z, a-z, 0-9, "-", "_", " ' ", ".", space	From field in Precode File "Educator" is also known as "Examiner".
564	633	70	ExaminerEmail	Up to 50 characters, valid email format (xxx@xxx.xxx), Blank if no email included.	From Precode File. Examiner email is the same as Educator's email.
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; set to Y if student was in a Precode file, if blank student was manually entered.	Only set if the student comes in the precode file.
660	709	50	Blank for Future Use	Filler	Reserved for future use
			Accommodations		
710	710	1	Accommodation Braille edition (A012)	Blank = Not Indicated Y = Indicated	Code A012 refers to Braille administered via Paper format

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Start	End	Len	Field	Values	Remarks
711	711	1	Accommodation Large Print edition (A021)	Blank = Not Indicated Y = Indicated	Paper format only
712	712	1	Accommodation Signing of assessment (ASL) for Math and Science and ELA Listening items (A051)	Blank = Not Indicated Y = Indicated	Online
713	713	1	Accommodation Signing of assessment (ASL) for Math and Science and ELA Listening items (A052)	Blank = Not Indicated Y = Indicated	Any format (online or paper)
714	714	1	Accommodation Paper Based Assessment (A102)	Blank = Not Indicated Y = Indicated	Any format
715	715	1	Accommodation Use of Specialized Calculator on items where calculator is allowed, includes talking calculators or Braille calculators. (A396)	Blank = Not Indicated Y = Indicated	Any format
716	716	1	Accommodation Alternate Response Options (such as adapted keyboards, stickykeys, touch screens.) (A441)	Blank = Not Indicated Y = Indicated	Any format
717	717	1	Accommodation Use of Bilingual Dictionary (S431)	Blank= Not Indicated Y = Indicated	
718	718	1	Support Color Contrasting Text (S101)	Blank = Not Indicated Y = Indicated	S101 = Online
719	719	1	Support Color Chooser (S101)	Blank = Not Indicated Y = Indicated	
720	720	1	Support Color Contrast (S102)	Blank = Not Indicated Y = Indicated	S102 = Paper
721	721	1	Accommodation S103 Color Overlay	Blank = Not Indicated Y = Indicated	Paper
722	722	1	Accommodation S105 Magnification	Blank = Not Indicated Y = Indicated	
723	723	1	Accommodation Masking (S106)	Blank = Not Indicated Y = Indicated	S106=Online
724	724	1	Accommodation Masking (S107)	Blank = Not Indicated Y = Indicated	S107=Paper
725	725	1	Accommodation Read-Aloud (For all items in any subject, excluding ELA Reading passages) (S041)	Blank = Not Indicated Y = Indicated	(EXCLUDING ELA READING PASSAGES) S041=Online; The system allows items in mathematics and English Language Arts to be read aloud to the student via embedded text-to-speech technology. The student can control the speed and volume of the voice.

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Start	End	Len	Field	Values	Remarks
726	726	1	Accommodation Read-Aloud (For all items in any subject, excluding ELA Reading passages) (S042)	Blank = Not Indicated Y = Indicated	S042= Online- Not Embedded; Student may use assistive technology text-to-speech software to allow all items in any subject, not including ELA reading passage, to be read aloud.
727	727	1	Accommodation Read-Aloud (For all items in any subject, excluding ELA Reading passages) (S111)	Blank = Not Indicated Y = Indicated	S111=Any; Students may have items in mathematics, science, and English language arts to be read aloud to them in their native language by a trained translator. Read Aloud of ELA reading passages requires an IEP or 504 plan
728	728	1	Accommodation Scribe (for all items in any subject, excluding ELA Writing) (S351)	Blank = Not Indicated Y = Indicated	(EXCLUDING ELA WRITING) Any format
729	729	1	Accommodation Separate Setting (S501)	Blank = Not Indicated Y = Indicated	
730	730	1	Support Translated Test Directions (S109)	Blank = Not Indicated Y = Indicated	S109 Any format
731	731	1	Support Translation (Glossary) (S109) Accommodation Translation (Stacked) (S108)	Blank = Not Indicated Y = Indicated	S109 Any format
732	732	1	Support Glossary (Grades 3-8 Math and ELA Only) (S104)	Blank = Not Indicated Y = Indicated	Online - Not Embedded All students taking the paper based, Braille or Large Print assessment may have access to a specific glossary, to be included with the assessment.
733	733	1	Accommodation Read-Aloud ELA Reading passages (GRADES 3-5 ONLY) (A041) – invalidates ELA	Blank = Not Indicated Y = Indicated	If marked "Y" then ELA will be invalidated. Any format. Students in grades 3-5 may have English Language Arts reading passages read aloud to them by a trained reader. Note: Use of this will result in invalidation - student will receive the lowest obtainable scale score (LOSS).
734	734	1	Accommodation Read-Aloud ELA Reading passages (GRADES 3-5 ONLY) (A042)– invalidates ELA	Blank = Not Indicated Y = Indicated	Online - Not Embedded - Students in grades 3-5 may use assistive technology text-to-speech software to allow ELA reading passages to be read aloud. Note: Use of this will result in invalidation - student will receive the lowest obtainable scale score (LOSS).

