

# WISCONSIN KNOWLEDGE AND CONCEPTS EXAMINATIONS

## FALL 2013 WKCE TECHNICAL REPORT



CTB/MCGRAW-HILL  
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## Copyright

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## **Foreword**

The technical information herein is intended for use by those who evaluate tests, interpret scores, or use test results in making educational decisions. It is assumed that the reader has technical knowledge of test construction and measurement procedures as stated in *Standards for Educational and Psychological Testing* (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education, 1999).

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## Part 1: Overview

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The *Fall 2013 Wisconsin Knowledge and Concepts Examinations (WKCE) Technical Report* documents the processes and procedures applied in the Fall 2013 WKCE as well as the results. This report also documents processes, procedures, and results of this administration to support validity and reliability evidence for the testing program in adherence to the *Standards for Educational and Psychological Testing* (American Educational Research Association [AERA], American Psychological Association [APA], & National Council on Measurement in Education [NCME], 1999). This report demonstrates that the Fall 2013 WKCE adhered to the appropriate standards and practices of educational assessment. Ultimately, this report serves to document evidence that valid inferences about Wisconsin student performance can be derived from this assessment.

The *Improving America's Schools Act* of 1994 required that states establish challenging academic standards as well as aligned annual assessments. The *Goals 2000: Educate America Act* and the *Elementary and Secondary Education Act* spell out additional requirements to ensure that citizens receive coherent information about whether and to what degree students are meeting rigorous academic standards. This Technical Report is an important part of meeting those requirements.

Wisconsin students in grades 4, 8, and 10 began taking the Wisconsin Knowledge and Concepts norm-referenced assessments in the 1997 school year. The assessments used at that time were *TerraNova*<sup>™</sup> tests developed by CTB. The selection of those tests was partly predicated on an awareness of the academic standards being developed. In January 1998, the Wisconsin Model Academic Standards were adopted. These new standards were the work of the Governor's Commission on Wisconsin Model Academic Standards, chaired by then-current Lieutenant Governor McCallum and the Wisconsin Department of Public Instruction (DPI). The Wisconsin Model Academic Standards would measure student performance in the same subjects as the *TerraNova* tests.

Beginning in the 2005–06 school year, the federal *No Child Left Behind Act* (NCLB) required all states to test all students in Reading and Mathematics in grades 3 through 8 and once in high school (in grade 10 under Wisconsin law § 118.30). Based on the NCLB legislation, student performance, reported in terms of proficiency categories, has been used to determine the Adequate Yearly Progress (AYP) of students at the school, district, and state levels.

Beginning with school year 2007–08, states were also required to administer Science assessments at least once during grades 3–5, grades 6–9, and grades 10–12. Wisconsin students in grades 4, 8, and 10 are, and will continue to be, assessed in Language Arts, Science, and Social Studies as required by state law (§ 118.30 Wisconsin Statutes).

It is within this policy context that the WKCE was constructed, as a criterion-referenced test, for the Fall 2005 administration, replacing the previously existing norm-referenced WKCE Reading and Mathematics tests. The criterion-referenced WKCE is designed specifically for Wisconsin students, and specifically to measure their performance on the Wisconsin Model Academic Standards adopted by the state. These assessments are designed to evaluate students'

knowledge and to measure achievement in the basic skills taught in schools at grades 3–8 and 10. The Fall 2013 WKCE is the ninth administration of these assessments.

The Wisconsin Model Academic Standards describe what students should know and be able to do in grades 4, 8, and 12. To determine what should be tested in grades 3, 5–7, and 10, committees of Wisconsin educators carefully considered what knowledge and skills students should have by the fall of each school year by extrapolating and interpolating the standards for grades 4, 8, and 12. The committees then defined the eligible test content and assessment limits, ensuring that the test framework they designed incorporated the content and performance standards enumerated in the Wisconsin Model Academic Standards. Therefore, the assessment framework, used to define what is tested on the WKCE, reflects what students should have learned by the beginning of the school year in order to be successful in that grade. As a result, the grade 6 test, for example, assesses what students should have learned by the end of grade 5.

The WKCE tests consist of criterion-referenced items, written by CTB and edited and reviewed by Wisconsin teachers, and items from CTB’s norm-referenced test, *TerraNova*, The Second Edition (*TerraNova*, CTB/McGraw-Hill, 2001). The Fall 2013 WKCE tests include Reading and Mathematics at grades 3–8 and 10 and Science, Social Studies, and Language Arts (including Writing) at grades 4, 8, and 10.

Based on the input of Wisconsin educators and the Wisconsin Model Academic Standards, a design was derived for the development, administration, and scoring of the WKCE. The present Technical Report documents all aspects of the testing cycle in the subsequent chapters. The structure of the present Technical Report mirrors the testing cycle. A brief content summary of the report is provided below.

## **PART 2: Test Design and Item Development**

Part 2 of this report describes test design, the item development process, and some aspects of the content-related validity of the WKCE tests. More specifically, it describes how CTB, DPI, and Wisconsin educators collaborated through a series of test development processes to ensure that the appropriate content was included in the WKCE and to ensure that the test items adequately sampled the domain of content knowledge necessary to make legitimate inferences about student performance. Wisconsin Model Academic Standards were translated into grade-level content frameworks, which in turn formed the basis for test blueprints and item specifications. Wisconsin educators were involved in design at every step to ensure the appropriateness of the test to the standards. Test design started in August 2003 with the convention of approximately 35 educators per content area for grades 3–8 and 10 to establish the grade-level content frameworks based on the Wisconsin Model Academic Standards, establish assessment limits, create the test blueprint, and review reading passage and page specifications. The test specifications documents created and later approved by DPI continue to serve as a foundation for item and test development.

### **PART 3: Test Form Development**

Part 3 discusses key development tasks and issues related to creating the Fall 2013 WKCE test forms. Item development was based on the approved test blueprints, with a sufficient quantity of items written across years to develop multiple operational test forms. Part 3 also discusses the process of selecting operational test items and the process of obtaining DPI approvals. As detailed in Part 3, there have been 5,025 unique multiple-choice (MC) items and 499 unique constructed-response (CR) items field tested to date, that is, through the Fall of 2013, totaling 5,524 unique items. Selection of the Fall 2013 operational forms was done using the ITEMWIN (Burket, 2000) software utilizing methods similar to previous administrations for all grades and content areas.

### **PART 4: Test Administration**

Part 4 briefly describes test administration and accommodations. The test administration window was October 28–November 29, 2013. Delivery of materials was handled through the district and school assessment coordinators. In 2013, all content area tests in a grade were administered to students using a single test book.

### **PART 5: Scoring**

Part 5 documents the scanning and scoring process for the MC and CR items. The machine-scanning process and the handscoring process, including the development and review of the scoring rubrics, anchor (sample) papers, and writing prompts, as well as the training of scoring personnel, ongoing quality assurance, the application of an inter-rater reliability assessment, and a systematic review of the resulting score distributions supported reporting reliable and valid test scores. The scoring rubrics used in handscoring are presented in detail for all content areas with handscored items.

### **PART 6: Characteristics of the Calibration Sample**

The baseline calibration and equating of the Fall 2013 WKCE tests occurred during the 2009 WKCE administration for all grades and content areas. The calibration was based on a sample of student response data termed the calibration sample. The calibration sample roughly approximates the census population for minority students and under-represents majority students, as has been the historical practice.

### **PART 7: Calibration, Equating, and Deriving Scale Scores**

Part 7 reviews calibration, equating, and scoring methods implemented for WKCE. The Fall 2013 WKCE was calibrated and scaled using two different item response theory (IRT) models, one for CR items and one for MC items, which are the item types used for most large-scale standardized testing programs in education. Evaluation of the sufficiency of the IRT model

results include model-to-data fit and the standard error of measurement (SEM). Item-pattern scoring was applied to the Fall 2013 WKCE. As discussed in Part 7, item-pattern scoring is generally recommended over number-correct scoring because it produces more accurate scores for individual students. Part 7 also explains how a student's scale score is derived from the raw score using item-pattern scoring. Examples of a very low-performing student, a very high-performing student, and several students with a 50% correct raw score are provided. Several students with the same 50% correct raw score are provided in order to illustrate how students with the same raw score can have different scale scores.

## **PART 8: Test Results**

Part 8 summarizes item analyses, raw scores, scale scores, performance levels, and a standard performance indicator score for content standards. Reliability of the WKCE tests are reported using Cronbach's alpha and SEM. Summary descriptive statistics for all scores (raw scores, scale scores, standard performance indicator scores, and performance levels) are reported for all students and for subgroups identified by gender, race/ethnicity, socioeconomic status, disability status, and English language proficiency.

## **PART 9: Reliability**

Part 9 elaborates on the reliability of the test based on results presented in previous parts of the report. SEM was assessed for raw scores and scale scores. Inter-rater reliability was estimated for all CR items. Internal consistency was assessed for all MC and CR items using Cronbach's alpha. Classification consistency and accuracy were estimated for performance classification.

## **PART 10: Validity**

Part 10 reviews the validity evidence presented in all prior parts and provides additional validity evidence supporting the WKCE tests. Factor analysis and correlations among content standards are presented in the context of construct validity. An analysis of differential item functioning (DIF) is presented. Erasure analysis, a procedure used to identify high erasure rates, is also discussed.

## **PART 11: Summary Recommendations**

Key findings of the Fall 2013 WKCE administration are presented in the body of the report. However, some items of a more technical nature, which stand out as key recommendations and summary statements that should be considered in subsequent administrations, are presented in Part 11. Recommendations based on the Fall 2013 WKCE administration cover three different phases of the testing cycle: item development, scoring, and psychometric, or measurement-based, research and evaluation.

## Part 2: Test Design and Item Development

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The purpose of this section is to describe how CTB, DPI, and Wisconsin educators collaborated through a series of test development processes to ensure that appropriate content was included in the WKCE, and to ensure that test items adequately sampled the domain of content knowledge necessary to make accurate inferences about student performance. Part 2 documents the test development process for the Fall 2013 WKCE administration.

As described below, the Wisconsin Model Academic Standards were central to the entire test design process. Part 2 of the Technical Report demonstrates the adherence of the WKCE program to the *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 1999) and specifically to standards 1.2, 1.6, 3.1, 3.2, 3.3, 3.11, 6.4, 6.15, 13.3, and 13.5.