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Start	End	Len	Field	Values	Remarks
735	735	1	Accommodation Read-Aloud ELA Reading passages (GRADES 3-5 ONLY) (A111)– invalidates ELA	Blank = Not Indicated Y = Indicated	ELL students in grades 3-5 may have English Language Arts reading passagges read aloud to them in their native language by a trained translator. Note: Use of this will result in invalidation - student will receive the lowest obtainable scale score (LOSS).
736	736	1	Accommodation Read-Aloud (For all items in any subject, excluding ELA Reading passages) (S043)	Blank = Not Indicated Y = Indicated	S043=Any; Students may have items in mathematics, science, and English language arts to be read aloud to them by a trained reader. Read Aoud of ELA reading passages requires an IEP or 504 plan.
737	737	1	Accommodation Read-Aloud ELA Reading passages (GRADES 6-8 only) (A044)	Blank = Not Indicated Y = Indicated	A044=Online - Not Embedded; Students may use assistive technology text-to-speech software to allow ELA reading passages to be read aloud.
738	738	1	Accommodation Read-Aloud ELA Reading passages (GRADES 6-8 only) (A045)	Blank = Not Indicated Y = Indicated	A045=Any; Students may have English Language Arts reading passages to be read aloud to them by a trained reader.
739	739	1	Accommodation Read-Aloud ELA Reading passages (GRADES 6-8 only) (A112)	Blank = Not Indicated Y = Indicated	A112=Any ELL students may have English language arts reading passages to be read aloud to them in their native language by a trained translator.
740	740	1	Accommodation A046 Read-Aloud ELA Reading passages (Blind students)	Blank = Not Indicated Y = Indicated	This accommodation is used for Blind students who do not yet have adequate Braille skills. Note this does not invalidate the test.
741	741	1	Accommodation Use of scribe - ELA writing (A351)	Blank = Not Indicated Y = Indicated	Any format
742	742	1	Accommodation Abacus (A391)	Blank = Not Indicated Y = Indicated	
743	743	1	Accommodation Calculator GRADE 3 ONLY (for Non-Calculator Allowed Items Only)– invalidation (A392)	Blank = Not Indicated Y = Indicated	If marked "Y" then Mathematics will be invalidated.
744	744	1	Accommodation Calculator GRADE 4-8 ONLY (for Non-Calculator Allowed Items Only) (A393)	Blank = Not Indicated Y = Indicated	
745	745	1	Accommodation Multiplication Table GRADE 3 ONLY - invalidation (A394)	Blank = Not Indicated Y = Indicated	If marked "Y" then Mathematics will be invalidated.
746	746	1	Accommodation Multiplication Table GRADES 4-8 (A395)	Blank = Not Indicated Y = Indicated	
747	747	1	Non-Accommodation Special Case – Paper Based Assessment	Blank = Not Indicated Y = Indicated	This is for those students who are taking the paper-based assessment but don't have an IEP. They will need to pay for it. This is available for all subjects.