Operational items administered in 2013 adhered to the test specifications documents developed in previous years. The Fall 2006 Technical Report (Parts 2, 3, and 4) provides a detailed account of the development of the test specifications documents during previous years. Interested readers can find these sections of the Fall 2006 Technical Report in Appendix 2 of the 2010 WKCE Technical Report available online at: <http://oea.dpi.wi.gov/files/oea/pdf/td-2010-techman.pdf>. The assessment frameworks, test design, test blueprints, reading passage specifications, item specifications, art specifications, and style guide were all developed in 2003, the first year of the WKCE program. The role of Wisconsin educators was an essential component of the development of the WKCE. Their professional expertise and judgment were central to approving content that was appropriately rigorous for the grade and content area in which it was presented and that was expected to have been taught to students.

During the first year of the contract, August 2003 to August 2004, the test specifications documents were developed through an extended, collaborative process with DPI and based on the contributions of Wisconsin educators during meetings conducted in 2003 (see the Fall 2006 Technical Report, p. 6, which is provided in Appendix 2 of the 2010 WKCE Technical Report available online at: <http://oea.dpi.wi.gov/files/oea/pdf/td-2010-techman.pdf>). Test specification documents include the test blueprints, passage specifications, item specifications, page specifications, and style guide.

According to the most recent edition of the standards (AERA, APA, NCME, 1999), “Validity refers to the degree to which evidence and theory support the interpretations of test scores entailed by proposed uses of test scores” (p. 9). Much of the content-related validity evidence is produced during the test development process. The content-related evidence supports inferences from a sample of observations (the test) to a domain of observations (the content area). A substantial source of content-related validity evidence is the expert judgment that the test items are an adequate and representative sample of the domain being measured. Content-related validity evidence can support interpretations of test scores in terms of performance over a performance domain. If the content domain is specified clearly and a representative sample of performance tasks is drawn from the domain, then inferences about expected performance over the domain based on observed performances should be legitimate.

## 2.1 Content Framework and Assessment Limits

The Assessment Framework documents created by DPI provide information about the content measured at each grade level and explain the relationships among the Wisconsin Model Academic Standards, the Assessment Framework, and classroom instruction. The Framework documents are located on DPI's website at [http://oea.dpi.wi.gov/oea\\_wkce-crt](http://oea.dpi.wi.gov/oea_wkce-crt). The Fall 2006 Technical Report, Section 3.1.1, explains the structure and development of the Assessment Frameworks (see Appendix 2 of the 2010 WKCE Technical Report available online at: <http://oea.dpi.wi.gov/files/oea/pdf/td-2010-techman.pdf>).

The Assessment Frameworks specify the broad categories within the content area at which test sub-scores may be reported. For example, “Number Operations and Relations” or “Measurement” for Mathematics and “Understands Text” or “Analyzes Text” for Reading. These broad categories are further delineated into subskills. For example, “Number Operations and Relations” is further subdivided into “Reading, Writing, and Representing Numbers” and “Ordering and Comparing Numbers” and so forth. Assessment limits are bulleted statements that identify the specific content that is eligible for testing for each subskill and may clarify how the content could be assessed. For example, in Mathematics, the size of numbers or the types of plane and solid geometric figures that are appropriate at each grade level would be specified in the assessment limits. For Reading, the assessment limits clarify which prefixes or suffixes or which literary devices are appropriate to assess at each grade level. For the grade 4, 8, and 10 Science assessments, the Wisconsin Model Academic Standards served as the foundation for the creation of the Science Assessment Frameworks. Similarly, the Wisconsin Model Academic Standards for Language Arts and Social Studies provide the content framework for these content area tests at grades 4, 8, and 10.

## 2.2 Test Blueprint

The test blueprints specify the number of multiple-choice (MC) and constructed-response (CR) items for each reporting category and subskill. The process used for developing the blueprints was described in detail in Parts 2 and 3 of the Fall 2006 Technical Report (see Appendix 2 of the 2010 WKCE Technical Report available online at: <http://oea.dpi.wi.gov/files/oea/pdf/td-2010-techman.pdf>). Tables 2-1 through 2-5 present the target blueprints for the Fall 2013 WKCE. Tables 2-6 through 2-10 present the actual test blueprints showing how the items selected for the Fall 2013 WKCE forms were distributed by reporting category and subskill for each item type.

In 2007, some changes were made to the blueprints for Mathematics, Science, and Language Arts grade 8. The Mathematics blueprints were modified to reflect the inclusion of a 2-point CR item and the subsequent reduction of the 3-point CR items from four to three. In addition, the number of MC items for each reporting category was adjusted to reflect the use of MC items for reporting category A. The Science blueprints were modified slightly to show a shift in emphasis among reporting categories A and B and among reporting categories G and H. The Language Arts grade 8 blueprint changes involved shifting two MC items from reporting category D to reporting category B. This change was made in response to Wisconsin educators’

concerns expressed at the 2005 content review that the language test should not require excessive reading. When selecting test forms for 2005 and 2006, CTB made an effort to minimize the number of item sets that use a common stimulus, such as a brief essay or letter. However, when selecting the 2008 forms, the use of two lengthy stimuli would have been necessary in order to meet the blueprint. CTB brought this concern to the attention of DPI and suggested that two items be shifted from category D to category B. DPI approved this change to the blueprint on March 9, 2007.

In addition to the changes above, Depth of Knowledge (DOK) requirements were incorporated into the Reading and Mathematics blueprints to indicate the number of items needed at each DOK level for each reporting category.

### **2.3 Reading Passage Selection**

Reading passages on the 2013 operational<sup>1</sup> forms were selected, reviewed, and approved between 2001 and 2008. The processes used for selecting, reviewing, and approving WKCE Reading passages were detailed in Section 3.1.3 of the Fall 2006 Technical Report (see Appendix 2 of the 2010 WKCE Technical Report available online at: <http://oea.dpi.wi.gov/files/oea/pdf/td-2010-techman.pdf>).

### **2.4 Item Development and Editing**

While historically new items have been developed each year for the WKCE, in 2013 new items were not developed. Table 2-11 shows the number of MC, CR, and total items that have been written up to 2013 for the WKCE.

### **2.5 Content/Bias Review and Item Alignment**

Because there were no field test items on the 2013 test forms, content and bias reviews for field test items did not occur. For a detailed account of the content and bias review that occurred after these items were originally field tested in 2008, please refer to the 2008 WKCE Technical Report, available online at: <http://oea.dpi.wi.gov/files/oea/pdf/td-2008-techman.pdf>

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<sup>1</sup> Operational items are those items that contribute to student scores. Operational items are abbreviated in this report as OP.

## **Part 3: Test Form Development**

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Part 3 of the Technical Report focuses on key development tasks and issues related to creating the Fall 2013 WKCE operational test forms. The test specifications and item development activities described in Part 2 explain how specific development processes provided evidence to support test validity, primarily content validity, through the use of expert professional judgment from Wisconsin educators and from CTB test development specialists. The foundation test specifications documents—assessment frameworks, assessment limits, passage specifications, item specifications, test blueprints, art and page specifications, and style guide—developed and approved during the initial phases of the project served as critical guides throughout development and field testing of items. These documents contributed to ensuring that each form of the test accurately measured the content in consistent and stable ways, thus providing evidence supporting the test’s use as an indicator of student achievement of state standards. Information is provided in Part 3 relating to the following topics:

- a general discussion of CTB’s test book creation and editing process
- the process of selecting operational test items
- the process of obtaining DPI approvals

A comprehensive, multi-segment development process guides the development of assessment materials. The following section outlines this process in general terms. The remainder of Part 3 provides details of how these processes were implemented in Wisconsin. This section of the Technical Report addresses the following AERA/APA/NCME (1999) standards: 1.6, 3.1, 3.5, 3.6, 3.7, 3.9, 3.11, 3.16, 6.4, 6.15, 7.3, 7.4, 7.7, 13.3, and 13.5.

### **3.1 Overall Test Book Development Process**

The creation of test book materials involved the expertise of multiple CTB departments, DPI, and Wisconsin educators. The activities that contributed to the creation of the test book materials are described below.

#### **3.1.1 WKCE Fall 2013 Form Selection**

The WKCE operational test forms for all content areas and grade levels use the common item non-equivalent groups design in order to equate parallel test forms from year to year. The minimum number of common items (also called anchor items) per content area follows:

- Reading: 14 items
- Mathematics: 18 items
- Language Arts: 15 items
- Social Studies: 15 items
- Science: 15 items

CTB assessment editors selected items for the 2013 operational forms while considering a variety of criteria, including the following:

- Selected items must fully cover the reporting areas of the test blueprint.
- Selected items must represent the diversity of content.
- MC items with  $p$ -values below 0.30 should be avoided when possible.
- CR items with  $p$ -values below 0.20 should be avoided when possible.
- Items with positive point-biserials on distractors should be avoided when possible.
- Items should represent a range of scale score values.
- Items with differential item functioning (DIF) flags (C flags) should be avoided when possible.
- Items with poor fit flags should be avoided when possible.

CTB content editors used CTB's proprietary software, called ITEMWIN (Burket, 2000), to select items for the Fall 2009 WKCE operational test forms for all content areas and grade levels. These 2009 test forms were re-administered in 2011 and 2013 with no modifications made to the operational selection. ITEMWIN has two phases. In the first phase, CTB uses ITEMWIN to select a working item pool of manageable size from the larger tryout pool; items clearly inappropriate to the target grade range are eliminated. There is information about each item in the pool, including the item format to which the item is assigned, a descriptive phrase about the item, the association of the item with a stimulus, the item parameters, a fit rating indicating how well the item fits the expectations based on the IRT model used, and a DIF rating indicating whether the probability of answering the item correctly by students of equal ability differed by a particular group or category, such as gender, race/ethnicity, socioeconomic status, disability status, or English language proficiency. DIF is discussed further in Part 10.

ITEMWIN shows tables with both the expected number correct and standard error of measurement (SEM) as functions of scale score, as well as statistical and graphical summaries of DIF, fit, and the average standard error of the test as selected. Any fault in the selection, whether the test is too easy or too difficult for the target grade, contains items showing DIF, or does not adequately cover part of the scale score range, becomes apparent as the final statistics are generated. CTB assessment editors and the CTB Research team examined these statistics for each of the WKCE selections against those of the previous operational form to confirm that each new form was parallel in difficulty to the previous operational form. In addition, the vertical properties of tests were assessed by CTB and DPI through a visual inspection of the test characteristic curves for all grades when they are plotted side-by-side, where appropriate. Finally, CTB assessment editors reviewed each selection for content diversity to ensure that no two items were similar in content.