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Start	End	Len	Field	Values	Remarks
748	767	20	Blank for Future Use	Filler	
			Teacher Invalidations		"Teacher Invalidations" are populated from eDIRECT
768	768	1	Teacher Invalidation	Blank = No Invalidation marked Y = Invalidated	When invalidation is marked this will invalidate the content area for all sessions.
			Absent		Absent populated from eDIRECT
769	769	1	Absent	Blank = Not Marked, Y = Marked	
			Not Enrolled for Content Area		Not Enrolled populated from eDIRECT
770	819	50	Blank for Future Use	Filler	Blank for future use
			Item Responses and Score Data		
820	840	21	Content Area Title	"English Language Arts", "Mathematics", "Science", blank	
841	940	100	Item Responses for MC	Correct = A, B, C, D (*letter*); Incorrect = 1, 2, 3, 4 (*numeric*); Omit = 0; marked 'Absent'.	Showing up to 100 MC items.
941	1040	100	Item Scores for MC	1 = correct response; 0 = wrong or omitted; blank (blank = field test item when applicable). In all of the following cases: 1) The student started a test, but it was marked with an applicable invalidating Accommodation code 2) The student test was marked 'Teacher Invalidation' (started test or not) 3) The student did not start a test, but was marked 'Absent' then this field is NULL.	
1041	1043	3	Raw Score for MC Items	0-100, blank	0-NNN where NNN is the maximum score of MC; In cases where the student attempted a test, but it was marked with an applicable invalidating Accommodation code the Raw Score is 0 (zero). In cases where the student test was marked 'Teacher Invalidation' (started test or not) the Raw Score is 0 (zero). In cases where the student did not start a test, but was marked 'Absent' the Raw Score is NULL (blanks).
		100	Item Scores CR scores (includes WER)		Total field positions 1044-1143 (100 bytes)

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Start	End	Len	Field	Values	Remarks
1044	1123	80	Item Scores CR scores	0-9, A,B,C,D,E Blank, (Trailing blank)	Resolved Final CR score 1 byte (single character) each in positions 1-80 of the overall 100 byte field. For data in the remaining positions 81-100 (see row below).
1124	1143	20	Item Scores CR scores - WER (long write) items	0-9, A,B,C,D,E Blank, (Trailing blank)	This 20 byte section is still part of the 100 byte string of the "Item Scores CR scores" field above and is only separated out for clarity of reading the file. In positions 81 & 82 for ELA Grades 5 & 8 ONLY it will contain the 1 byte 2-point WER (long write) trait score values for 'Conventions', followed by the 1 byte average score of the two 4-point WER trait items, 'Purpose/Organization' and 'Evidence/Elaboration'. This 20 byte section will be blank for all other content areas and grades.
1144	1146	3	Raw Score for CR Items		Total Raw Score for CR Items
1147	1196	50	Item score for TE	0-9, A,B,C,D,E Blank, (Trailing blank)	Resolved Final TE score 1 byte (single character) each.
1197	1199	3	Raw Score for TE Items		
1200	1202	3	Total Raw Score MC, CR, TE	0-100, blank	Raw Score for MC + Raw Score of CR + Raw Score for TE
1203	1203	1	Completion Criteria	N, Y	Y = met, N = not met (Completion Criteria Met = Valid Attempt)
1204	1207	4	Percent Correct	0.0 - 100, blank	Whole Number plus one decimal position (99.9). Total Raw Score / Total Raw Score Possible. Report to the tenth. No decimal point for 100 Rounding rules: we will round up from anything half-way between tenths (for example, 22.25 rounds to 22.3)
1208	1211	4	Scale Score	0000-9999, blank	
1212	1212	1	Content Achievement Level	Values 0, 1-4, Blank Blank = Content Area Not Applicable 0 = if Absent or No Valid Attempt (Level Not Determined) 1 = Below Basic 2 = Basic 3 = Proficient 4 = Advanced.	In cases where the student started a test, but it was marked with an applicable invalidating Accommodation code the Achievement Level is Below Basic (1). In cases where the student test was marked 'Teacher Invalidation' (started test or not) the Achievement Level is Below Basic (1). In cases where the student did not start a test, but was marked 'Absent' the Achievement Level is 0.
1213	1242	30	Blank for Future Use	Filler	Reserved for future use