CTB assessment editors prepared a detailed document for each selected form that summarized the test and item characteristics, submitted their selections to a content supervisor for review, and in some cases to the Content Development Lead. Appendix 1 shows the Form Selection Summary Document. The supervisor and/or manager requested changes to the selections, as necessary, in order to improve the test characteristic curve or standard error curve. Form selections were then submitted to the CTB Research team for review. Additional revisions

may have been requested at this stage. For the Reading and Mathematics selections, it was important to ensure the test characteristic curves for all grade levels formed a progression. The CTB Research team reviewed the form selections to ensure the test characteristic curves for the 2011 forms that were also used in 2009 were as similar as possible to the 2008 forms and that curves for the anchor items were aligned closely to the test forms.

Upon approval of the selections by the CTB Research team in 2011, the CTB assessment editors submitted the selections to DPI for review. For some selections, DPI requested revisions for content, difficulty, or statistical reasons. Upon making the requested changes and submitting revised selection summary forms, all operational forms were approved by DPI. For 2013, DPI reviewed the 2011 forms and accompanying statistics and approved the re-use of these forms. Table 3-1 shows the structure of operational test forms in the Fall 2013 WKCE.

### **3.1.2 WKCE Field Test Item Selection**

No items were field tested in 2013. Table 3-2 shows the number of items that were field tested up to 2009.

### **3.1.3 Quality Reviews**

A smooth test administration requires that all test materials, including test books, manipulatives, and test administration manuals, align with each other. All items, page numbers, and administration times must be accurate in all components of the test program. When materials are not in alignment, not only can rework and additional costs be incurred, but there is also the possibility of jeopardizing the validity of test results and creating poor publicity. Therefore, to help ensure all documents required for the administration of a test are in alignment with each other, a Materials Integration Review (MIR) is conducted prior to moving the materials on to the Quality Assurance (QA) Department within CTB.

During the MIR, a proctor simulated the test experience by administering the test to two test takers for each grade and content area using the WKCE examiner's manual. The purpose of this review is twofold: to ensure the test materials are in alignment with each other and to verify the answer keys are correct.

In addition, a QA review was conducted on each test book and all ancillary materials. The purpose of the QA review is to ensure all publishable products meet the standards and expectations of DPI. The QA review includes, but is not limited to, the review for page number location/order, header/footer information, "go on" and "stop" signs, item sequence numbering, accuracy of directions, vertical and horizontal alignment, conventions of written English, clarity/accuracy of art, accuracy of cross-references, and assurance that there is only one correct answer to each item. This QA review occurred at the end of the page production cycle and prior to releasing the materials to CTB's Manufacturing Department.

In addition to the MIR and QA review steps, the WKCE test books were reviewed by CTB's Technology Department to verify the scannable test books were constructed to meet CTB's scanning and scoring specifications. With each round of page production, CTB's Production Department staff viewed the position of answer choice bubbles to confirm they were "on grid" and readable by CTB scanners.

### **3.2 Description of the WKCE 2013 Tests**

The 2013 test books contained Reading and Mathematics in a single test book at each grade for grades 3, 5, 6, and 7. The single test books for grades 4, 8, and 10 contained Reading, Mathematics, Science, Language Arts, Writing, and Social Studies. The use of a single test book, rather than multiple test books per student, was first implemented in 2009. This was done to improve data quality because the use of two booklets created problems with matching student records.

The Reading and Mathematics tests for grades 3–8 and 10 consist of custom items developed specifically for the WKCE. Language Arts, Science, and Social Studies at grades 4 and 8 consist primarily of *TerraNova* items. A few custom MC items were added to address content standards not adequately covered by the *TerraNova* items. The grade 10 Language Arts, Science, and Social Studies tests consist of custom items previously developed for Wisconsin.

#### **3.2.1 Reading**

Table 3-1 presents the configuration of the operational tests. The Reading tests for grades 3–8 had one operational passage for each of the six types of passages: short literary, long literary, short informational, long informational, poetry, and everyday text.

For grades 3–8 and 10, there was one test form given in three test sessions. Each grade had at least one set of paired reading passages with a few items that required analyzing or synthesizing ideas from the passages. Each of the three sessions had approximately 18 MC items. Two of the three operational sessions included a CR item, with the exception of Reading grade 3 which had one CR item in one session. In grades 4-10, one of the CR items was for the reporting category "Analyzing Text," while the other was for the reporting category "Evaluate and Extend Text." In grade 3, the CR item was for the reporting category "Analyzing Text." Each session was allotted 40 minutes of testing time. The grade 10 test consisted of three sessions: Sessions 1 and 2 were 35 minutes and Session 3 was 40 minutes.

### **3.2.2 Mathematics**

Table 3-1 also shows the operational Mathematics test structure. The Mathematics tests for grades 3, 4, and 5 each had three sessions. Grades 6, 7, 8, and 10 had four sessions.

In each grade, the first session was a “non-calculator” session. Grades 3 and 4 do not permit the use of calculators for any session. For these grades, if a student is provided an accommodation that allows the use of a calculator, the calculator may not be used to answer the items in Session 1.

### **3.2.3 Language Arts**

The operational test configurations of Language Arts tests for grades 4, 8, and 10 are presented in Table 3-1 as well. The grades 4 and 8 Language Arts tests consisted of 24 *TerraNova* MC items and 6 custom MC items that measure content standard F, “Research and Inquiry.” The session was allotted 30 minutes of testing time. There was a writing session in grades 4 and 8 that presented an operational writing prompt. This session was allotted 30 minutes. The grade 10 test consisted entirely of custom items developed for Wisconsin. The test was administered in two sessions: the first session contained 30 MC items, and the second session contained the writing prompt.

### **3.2.4 Social Studies**

Table 3-1 also presents the operational Social Studies test structure. The Social Studies test at grades 4 and 8 consisted almost entirely of *TerraNova* items, but also included a few custom items previously developed for the WKCE. There was one test session at these grades, which was allotted 40 minutes. The grade 10 test consisted of 50 custom MC items developed for Wisconsin. The test was administered in two sessions; each session was timed at 25 minutes.

### **3.2.5 Science**

Table 3-1 presents the operational Science test structure as well. The Science test at grades 4 and 8 consisted almost entirely of *TerraNova* items, but also included a few custom items previously developed for the WKCE. There was one test session at these grades, which was allotted 40 minutes. The grade 10 test consisted entirely of custom items developed for Wisconsin. The test was administered in two sessions; each session was allotted 25 minutes.

## **3.3 Customer Approvals**

The development phases where DPI approval was obtained included the following:

- pre-content and bias review of new items
- item content and bias review

- item selection for the Fall 2011 WKCE form
- first pages in 2013
- final pages (prior to release to Manufacturing)

More specific information describing DPI's role during the development phases is overviewed in the following sections.

### **3.3.1 Item Content and Bias Review**

Following the review of items, CTB and DPI staff reviewed the edits recommended by the educator committees. DPI gave final approval of educator recommendations. DPI and CTB each kept a copy of the item review book with the edits marked.

### **3.3.2 Item Selection Approval**

In 2011, CTB submitted item selection summaries to DPI for the 2011 test forms, which were subsequently re-administered in 2013. Item selection summaries included test characteristic curves and standard error plots, lists of the items selected and summary test statistics. DPI approval was obtained using a sign-off form.

### **3.3.3 First Pages Approvals**

CTB assessment editors submitted copies of the test book manuscripts to the CTB Production team. The manuscripts show the items as sequenced within test sessions. The manuscripts for the test administration manuals were also submitted to DPI for review, and content changes were addressed at this stage. DPI approval was obtained using a sign-off form.

The Production team returned the test book pages to CTB style editors as first pages. CTB style editors reviewed first pages to ensure pages followed the proper format. CTB assessment editors reviewed first pages for format and content issues. Assessment editors marked first pages to indicate content changes requested by DPI on the manuscript sign-off form. CTB assessment editors submitted a copy of first pages with correction markup to the Production team, and the edits were incorporated in the InDesign files. CTB editors reviewed the corrected pages before submitting them to DPI for review. If an edit was not incorporated correctly, it was re-marked for correction.

### **3.3.4 Second Pages Approvals**

Because of the re-administration of the 2011 test forms, it was determined that second pages approvals were not needed for this administration.

### **3.3.5 Final Pages Sign-Off**

The final pages represent DPI's last opportunity to review test book and test administration manual pages prior to releasing the materials to CTB's Manufacturing team. At this stage, the materials had been through CTB's quality assurance process and all queries had been resolved. The focus of this review was to verify that previously requested edits had been made and that there were no errors in content or conventions of standard written English. DPI approval was obtained using a sign-off form.

## Part 4: Test Administration

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In the fall of 2013, Wisconsin administered assessments in Reading and Mathematics for grades 3–8 and 10 and Language Arts, Social Studies, and Science for grades 4, 8, and 10. The test administration window was October 28–November 29, 2013. Part 4 of the Technical Report describes a set of standardized procedures and policies applied to administer WKCE assessments. The issue of test security in test administration has important implications for the integrity of the results and thus the validity of WKCE scores. Documentation citing the written procedures provided to test administrators and school personnel in order to standardize the administration of the test are also provided in this part. The following AERA, APA, & NCME (1999) standards are addressed in Part 4: 1.13, 3.3, 3.19, 3.20, 3.21, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 6.11, 6.15, 9.1, 10.1, and 10.2.

DPI is committed to the proposition that all schools, and all students within schools, will be held accountable to a common set of high academic content standards. Students who have an Individualized Education Program (IEP)—a 504 plan (under Section 504 of the Rehabilitation Act of 1973)—or are identified as limited English proficient (LEP) or formerly limited English proficient (FLEP) may be eligible to receive testing accommodations. Accommodations are changes in the routine conditions under which a student takes an assessment in order to provide the student an equal opportunity to demonstrate his or her knowledge. The types of accommodations and guidelines for test administration conditions are described below.