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Start	End	Len	Field	Values	Remarks
1243	1243	1	Objective 1 ELA - Code	1-Reading	Objective score = Claim-level score
1244	1246	3	Objective 1 ELA - Number Correct	0-100, Blank	
1247	1250	4	Objective 1 ELA - Percent Correct	0.0 - 100, blank	Whole Number plus one decimal position (99.9). Total Raw Score / Total Raw Score Possible. Report to the tenth. No decimal point for 100 Rounding rules: we will round up from anything half-way between tenths (for example, 22.25 rounds to 22.3)
1251	1251	1	Objective 1 ELA - Achievement Level	0-3, Blank Blank = Content Area Not Applicable 0 - if Absent or No Valid Attempt (Level Not Determined) 1 - Below standard 2- At/Near standard 3 - Above standard	Smarter Balanced Objective Achievement levels (NOT APPLICABLE TO SCIENCE - blank for Science) In cases where the student started a test, but it was marked with an applicable invalidating Accommodation code the Achievement Level is Below Basic (1). In cases where the student test was marked 'Teacher Invalidation' (started test or not) the Achievement Level is Below Basic (1). In cases where the student did not start a test, but was marked 'Absent' the Achievement Level is 0.
1252	1252	1	Objective 2 ELA - Code	2-Writing	Objective score = Claim-level score
1253	1255	3	Objective 2 ELA - Number Correct	0-100, Blank	
1256	1259	4	Objective 2 ELA - Percent Correct	0.0 - 100, blank	
1260	1260	1	Objective 2 ELA - Achievement Level	0-3, Blank (same as Objective 1 ELA – Achievement Level)	
1261	1261	1	Objective 3 ELA - Code	3-Listening	Objective score = Claim-level score
1262	1264	3	Objective 3 ELA - Number Correct	0-100, Blank	
1265	1268	4	Objective 3 ELA - Percent Correct	0.0 - 100, blank	
1269	1269	1	Objective 3 ELA - Achievement Level	0-3, Blank (same as Objective 1 ELA – Achievement Level)	
1270	1270	1	Objective 4 ELA - Code	4-Research	Objective score = Claim-level score
1271	1273	3	Objective 4 ELA - Number Correct	0-100, Blank	
1274	1277	4	Objective 4 ELA - Percent Correct	0.0 - 100, blank	
1278	1278	1	Objective 4 ELA - Achievement Level	0-3, Blank (same as Objective 1 ELA – Achievement Level)	
1279	1279	1	Objective 1 MA - Code	1-Concepts and Procedures	Objective score = Claim-level score
1280	1282	3	Objective 1 MA - Number Correct	0-100, Blank	
1283	1286	4	Objective 1 MA - Percent Correct	0.0 - 100, blank	
1287	1287	1	Objective 1 MA - Achievement Level	0-3, Blank (same as Objective 1 ELA – Achievement Level)	
1288	1288	1	Objective 2 MA - Code	2-Problem Solving and Modeling and Data Analysis	Objective score = Claim-level score
1289	1291	3	Objective 2 MA - Number Correct	0-100, Blank	
1292	1295	4	Objective 2 MA - Percent Correct	0.0 - 100, blank	

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Start	End	Len	Field	Values	Remarks
1296	1296	1	Objective 2 MA - Achievement Level	0-3, Blank (same as Objective 1 ELA – Achievement Level)	
1297	1297	1	Objective 3 MA - Code	3-Communicating Resasoning	Objective score = Claim-level score
1298	1300	3	Objective 3 MA - Number Correct	0-100, Blank	
1301	1304	4	Objective 3 MA - Percent Correct	0.0 - 100, blank	
1305	1305	1	Objective 3 MA - Achievement Level	0-3, Blank (same as Objective 1 ELA – Achievement Level)	
1306	1306	1	Objective 1 SC - Code	1-Matter and Energy	Objective score = GLE Strand score
1307	1309	3	Objective 1 SC - Number Correct	0-100, Blank	
1310	1313	4	Objective 1 SC - Percent Correct	0.0 - 100, blank	
1314	1314	1	Objective 1 SC - Achievement Level	0-3, Blank (same as Objective 1 ELA – Achievement Level)	
1315	1315	1	Objective 2 SC - Code	2-Force and Motion	Objective score = GLE Strand score
1316	1318	3	Objective 2 SC - Number Correct	0-100, Blank	
1319	1322	4	Objective 2 SC - Percent Correct	0.0 - 100, blank	
1323	1323	1	Objective 2 SC - Achievement Level	0-3, Blank (same as Objective 1 ELA – Achievement Level)	
1324	1324	1	Objective 3 SC - Code	3-Living Organisms	Objective score = GLE Strand score
1325	1327	3	Objective 3 SC - Number Correct	0-100, Blank	
1328	1331	4	Objective 3 SC - Percent Correct	0.0 - 100, blank	
1332	1332	1	Objective 3 SC - Achievement Level	0-3, Blank (same as Objective 1 ELA – Achievement Level)	
1333	1333	1	Objective 4 SC - Code	4-Ecosystems	Objective score = GLE Strand score
1334	1336	3	Objective 4 SC - Number Correct	0-100, Blank	
1337	1340	4	Objective 4 SC - Percent Correct	0.0 - 100, blank	
1341	1341	1	Objective 4 SC - Achievement Level	0-3, Blank (same as Objective 1 ELA – Achievement Level)	
1342	1342	1	Objective 5 SC - Code	5-Earth's Systems	Objective score = GLE Strand score
1343	1345	3	Objective 5 SC - Number Correct	0-100, Blank	
1346	1349	4	Objective 5 SC - Percent Correct	0.0 - 100, blank	
1350	1350	1	Objective 5 SC - Achievement Level	0-3, Blank (same as Objective 1 ELA – Achievement Level)	
1351	1351	1	Objective 6 SC - Code	6-The Universe	Objective score = GLE Strand score
1352	1354	3	Objective 6 SC - Number Correct	0-100, Blank	
1355	1358	4	Objective 6 SC - Percent Correct	0.0 - 100, blank	
1359	1359	1	Objective 6 SC - Achievement Level	0-3, Blank (same as Objective 1 ELA – Achievement Level)	
1360	1360	1	Objective 7 SC - Code	7-Scientific Inquiry	Objective score = GLE Strand score
1361	1363	3	Objective 7 SC - Number Correct	0-100, Blank	
1364	1367	4	Objective 7 SC - Percent Correct	0.0 - 100, blank	
1368	1368	1	Objective 7 SC - Achievement Level	0-3, Blank (same as Objective 1 ELA – Achievement Level)	

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Start	End	Len	Field	Values	Remarks
1369	1369	1	Objective 8 SC - Code	8-Impact of Science, Technology, and Human Activity	Objective score = GLE Strand score
1370	1372	3	Objective 8 SC - Number Correct	0-100, Blank	
1373	1376	4	Objective 8 SC - Percent Correct	0.0 - 100, blank	
1377	1377	1	Objective 8 SC - Achievement Level	0-3, Blank (same as Objective 1 ELA – Achievement Level)	
1378	1378	1	Appeal Indicator	Y = Yes, records in this GRF have a appeal rescore change resulting in a higher score/achievement level; X = No score/achievement level change during the appeal/rescore; Blank = Not an appeal student.	• Y = Yes (Score/Level was changed). Records marked with "Y" in this field have an appeal rescore change resulting in a higher score/achievement level; • X = No (No Score/Level change). Records marked with "X" in this field did not have an appeal rescore change, although they were an appeal student; • Blank = Not an appeal student;
1379	1428	50	Blank for Future Use	Filler	Reserved for future use

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Appendix F:
Achievement Level Descriptors

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English Language Arts/Literacy

Grades 3–5

Below Basic (Level 1)
The student has not met the achievement standard and needs substantial improvement to demonstrate the knowledge and skills in English language arts/literacy needed for likely success in future coursework.

MAP score ranges:
Grade 3: 2114–2366
Grade 4: 2131–2415
Grade 5: 2201–2441

Basic (Level 2)
The student has nearly met the achievement standard and may require further development to demonstrate the knowledge and skills in English language arts/literacy needed for likely success in future coursework.

MAP score ranges:
Grade 3: 2367–2431
Grade 4: 2416–2472
Grade 5: 2442–2501

Proficient (Level 3)
The student has met the achievement standard and demonstrates progress toward mastery of the knowledge and skills in English language arts/literacy needed for likely success in future coursework.