### 4.1 Accommodations

Accommodations were allowed for eligible individual students participating in the WKCE. Accommodations provided to a student must be documented in a current IEP and used during routine instruction. IEP teams were directed to refer to the WKCE accommodations policy (Appendix 2 and <http://oea.dpi.wi.gov/files/oea/pdf/accomswd.pdf>). Test administrators indicated which accommodations were used by each student by completing the Student Assessment Report, which is located on the back cover of the student answer document. The following accommodations information was collected from the Student Assessment Report:

#### Type of Accommodation:

- Used translation
- Signed test questions and content to student
- Used Braille
- Used assistive device (e.g., text-talker, adaptive keyboard, picture symbols)
- Used objects or manipulatives
- Used another DPI-approved accommodation
- Used a non-allowed accommodation resulting in the invalidation of test results

For the Fall 2013 WKCE administration, the State of Wisconsin used Spanish and Hmong translation scripts for the WKCE. The aim of these scripts is to better help students demonstrate their knowledge on the WKCE when English language is part of the test construct. Students whose native language is Spanish or Hmong were given the choice to use all or parts of the translation accommodation, which included a bilingual word list of commonly used content area vocabulary, translation of the test directions, and a written translation script of Mathematics, Science, and Social Studies test items. DPI recommended that educators also consult the list of allowable accommodations in order to create the most appropriate testing situation for their students.

DPI recognizes that approximately 5% of the Wisconsin limited English proficient population speaks a language other than Spanish or Hmong. Districts who serve students who speak languages other than Spanish or Hmong were allowed to use qualified translators to provide oral translation support to students. However, the use of translation support was restricted to Mathematics, Science, and Social Studies tests, given that the test constructs are not specific to English language.

Table 4-1 provides the list of standard accommodations made available for the Fall 2013 WKCE assessments and the number and percent of students provided these accommodations. Table 4-1 also provides a summary view of the accommodations provided, based on all students. The table is split across pages by accommodation, with one accommodation per page. Additional accommodation tables were also delivered to DPI from CTB, which detailed the accommodations provided for subgroup populations of interest, including gender, race/ethnicity, socioeconomic status, disability status, English language proficiency, and migrant status.

## **4.2 Reporting Results of Assessments Taken with Accommodations**

Scores of assessments taken with accommodations were included with the results for students who took these tests under standard conditions and presented at the school, district, and state levels.

## **4.3 Test Security**

The primary goal of test security is to protect the integrity of the assessments and ensure that scores retain their interpretability. To ensure that trends in achievement results can be calculated across years and in order to provide longitudinal data, a certain number of test questions must be repeated from year to year. If any of these questions are made public, the validity of the test may be compromised. Access to test materials was limited to those educators who required access. DPI ensured that all who had access to test materials understood the critical need for test security. They presented security requirements during the 2013 Pre-Test Workshops and outlined the acceptable and unacceptable test preparation and administration practices (a “Do’s/Don’ts” sheet provided in the Test Coordinator Kits). All WKCE tests were administered under secure testing conditions established by DPI.

The following Wisconsin Student Assessment Security Warning Statement was directed by DPI to appear on every test book beginning with the 2004–05 school year and through the current year:

### **Test Security**

**All passages, stimuli, and questions used in the *Wisconsin Knowledge and Concepts Examinations—Criterion-Referenced Test* are CONFIDENTIAL and must be kept SECURE at all times. Unauthorized use, duplication, or reproduction of ANY or ALL portions of the test materials is prohibited. Violation of security can result in district disciplinary action, prosecution, and/or penalties by the Department of Public Instruction or CTB/McGraw-Hill.**

Other security measures for WKCE test administrations are described below.

Limited English proficient students and students with disabilities were allowed to use highlighters. Test administrators were instructed to carefully supervise the use of highlighters because they may cause smudging of pencil marks and bubbles, which could affect reliability of scanning and scoring. If highlighters were used, the following guidelines were provided:

#### Guidelines for Highlighters:

1. Do not allow the highlighting of track marks, litho codes, skunk lines, barcodes, preslugged bubbles, or any carbon black printing. The highlighters cause these black inks to blur and bleed.
2. Do not allow the highlighting of pencil marks of any kind, whether bubbles or handwriting. The highlighters cause pencil marks to blur and bleed.
3. Use only highlighters from the following list, which were tested and found to have minimal problems:
  - Avery Hi-liter
  - Avery Hi-liter, thin-tipped
  - Bic Brite-Liner
  - Sanford Major Accent
  - Sanford Pocket Accent, thin-tipped

#### Test Security during Breaks:

Test security must be maintained during all breaks within a testing session. To lessen the risk of a security breach occurring during these breaks, students requiring the use of restroom facilities must be escorted by either a proctor or test examiner. In addition, students must not be allowed to use any form of wireless communication during these breaks.

Parameters for marking test books with a No. 2 pencil:

- Do not mark in the bubble answer positions.
- Do not mark in the student Pre-ID Barcode on the barcode label.
- Do not mark in the timing tracks (the parallel lines along the side of the test book).
- Do not mark in the skunk lines (the little squares and rectangles across the bottom of each page of the test book).
- Do not mark in the litho codes (the squares and numbers across the bottom of the document on the first and last pages of the test book).
- Do not mark more than one answer bubble as the scanner cannot determine a response.

#### **4.4 Test Administration**

In order to ensure standardized testing administration for all students, a Guide for District Assessment Coordinators and School Assessment Coordinators was made available to all assessment coordinators (DPI, 2013–2014). The guide included the following topics:

- Test Security
- Test Materials and Procedures
- Packaging the Test Materials
- Procedures for Returning Materials
- Test Results
- Responsibilities of District Assessment Coordinators (DACs)
- Responsibilities of School Assessment Coordinators (SACs)
- Checklist for School Assessment Coordinators
- WSAS Policy and Procedure Manual

In addition, Test Administration Manuals were made available to all test administrators. The manuals included the following:

- Test Materials
- Test Security
- Testing Schedules
- Organizing the Classroom
- Preparing Students to Take the Test
- Use of Appropriate Test Procedures
- Filling in the Student Information Page
- Administering the WKCE
- Filling in the Student Assessment Report
- Assembling Materials for Return

For specific information related to test administration, refer to the Test Coordinator's Manual and/or the Test Administration Manuals that are available online at: [http://oea.dpi.wi.gov/oea\\_publications](http://oea.dpi.wi.gov/oea_publications).

## Part 5: Scoring

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The purpose of Part 5 is to demonstrate adherence to AERA, APA, & NCME (1999) standards for scoring, including 3.22, 3.23, 3.24, 5.8, and 5.9. Part 5 describes the following:

- The scoring process of MC items
  - scanning process
  - calibration of scanners and other quality-control measures
  
- The scoring of CR items
  - scoring rubrics
  - handscoring process
  - electronic handscoring system
  - selection of Scoring personnel
  - selection of anchor papers
  - distribution of CR item scores

### 5.1 Scoring of Multiple-Choice Items

At the conclusion of the Fall 2013 WKCE administration window, student test documents were returned to CTB's scoring facility by the districts. Test materials were tracked through the entire scoring process, from the initial retrieval of the student test documents, through all scoring processes, and on to the final document retention period.

CTB's Scoring Operations processes were organized into Lean Processing Scanning Cells. Each cell was a self-contained, cross-functional team made up of the stations, equipment, and personnel skill-sets necessary to efficiently and accurately complete the operational processing cycle for student test documents.

Student answer documents were handled in a series of distinct processes. In order, those processes were as follows:

**Receiving**—Answer documents were tracked from retrieval to receipt at CTB, checked for damage in shipping, verified for full box counts, registered into an internal tracking system called the On-Hold Tracking System (OHTS), and then passed along to Login.

**Login**—Answer documents were then removed from the boxes, the pre-work was verified for district accuracy, and stacks of answer documents were aligned and cut for scanning.

**Scanning**—Stacks of answer documents were fed through optical scanners (see the following section for details) and any scanning problems were monitored and rectified (also detailed below).

**Updates**—The raw scoring and editing of scanned student data were performed using a system of edits to verify the integrity of each batch of scanned answer documents. The raw scoring and editing of the scanned student data also yielded an error list. Errors were resolved by trained editors using pre-defined guidelines in the Winscore editing system.

Documents were moved directly from process to process or sat momentarily in mini-queues. Once this stepwise process was complete, the student test documents were prepared for secure document retention.

**Document Retention**—Student test documents were then moved to a staging area where they were caged, warehoused, and ultimately retained for retrieval during the specified retention period. At the end of the 365-day retention period established in the WKCE contract, and upon customer approval, these documents will be loaded into containers provided by a designated NAID-certified<sup>2</sup> secure destruction company following strict national guidelines. The documents will then be picked up and shredded within 24 hours. Until shredded, the documents are caged and locked in a secure environment.

### 5.1.1 Scanning and Calibration of Scanners

This section provides a description of the scanning process and quality control processes applied in the scoring process.

Optical scanners captured all MC, ancillary, and student demographic data. An optical scanning technology called Optical Mark Recognition (OMR) detected all pencil marks in the answer section of the scanned document. The student test data was processed through CTB’s proprietary Winscore editing system. The Winscore scanning program evaluated detectable marks on both sides of each page, recording the intensity and coordinates of solid marks for resolution in the raw scoring step. The scanner reported intensities in the range 0 (lightest) to 15 (darkest). Winscore scored the darkest mark for each question as the intended response. In this way, completed bubbles were turned into characters of data representing test-item responses or other information.

The scanning production systems separated the MC item data from the CR item data. The CR data was handled in a “handscoring” process, as described in Section 5.2. The MC data and the handscoring data were later merged for correction, analysis, and reporting.

CTB’s scanning software captured student response data in images called TIFFs. The scanning process also captured data in barcodes and in identification marks (i.e., “skunk marks”), which were used to determine the type of document. Document headers provided customer identification and district, school, and class information. All images were captured during scanning using high-resolution technology, also called “grayscale.” Any item determined to be “unclear” was electronically retrieved in grayscale in the Electronic Handscoring System (EHS).

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<sup>2</sup> NAID is the National Association for Information Destruction.

The optical scanners were able to run at a rated speed without any interruptions except for problems with the physical documents. At the beginning of each shift, and after scanning every 5,000 sheets, a diagnostic sheet was used to assess the camera functionality. CTB cell leads also cleaned the scanners at the end of their shifts and ran a “quick check utility” to confirm that the equipment was ready for the next shift. If the scanner did not pass the quick check, or a diagnostic check, a field engineer was then called in to address the problem. If the scanning camera was adjusted in any way, the scanner was recalibrated and the quick check utility was run again. When readied, the scanner was then released for scoring. All scanners were calibrated as scheduled.

No recalibration was necessary during the WKCE Fall 2013 administration. The following processing metrics were obtained:

- Number of sheets scanned: 24,591,557
- Number of books scanned/processed: 426,711

The following checks were used to ensure the integrity of the student response data:

**Reliability check**—When there were low scores, either among groups or at the individual student level, the reasonability of the low-score ranges was verified.

**Biographical data**—During the Winscore process, a series of checks were completed on critical Wisconsin fields, such as student name, gender, and date of birth. The system flagged missing, double marked, or invalidly marked data. When a record was flagged for any critical Wisconsin field errors, the document was pulled and the bubbled data was verified and corrected accordingly.

**Duplicate barcode and litho code checks**—Additional checks were completed in Winscore to ensure that each document was scanned only once. A duplicate checker in Winscore flagged duplicate barcodes and litho codes. If either was flagged, the book was pulled and the barcode or litho code was verified to ensure that it had been accurately scanned, that no document was scanned twice, and that no barcode labels had been incorrectly applied. In addition to checks carried out in Winscore, further checks were carried out in Monarch, a back-end data system that flagged duplications and matched district and school data.

**Student counts**—The actual book counts generated by the scanners were compared to the book counts provided by the school districts on the School Group List and School Header Sheet. In 2013, 162 discrepancies were identified and resolved by emails and telephone calls placed to the districts. These completeness checks occurred from November 29, 2013 to January 10, 2014.

**School name/number**—Pre-assigned school numbers and names were verified against data provided by DPI.

The scored student response data were later retrieved by the CTB Research and Technology teams for statistical analyses and for producing reports.

## **5.2 Scoring of Open-Ended or Constructed-Response Items**

Sections 5.2.1 through 5.3 document the scoring processes used for CR items. This documentation forms part of the validity evidence supporting the scoring process used for CR items. Sections 5.2.1 through 5.3 describe the scoring rubrics, the scoring process, the selection of sample (anchor) papers used to train scoring personnel, the process of selecting personnel, inter-rater reliability, and the distributions of scores from CR items.

### **5.2.1 Description of Scoring Rubrics**

In the 2013 administration, the Reading and Mathematics forms in grades 3–8 and 10 contained CR items. A Writing prompt was also administered at grades 4, 8, and 10. The Writing prompts were scored using two holistic rubrics: a 3-point Conventions Rubric and a 6-point Composing Rubric. Tables 5-1 through 5-8 present the scoring rubrics.

### **5.2.2 Handscoring Process**

The Scoring personnel who score CR items are referred to as “readers.” As indicated previously, the process of scoring CR items is referred to as “handscoring.” The handscoring readers were trained using customer-approved training materials, such as the anchor papers described in Section 5.2.4. Once qualified, readers were required to maintain accuracy standards throughout the project. These requirements were assessed at the item level primarily through each reader’s daily “checkset” performance (described below), as well as agreement rates with other readers on the second reads (described below), and targeted read-behinds with team leaders (described below). Data monitors generated reports daily that flagged any readers falling below the established quality standards for any item, providing insight on reader scoring trends (such as difficulty with any particular score point). These reports were shared with handscoring supervisors. Those readers identified in the reports received additional coaching, training, reviews, targeted read-behinds, or additional checksets. Readers who did not meet standards with these initial corrective actions were administered another validation (recalibration) round. Failure to recalibrate resulted in dismissal from the scoring assignment. This process was in place throughout the entire handscoring window.

### 5.2.3 Electronic Handscoring System

The Electronic Handscoring System (EHS) was used to score CR items. EHS presented images of scanned test books to trained readers who assigned scores for the CR items. The scanned student responses were viewed on high-quality, 19-inch workstation monitors. Images of each student's responses were automatically routed to two or more readers when required, and images of specific subsets of test items were routed to designated groups of readers trained to score these items.

### 5.2.4 Anchor Papers and Training Papers

In 2013, all training materials, including scoring guides and Reading and Mathematics rubrics, anchor papers, training papers, qualification round papers, and checksets, were from the 2011. Prior to the actual scoring in 2011, the CTB Scoring Center created training materials. A selected group of papers written by WKCE students were selected as models to train raters for scoring. These papers, referred to as "anchor papers," played an important role in deciding which level of writing should receive which score. Range-finding meetings were held with DPI staff and educators to select sample papers for each score point. CTB randomly sampled student answer documents to ensure a representative sample of the possible responses. The sample papers were used to construct scoring guides and training papers. CTB's scoring team collaborated with DPI to make necessary revisions to the rubrics and in the selection of scoring guides and training papers. This process included several pre-sorting steps and subsequent iterative/consensus processes in order to achieve agreement and precision through a "round robin" scoring process. Once approved by DPI, the scoring guides (consisting of rubrics, anchors, and annotations) served as a constant guide, setting the course for all subsequent training and scoring.

### 5.2.5 Scoring Personnel and Qualifications

CTB recruited, trained, and managed personnel to complete all of the handscoring operations within the timelines of the contract. This involved extensive consultation between CTB's Scoring and Publishing Departments, Wisconsin educators, and DPI in order to review scoring rubrics, develop the anchor papers and other reader training materials, and to provide analyses of student responses to tryout forms. The characteristics of the readers, team leaders, and scoring supervisors are described in the following sections.

**Readers**—Many CTB readers had years of classroom teaching experience. The CTB reader pool included many retired and current educators, as well as engineers, editors, published authors, and individuals with advanced degrees. The minimum qualification for all readers was a Bachelor's degree. Readers were required to participate in training and successfully pass at least one of two qualification rounds. Once qualified, readers could start scoring, but throughout the scoring process, reader performance was assessed by a supervisor and data-monitoring staff through the use of checksets, read-behinds, and the review of inter-rater reliability statistics, as described in Sections 5.2.7, 5.3, and Part 9.

**Team Leaders**—Team leaders were selected on the basis of their ability to maintain a high degree of scoring accuracy and consistency, often across multiple content areas and grades. Team leaders were also required to possess good interpersonal and leadership skills in order to be effective when training and counseling readers. Team leaders were each responsible for a small team of readers. In addition to performing read-behinds on readers, team leaders also coached readers when needs were identified through data monitoring or otherwise by supervisory staff. Team leaders working on the writing component also resolved discrepant scores.

**Scoring Supervisors**—Scoring supervisors were the core group at CTB who directed and organized the assessment process, and trained team leaders and readers. Scoring supervisors had extensive experience as team leaders prior to their qualification and selection. Scoring supervisors were content area experts in the content areas they supervised and trained. They oversaw all team leaders and readers.

### 5.2.6 Reader Training

Validation was a critical task in the training process and the final determinant of reader readiness. All readers, including team leaders, were required to achieve a certain level of scoring accuracy in the qualifying round that followed training. The standard to which they were held was dependent on the score point range of an item. For example, where scores were either zero or one point, the level of agreement required was 95%, but where scores could range from zero to two points, the level of agreement required was 90%. Those readers not validating on the first attempt received further training prior to taking an additional qualifying round. Only those who were successfully validated were qualified as readers to score tests. Team leaders were required to complete two validation rounds with at least 80% exact agreement in each round.

### 5.2.7 Inter-Rater Reliability

**Checksets**—Throughout the course of the handscoring process, sets of pre-scored papers called “checksets” were administered daily to the team leaders as well as to the readers. The checksets were used to monitor scoring accuracy and to maintain a consistent focus on the established rubric and guidelines. This kind of monitoring occurred without reader knowledge. Readers, whose checkset scores fell below the qualifying level, were flagged for additional coaching (training review, targeted read-behinds, etc.). Those readers who remained below standard were given another validation (recalibration) round. Readers unable to recalibrate were dismissed.

**Read Behinds**—The “read-behind” was another valuable monitoring technique used. Each team leader was able to read a random selection of a reader’s scored items. This reading could be targeted at the item and score point level. The scores were compared, and if they agreed, the team leader was able to offer feedback, which enhanced the reader’s confidence and ability to score quickly and accurately. However, if a reader strayed from the standards established in the training and validation samples, the aberrant scoring was detected, and the team leader was able to offer guidance necessary to refocus the reader’s effort. Readers, whose

scoring was inconsistent, were read behind more frequently by their team leaders, thus correcting any scoring variations.

**Final Score**—In Writing, Reading, and Mathematics, the first score assigned for each CR item was the final score; however, 5% of the responses per item were double read (in “second reads”) to obtain indices regarding the consistency and accuracy of raters. Inter-rater reliability was monitored throughout the scoring process, as described in Part 9.

### 5.3 Distribution of Constructed-Response Item Scores

Tables 5-9 through 5-16 show distributions of CR item scores across each score point level (one point, two points, etc.) for each CR item and the Writing prompts. The scoring distributions shown for Reading and Mathematics are the scoring distributions of the first read. As described previously, 5% of the responses to the CR items in Reading, Mathematics, and Writing were double read (in “second reads”) for statistical purposes. These distributions were examined for quality assurance purposes in the scoring process.

These tables use four condition codes. Condition code “A” denotes items with no response or no attempt, code “B” represents an illegible response, code “C” indicates that another language was used in the response, and code “D” denotes a response that was off topic.<sup>3</sup>

All Reading items had one part and a maximum score of three points. In Mathematics, many CR items in grades 3–8 had two parts: a Part A worth one point and a Part B worth two points. The CR items in grades 3–8 with only one part were worth two points. In grade 10, all Mathematics CR items had one part and were worth two points.

As can be seen in Table 5-9 for Reading, in most cases, most students scored one or two points, and fewer students scored either three points or zero points. Scoring three points was not common in Reading; however, this result may be expected because CR items are often more difficult than MC items.

In Mathematics, although many students scored at the maximum score level for the CR items, many students also obtained a score of zero. This occurred on both Part A and Part B of the two-part CR items.

Students in grades 4, 8, and 10 were administered one Writing prompt. Tables 5-11 through 5-16 present the score distributions for the student responses to the Writing prompts. These tables are split between counts and percentages, and separate tables are provided for the 6-point Composing Rubric and the 3-point Conventions Rubric. The first score assigned for each Writing response on each rubric was the final score; however, 5% of the responses per prompt were double read (“second reads”) to obtain indices regarding the consistency and accuracy of

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<sup>3</sup> When calculating students’ scores on operational items, CR items receiving these condition codes were given zero score points.

raters. Scores from the first read, the second read, and the difference between the two reads are presented in Tables 5-11 through 5-16. As can be observed in Tables 5-11 through 5-16, the rater scores were very similar. As described previously, inter-rater reliability was also monitored in other ways throughout the scoring process. The full results for inter-rater reliability are presented in Part 9.