MAP score ranges:
Grade 3: 2432–2489
Grade 4: 2473–2532
Grade 5: 2502–2581

Advanced (Level 4)
The student has exceeded the achievement standard and demonstrates advanced progress toward mastery of the knowledge and skills in English language arts/literacy needed for likely success in future coursework.

MAP score ranges:
Grade 3: 2490–2623
Grade 4: 2533–2663
Grade 5: 2582–2701

Grades 6–8

Below Basic (Level 1)
The student has not met the achievement standard and needs substantial improvement to demonstrate the knowledge and skills in English language arts/literacy needed for likely success in entry-level credit-bearing college coursework after high school.

MAP score ranges:
Grade 6: 2210–2456
Grade 7: 2258–2478
Grade 8: 2288–2486

Basic (Level 2)
The student has nearly met the achievement standard and may require further development to demonstrate the knowledge and skills in English language arts/literacy needed for likely success in entry-level credit-bearing college coursework after high school.

MAP score ranges:
Grade 6: 2457–2530
Grade 7: 2479–2551
Grade 8: 2487–2566

Proficient (Level 3)
The student has met the achievement standard and demonstrates progress toward mastery of the knowledge and skills in English language arts/literacy needed for likely success in entry-level credit-bearing college coursework after high school.

MAP score ranges:
Grade 6: 2531–2617
Grade 7: 2552–2648
Grade 8: 2567–2667

Advanced (Level 4)
The student has exceeded the achievement standard and demonstrates advanced progress toward mastery of the knowledge and skills in English language arts/literacy needed for likely success in entry-level credit-bearing college coursework after high school.

MAP score ranges:
Grade 6: 2618–2723
Grade 7: 2649–2745
Grade 8: 2668–2769

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Mathematics
Grades 3–5

Below Basic (Level 1)
The student has not met the achievement standard and needs substantial improvement to demonstrate the knowledge and skills in mathematics needed for likely success in future coursework.

MAP score ranges:
Grade 3: 2189–2380
Grade 4: 2204–2410
Grade 5: 2219–2454

Basic (Level 2)
The student has nearly met the achievement standard and may require further development to demonstrate the knowledge and skills in mathematics needed for likely success in future coursework.

MAP score ranges:
Grade 3: 2381–2435
Grade 4: 2411–2484
Grade 5: 2455–2527

Proficient (Level 3)
The student has met the achievement standard and demonstrates progress toward mastery of the knowledge and skills in mathematics needed for likely success in future coursework.

MAP score ranges:
Grade 3: 2436–2500
Grade 4: 2485–2548
Grade 5: 2528–2578

Advanced (Level 4)
The student has exceeded the achievement standard and demonstrates advanced progress toward mastery of the knowledge and skills in mathematics needed for likely success in future coursework.

MAP score ranges:
Grade 3: 2501–2621
Grade 4: 2549–2659
Grade 5: 2579–2700

Grades 6–8

Below Basic (Level 1)
The student has not met the achievement standard and needs substantial improvement to demonstrate the knowledge and skills in mathematics needed for likely success in entry-level credit-bearing college coursework after high school.

MAP score ranges:
Grade 6: 2235–2472
Grade 7: 2250–2483
Grade 8: 2265–2503

Basic (Level 2)
The student has nearly met the achievement standard and may require further development to demonstrate the knowledge and skills in mathematics needed for likely success in entry-level credit-bearing college coursework after high school.

MAP score ranges:
Grade 6: 2473–2551
Grade 7: 2484–2566
Grade 8: 2504–2585

Proficient (Level 3)
The student has met the achievement standard and demonstrates progress toward mastery of the knowledge and skills in mathematics needed for likely success in entry-level credit-bearing college coursework after high school.

MAP score ranges:
Grade 6: 2552–2609
Grade 7: 2567–2634
Grade 8: 2586–2652

Advanced (Level 4)
The student has exceeded the achievement standard and demonstrates advanced progress toward mastery of the knowledge and skills in mathematics needed for likely success in entry-level credit-bearing college coursework after high school.

MAP score ranges:
Grade 6: 2610–2748
Grade 7: 2635–2778
Grade 8: 2653–2802

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Science

Grade 5

Below Basic (Level 1)

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 (Level 2)

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 (Level 3)

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 (Level 4)

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 (Level 1)

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 (Level 2)

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 (Level 3)

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 (Level 4)

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

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