As can be seen in Tables 5-11 and 5-12, most scores in the Composing Rubric were in the middle of the 6-point range, and relatively few students were at the low and the high extremes. The Conventions Rubric showed similar results. As can be seen in Tables 5-13 and 5-14, a large proportion of students scored in the middle level of the 3-point range for the Conventions Rubric, and relatively few students scored either 1 point or 3 points.

Tables 5-15 and 5-16 show the total score on the Writing prompt, combining scores from the Composing Rubric and the Conventions Rubric. The combined scores for most students were in the middle or upper-middle range of the 9-point total, from 4 points to 6 points. The highest and lowest levels of scoring were less common, but in every grade, a small proportion of students obtained zero score points, and a small proportion obtained the highest possible score.

## **Part 6: Characteristics of the Calibration Sample**

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The calibration and initial equating of the Fall 2013 WKCE occurred in 2009 and was based on student data from a preselected sample of districts in the state. This arrangement was chosen in order to expedite the return of score reports to districts. In accordance with AERA, APA, & NCME (1999) standards 1.5, 1.13, 2.4, 4.7, and 6.1, this section provides a description of how the 2009 calibration sample was selected and how the calibration sample and census data compare in terms of demographic characteristics. Part 6 serves to demonstrate that the 2009 calibration sample was sufficiently representative of the Wisconsin student population for the purposes of calibration. This documentation also serves as validity evidence supporting the WKCE program. Information about the calibration sample can be found in the 2009 WKCE Technical Report available from the DPI at: <http://dpi.state.wi.us/oea/pdf/td-2009-techman.pdf>.

## **Part 7: Calibration, Equating, and Deriving Scale Scores**

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Student responses on the WKCE are input into complex mathematic algorithms designed to model the relationship between a student’s ability in a content area and a test item. The group of algorithms is collectively known as item response theory (IRT). WKCE scores are established through the processes of calibration, equating, and item-pattern scoring. Part 7 of the Technical Report describes these processes as they were applied to the Fall 2013 WKCE administration, as well as the results. This portion of the Technical Report addresses AERA, APA, & NCME (1999) standards 1.13, 4.1, 4.2, 4.3, 4.10, 4.11, 7.1, 7.2, and 7.10.

Readers should note that calibration, equating, and scoring using IRT are mathematically complex and computationally intensive processes. A full understanding of these topics requires a background in psychometrics. However, in order to make these processes more accessible and transparent to a wider range of audiences, a brief, nontechnical explanation of how scale scores are derived from raw scores is provided in Section 7.3. Additional references are also provided.

Calibration is the mathematical process of estimating characteristics of individual items. These characteristics are termed “item parameters.” Sections 7.1, 7.1.1, and 7.1.2 serve to explain this process beginning with a description of the calibration and equating methods used in 2011 that were applied to the Fall 2013 WKCE, followed by a discussion of the calibration models and the software used. The derivation of scale scores from raw scores is then addressed, with a focus on nontechnical audiences. The results of the calibration process, using model-to-data fit statistics and the standard error of measurement (SEM), are also discussed.

### **7.1 Calibration and Equating Methods**

In the Fall 2009, the three-parameter logistic (3PL) IRT model (Lord & Novick, 1968; Lord, 1980) was used for MC items, and the two-parameter partial credit (2PPC) model (Muraki, 1992; Yen, 1993) was used for CR items. Language Arts, Social Studies, and Science items were calibrated using the 3PL model because these three content area tests are comprised of only MC items. Because the Reading and Mathematics tests consisted of both MC and CR items, a simultaneous calibration with the 3PL and 2PPC models was implemented. A simultaneous calibration was also applied to the Language Arts test in grade 10 because a Writing prompt was included as a component of a student’s scale score at this grade level. The 3PL and 2PPC models are described in detail in the next section.

Simultaneous calibration is used for the mixed format tests in part because a single scale communicates that the measured skills relate to the same underlying qualities and characteristics, and that they can be taught and measured using a variety of assessment modes. In considering the simultaneous calibration process, Thissen, Wainer, and Wang (1992) stated that items of diverse types can be scaled together provided that the different types of items assess the same primary characteristics of the content area.

By design, there was a special set of items in each content area and grade level test that was common to both the current (2013) administration and a prior administration. This

arrangement is called a *common item non-equivalent group* design. The purpose of this design is to place current operational items on a base scale using the common items. Horizontally equating the current test forms to the previously established scales is necessary in order to obtain results that are comparable across administration years. The equating process also mitigates differences in test difficulty between forms from the current and the previous year, which are built to be similar in difficulty and content (Kolen & Brennan, 1995). The items that were used for equating are called anchor items. In each grade and content area, each set of anchor items was a miniature version of the total test, which adequately represented the test content coverage in terms of item difficulty and the test specifications. The Stocking and Lord (1983) procedure was used to equate the estimated parameters to the scale from which the anchor items were drawn. This procedure estimates the linear transformation constants by minimizing the distance between the test characteristic curves for the calibrated anchor items and the values for the anchor items already on the test scale.

The Reading and Mathematics vertical scales had been established in Fall 2005 using a similar plan termed an *adjacent grade common item design*. Based on Fall 2004 data, scores for adjacent grades were linked so that student scores in grades 3–8 and 10 could be expressed on a single scale. Vertical scales were not developed for Language Arts, Social Studies, and Science because these tests were administered only in grades 4, 8, and 10. Instead, the scales for grades 4, 8, and 10 were constructed in such a way to show a vertical relationship (i.e., an increase in scale score means) across grades. For additional information on the scaling methods used to establish the WKCE scales, readers can refer to Part 8 and Part 11 of the WKCE Technical Report from the Fall 2005 WKCE administration, which can be found in Appendix 3 of the 2010 Technical Report, available at: [http://oea.dpi.wi.gov/oea\\_publications](http://oea.dpi.wi.gov/oea_publications). The 2005 Technical Report includes a fairly extensive discussion of the scaling methods.

### 7.1.1 Calibration Models

The 3PL model defines a MC item in terms of three characteristics, or *item parameters*: (a) item difficulty (or its location on a scale of difficulty/ability), (b) item discrimination (or how well the item differentiates between the low- and high-ability students in relation to its location), and (c) the level of guessing. The 2PPC model defines a CR item in terms of item discrimination and item difficulty for each score point.

In the 3PL model, the probability that a student with scale score  $\theta$  responds correctly to item  $i$  is

$$P_i(\theta) = c_i + \frac{1 - c_i}{1 + e^{-1.7a_i(\theta - b_i)}},$$

where  $a_i$  is the item discrimination,  $b_i$  is the item difficulty, and  $c_i$  is the probability of a correct response by a very low-scoring student.

The 2PPC model is a special case of Bock's (1972) nominal model. Bock's model states that the probability of an examinee with ability  $\theta$  having a score at the  $k$ th level of the  $j$ th item is

$$P_{jk}(\theta) = P(x_j = k - 1 | \theta) = \frac{\exp Z_{jk}}{\sum_{i=1}^{m_j} \exp Z_{ji}}, \quad k = 1, \dots, m_j,$$

where  $Z_{jk} = A_{jk}\theta + C_{jk}$ .

For the special case of the 2PPC model used here, the following constraints were used:

$$A_{jk} = \alpha_j(k-1) \text{ and } C_{jk} = -\sum_{i=0}^{k-1} \gamma_{ji}, \text{ where } \gamma_{j0} = 0,$$

where  $\alpha_j$  and  $\gamma_{ji}$  are parameters freely estimated from the data. The first constraint implies that higher item scores reflect higher-ability levels and items can vary in their discriminations. The 2PPC model estimates a total of  $m_j$  independent item parameters; for each item, there are  $m_j - 1$  independent  $\gamma_{ji}$  parameters and one  $\alpha_j$  parameter.

The item calibration process is a process of estimating item parameters. Parameters are estimated in an iterative process using a computer software program called PARDUX (discussed below). The PARDUX program operates by estimating person parameters (ability) and item parameters (e.g., difficulty) through a series of iterations until the change in parameter estimates between iterations is reduced to a given threshold.

### 7.1.2 Calibration Software

The IRT models and the student response data from the Fall 2009 WKCE administration were used to estimate item parameters for each test. The IRT models were implemented using CTB's PARDUX software (Burket, 1991). Using marginal maximum likelihood procedures implemented with the expected maximum algorithm, PARDUX estimates parameters simultaneously for MC and CR items (Bock & Aitkin, 1981; Thissen, 1982).

PARSCALE, MULTILOG, and BIGSTEPS are among the most widely known and used IRT programs. Extensive simulation studies and comparisons between PARDUX and MULTILOG (Thissen, 1990)—a program widely used for research purposes—have shown that PARDUX provides precise parameter and ability estimates and it performs more efficiently than MULTILOG (Fitzpatrick, 1991). Simulation studies have also compared PARDUX with PARSCALE (Muraki & Bock, 1991) and with BIGSTEPS (Wright & Linacre, 1992). Fitzpatrick and Julian (1996) found that PARDUX provided precise parameter and ability estimates and performed more efficiently than the other programs. Extensive research with simulation data has also shown that the IRT procedures used here produce accurate vertical scaling (Yen & Burket, 1997).

## 7.2 Calibration Results

The following sections describe the calibration results in terms of the estimation of item parameters, model-to-data fit, and the SEM of the scale scores across content areas and grades.

### 7.2.1 IRT Item Parameters

At times when calibrating items, items do not converge, meaning the characteristics of the item are not able to be determined. When this occurs, items are suppressed from student scoring and future assessments. In 2011, no convergence issues occurred for any item on the operational tests.

### 7.2.2 IRT Item Fit

The calibration process produces ability and item parameter estimates that can be used to predict student response patterns to each item. For example, based on the item parameter estimates for item difficulty and item discrimination, we may expect that low-ability students are less likely to answer a difficult and highly discriminating item correctly than higher-ability students. After parameters are produced, we can compare the predicted scoring patterns to the observed scoring patterns in what are referred to as item-to-model fit comparisons. Where there is little difference between the predicted scoring patterns and the observed scoring patterns, the model can be said to “fit” the data.

CTB evaluated item-to-model fit in a two-step process. First, item-to-model fit information was obtained for each item using a Z-statistic. The Z-statistic is an index of the degree to which obtained proportions of students with each item score match the proportions predicted by the estimated student ability and item parameters. When the difference between the obtained proportions of students with each item score and the proportions predicted by the estimated student ability and item parameters reached a certain threshold, the item was flagged for “misfit.”

The Z-statistic is a transformation of the chi-square ( $Q_j$ ) statistic that takes into account differing numbers of score levels as well as sample size using the equation

$$Z_j = \frac{(Q_{1j} - DF_j)}{\sqrt{2DF_j}}$$

where  $Q_{1j}$  is the item chi-square statistic,  $j$  is an item, and  $DF$  is the degrees of freedom for a given item  $j$ .

Because the value of  $Z$  increases as the sample size increases, with other things being equal, the critical values for  $Z$  were established using the following equation (Yen & Candell, 1991)

$$Z_{crit,j} = \frac{4N_j}{1500},$$

where  $Z_{crit,j}$  is the critical value of  $Z$  for item  $j$  and  $N_j$  is the number of students who responded to item  $j$ . These values, along with the associated chi-squares ( $Q_I$ ), are computed for ten intervals corresponding to deciles of the ability distribution (Yen, 1984).

Table 7-1 presents items that were flagged for less than optimal fit when the obtained  $Z$ -statistic exceeded the critical  $Z$ -statistic value. To take an example from the table, in Reading grade 6, item 23 was flagged because the observed  $Z$  of 23.29 is larger than the critical  $Z$  value of 16.83 based on a sample size of 6,312.

Table 7-1 specifies the item status, content area, grade level, test book form, item number, item type (MC or CR),  $N$  size (the number of students),  $Z$ , and critical  $Z$ , as described previously. For many of the flagged items, the observed  $Z$  and the critical  $Z$  are not very far apart. For example, in the case of the first item in the table, Reading grade 5 item 18 was flagged because the observed  $Z$  of 18.15 is larger than the critical  $Z$  value of 17.07. The misfit in this case may be considered small. Although many items in the table show a moderate degree of difference between the obtained  $Z$  and the critical  $Z$  statistic, others, such as the Mathematics grade 4 items 41B and 49, show much larger differences.

In order to evaluate item-to-model fit further, CTB inspected the observed-to-predicted item characteristic curve (ICC) for each flagged item. These ICCs simultaneously plot the characteristics of an item (e.g., item difficulty, item discrimination, the level of guessing) using IRT model predications and the observed student responses. The ICCs show exactly where along the ability continuum the misfit occurs and the extent of the misfit.

MC items flagged for misfit most commonly had empirical (observed) information that differed from the model in the lower-ability range or at the higher-ability range because there are fewer students to provide information at the tails of the distribution. Similarly, for CR items, there are, in general, smaller numbers of students at the lower and higher score levels, which provides less information at the tails of the student distribution. Items that only show misfit at the tails of the distribution provide stable information about the majority of the students—those in the middle range of the distribution. However, if the misfit happens around the middle of the ability range, where there are many students, this may be a concern and may lead to the item being dropped from the test.

In a large-scale assessment such as the WKCE, with 23 grades and content areas, it is expected that some items will be flagged for misfit. The number of items flagged for misfit in the Fall 2011 WKCE is consistent with the number flagged in the year prior. As noted, the difference between the obtained  $Z$ -statistic and the critical  $Z$ -statistic was often small or moderate. Items flagged for misfit were reported to the CTB Development team and DPI. As noted in Section

3.1.1, such items are avoided in future selections unless there is a compelling reason that they should be included, such as meeting the test blueprint.

### **7.2.3 Evaluating Anchor Items**

To evaluate whether anchor items are performing differently in the current administration versus a previous administration, differences between the ICCs were computed for each anchor item. Differences between the curves were evaluated using the following statistics:

- Average Signed Difference
- Average Absolute (Unsigned) Difference
- Root Mean Squared Difference

Both unweighted and weighted versions of these statistics were calculated. Unweighted differences gave equal weight to differences across the ability spectrum. Weighted differences assigned weights according to the number of test-takers that are impacted by differences in the curves. For both weighted and unweighted versions of the three statistics listed above, differences greater than + 0.10 were considered large, and differences between + 0.07 and 0.10 were considered moderate. In addition, the Maximum Absolute Difference was identified for each item. Large Maximum Absolute Differences were those greater than + 0.15, and moderate differences were all differences between + 0.125 and 0.15.

Although dropping an anchor item flagged based solely on statistical criteria has its simplicity, this option may change the content coverage and equating constants, shift scale score distributions, and affect the performance level classification of students by moving them into different proficiency levels. Before an anchor item may be dropped from an anchor set, the adequacy of the content coverage must be evaluated and a reason for the anchor item differential performance must be identified. As stated above, an item is removed from the anchor set only if it adversely affects quality of scaling, not desirability of results. As such, CTB does not consider how the removal of an item affects the overall mean scale score or the impact data (percent of students in each performance level) when recommending items for removal.

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

1. An item is flagged for large differences on the Average Signed Difference, Average Absolute (Unsigned) Difference, or Root Mean Squared Difference and for moderate or large differences on the Maximum Absolute Difference when examining the differences between the previous versus current ICCs.
2. 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 test blueprint.

### 7.3 Deriving Scale Scores in the WKCE

A scale score can be interpreted as a highly probable estimate of a student’s ability in a given content area. 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).

Scale scores in the WKCE are based on the theoretical models of the item response process described above and elaborated upon below. The essential idea behind these models is that the probability of a correct response to a given item is a function of examinee ability and the characteristics of the item, such as the difficulty of the item. IRT models expect that as examinee ability increases, the probability of a correct response to a given item also increases, given certain conditions and assumptions. This description applies specifically to MC items; CR items are handled slightly differently but follow logic that is essentially the same.

Whether looking at an individual item or at a group of items that make up a complete test, IRT uses probability models to describe the relationship between a student’s ability and his or her observed scores. As described above, the 3PL model is used to estimate the probability of a correct response for each of the MC items. The model is provided here because its components are reviewed in the following paragraphs.

$$P(u_i = 1 | \theta) = c_i + \frac{1 - c_i}{1 + e^{-1.7a_i(\theta - b_i)}} \quad (1)$$

In this model,  $\theta$  denotes a measured ability (e.g., Language Arts ability) and  $u_i$  represents an observed score on a particular item. For MC items, the observed score  $u_i$  is either 0 or 1, indicating either an incorrect or correct response, respectively. For a MC item, the probability model can be denoted as  $P(u_i=1|\theta)$ . That is,  $P$  is an estimation of the probability that a student with an ability value  $\theta$  would answer item  $i$  correctly.

The terms on the right side of the equation above ( $a_i, b_i, c_i$ ) represent the parameters in the model: *discrimination*, *difficulty (or location)*, and a *pseudo-guessing factor*. Discrimination refers to how well an item sorts students by ability level; difficulty represents the difficulty of the item or its location on an ability continuum; and the pseudo-guessing factor represents the probability of a low-ability student guessing the correct response.

Given any particular response pattern ( $u_1 u_2 \cdots u_n$ ) on a test with some number of items ( $n$  items), the “likelihood function,” or the probability that a student with a given ability value ( $\theta$ ) would produce this particular response pattern, is given by

$$P(u_1u_2 \cdots u_n | \theta) = \prod_{i=1}^n P(u_i | \theta) \quad (2)$$

The formula indicates that the “estimated maximum likelihood” IRT item-pattern scoring method searches for the ability estimate ( $\theta_0$ ) that maximizes the probability function in (2) and it assigns an ability estimate ( $\theta_0$ ) as the test score for the student with the response pattern  $u_1u_2 \cdots u_n$ . In other words, the scale score is the most likely, or most probable, estimate of student ability, produced in a context where item parameters are known and based on all of the items in a given test.

As indicated, the item-pattern scoring method takes into account not only a student’s total raw score, but also the psychometric characteristics of all items the student responded to, including the items the student responded to incorrectly.

Consider the following example. Suppose six examinees in the fourth grade take a MC test in Language Arts with 30 items. Suppose further that the properties, or parameters, of the items on that test are as follows:

Table 7-A. Item Parameters for a Test

Item	Discrimination (a)	Location (b)	Guessing (c)	Item	Discrimination (a)	Location (b)	Guessing (c)
1	0.0341	318.75	0.16	16	0.0398	286.13	0.13
2	0.0342	244.62	0.20	17	0.0523	290.65	0.26
3	0.0234	257.56	0.20	18	0.0387	280.23	0.14
4	0.0306	235.00	0.20	19	0.0329	315.71	0.21
5	0.0125	342.39	0.17	20	0.0370	287.88	0.25
6	0.0305	261.51	0.16	21	0.0387	280.25	0.18
7	0.0316	296.93	0.19	22	0.0321	285.86	0.17
8	0.0228	252.70	0.20	23	0.0219	302.52	0.13
9	0.0383	266.28	0.20	24	0.0551	301.11	0.26
10	0.0229	308.84	0.11	25	0.0165	324.24	0.19
11	0.0536	259.00	0.21	26	0.0279	297.19	0.11
12	0.0478	245.19	0.20	27	0.0423	296.06	0.28
13	0.0418	276.25	0.28	28	0.0658	324.76	0.21
14	0.0377	287.60	0.23	29	0.0488	281.56	0.32
15	0.0177	316.08	0.24	30	0.0237	345.32	0.37

Now suppose the student response patterns for these six examinees are as follows, where 0 represents an incorrect response, and 1 represents a correct response:

Table 7-B. Item Response Pattern

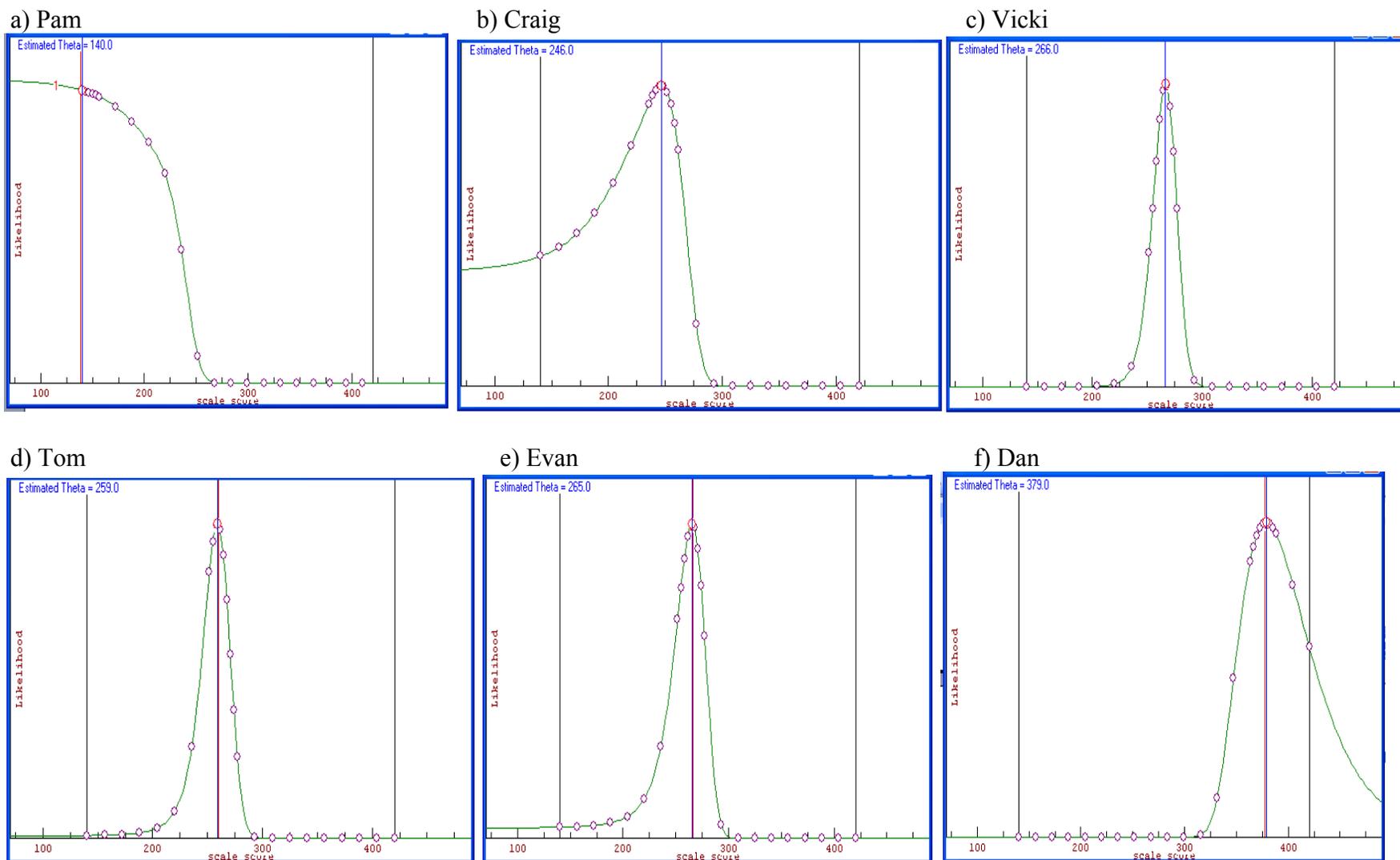
Student	Response Pattern ( $u_1u_2 \cdots u_n$ )	Raw Score	Item-Pattern Score
Pam	1000011001010000000000000101	7	140
Craig	101010101010101010101010101010	15	246
Vicki	010101010101010101010101010101	15	266
Tom	001100110011001100110011001101	15	259
Evan	110011001100110011001100110010	15	265
Dan	1111111111111111111111111011111	29	379

The first student, Pam, answered seven of the items correctly and obtained a scale score of 140, which is equal to the lowest point on the score range, called the “lowest obtainable scale score,” or LOSS. The next four students each answered 15 out of 30 items correctly, but the response pattern of each of these students is different. The *raw score* of each of these students is 15. However, the maximum likelihood item-pattern scoring method produced a different scale score for each examinee. Scale scores were 246 for Craig, 266 for Vicki, 259 for Tom, and 265 for Evan. These scores can be accounted for by considering the pattern of the student responses on the test together with the properties (or parameters) of the items, as shown in Table 7-A. By referring to Table 7-A, the reader can observe that Vicki and Evan answered some difficult and highly discriminating items correctly, whereas Craig and Tom did not. The remaining student, Dan, scored 29 out of the 30 items correctly and obtained a scale score of 379, which is near the upper limit of the scale score range, called the “highest obtainable scale score,” or HOSS.

Figure 7-A below shows the probability of each ability estimate (or scale score) for the six examinees. The total scale score range for Language Arts is plotted on the horizontal axis. As indicated by the two vertical lines in the plot, the lower and upper limits of the scale score range are 140 and 420, respectively. The likelihood or probability of all possible ability estimates for each examinee is plotted on the vertical axis and ranges from 0 to 1.0. The higher the likelihood, the more probable the ability estimate actually reflects the examinee’s ability level.

As indicated above, scale scores are the most likely, or the “maximum likelihood,” estimates of examinee ability. As can be observed for Vicki, Tom, and Evan, scores that are plus or minus only a few scale score points are markedly less likely estimates of their ability. The same is true for Craig and Dan, though to a slightly lesser extent. In the case of Pam, a few scores were almost as likely as the maximum likelihood estimate reported. Those scores that appear to be more likely than the reported score are outside of the scale score range of the test (below the LOSS).

Figure 7-A. Likelihood Functions, or the Probability of Each Ability Level Estimate (or Scale Score)\*



\*The circular dots in the likelihood functions indicate that the software program used is searching for a maximum likelihood estimate (scale score) for the student.

There are two IRT-based scoring methods generally used for large-scale assessments: number-correct scoring and item-pattern scoring. Item-pattern scoring may be recommended over number-correct scoring for several reasons. Two reasons, accuracy and reliability, are pertinent for present purposes.

Item-pattern scoring generally produces more accurate scores for individual students. Specifically, it produces a smaller standard error of measurement (SEM) across the scale score range for a given test compared to number-correct scoring. The smaller the SEM, the more confident one can be in the accuracy of the test results. The increase in accuracy provided by item-pattern scoring is equivalent, on average, to approximately a 15% to 20% increase in test length (Yen, 1984; Yen & Candell, 1991).

Second, reliability tends to be higher using item-pattern scoring, which means (a) fewer items are needed to achieve a given level of reliability and (b) a given test with a given number of items will have higher reliability than when using number-correct scoring. Yen (1984) has demonstrated that an equivalent level of reliability for a 20-item test scored by the number-correct scoring method could be obtained with a 16- or 17-item test scored by the item-pattern scoring method.

The procedures applied here are similar to those followed in the development of the *TerraNova* test (CTB/McGraw-Hill, 1997), *TerraNova* 2<sup>nd</sup> Edition (CTB/McGraw-Hill, 2000), and the prior Wisconsin Knowledge and Concepts Examinations developed in conjunction with CTB (1997–2001). Several supplements to this simplified outline of IRT are available. Introductory discussions of IRT can be found in *Educational Measurement* (Linn, 1989) or Chapter 11 in *Introduction to Measurement Theory* (Allen & Yen, 1979). More advanced discussions of partial credit models may be found in Muraki (1990, 1992), Yen (1993), and van der Linden and Hambleton (1997). For additional information on the technical details of the item-pattern scoring, readers can also refer to Yen & Candell (1991) and to *TerraNova* 2<sup>nd</sup> Edition (CTB/McGraw-Hill, 2000).

### **7.3.1 Standard Error of Measurement**

One way of characterizing the reliability of a reported test score is by examining the standard error associated with the score. An observed score should not be regarded as an absolute value, but as a point within a range that with a certain degree of probability includes a student's true score. The SEM can be used to obtain the range within which a student's true score is likely to fall, that is, with a certain degree of probability. It is expected that 68% of the time a student's score obtained from a single testing will fall within one SEM of that student's true score and that 95% of the time the obtained score will fall within two standard errors of the true score.

The SEM of the scale scores in the Fall 2013 WKCE, based on the Fall 2011 WKCE, is displayed graphically for each grade and content area in Figures 7-1 through 7-5. The SEM provided is based on item-pattern scoring. Each SEM curve is plotted as a function of the scale scores. These figures show the scale score range within which measurement is most accurate. The figures also show that extreme scale scores have more measurement error than scores in the

middle of the distribution. Scale scores in the high or low extremes of the student distribution are less precise than those in the middle of the distribution because there tends to be fewer test items in these score areas and fewer students. The lower and upper limits of the scale, referred to as the lowest obtainable scale score (LOSS) and highest obtainable scale score (HOSS), are the starting scale score and the last scale score in these figures. LOSS and HOSS are further discussed in the next section.

Because of the nature of item-pattern scoring, a scoring table showing a simple, direct conversion of raw score to scale score cannot be generated for the Fall 2013 WKCE. However, scoring tables showing a rough relationship between raw score, scale score, and SEM can be produced, and they are provided in Tables 7-2 through 7-24.

### **7.3.2 LOSS and HOSS**

As has been established, a scale score is a maximum likelihood ability estimate. The maximum likelihood procedure cannot produce scale score estimates for students with perfect scores or scores below the scoring level expected by guessing. Although maximum likelihood estimates are available for students with extreme scores other than zero or a perfect score, these estimates generally have large SEMs. Therefore, scores are established for these extreme highs and lows based on a rational, but necessarily non-maximum likelihood procedure. These values, which are set separately by grade, are called the LOSS and the HOSS.

Table 7-25 shows the number and percent of students at the LOSS and the HOSS. In general, there should not be many students clustered at the LOSS or HOSS. An accumulation of a high proportion of students in the LOSS or HOSS may indicate a floor or ceiling effect.

In most grades and content areas, the percentage of students at the LOSS and HOSS was small: less than one percent. However, in some grades and content areas the percentages were larger. In Reading, three grades had more than one percent of students at the LOSS (Grade 3–1.16%, grade 4–1.52%, grade 10–1.38%). In Mathematics, one grade had greater than one percent of students at the LOSS (grade 10–2.26%). These percentages at the LOSS can be considered to fall within an acceptable range, although they can still be considered as a point of reference when developing future forms. The percentage at the LOSS in these grades may be reduced in future years by including some additional items that are not difficult. The percentage of students scoring at the HOSS is similar: In most grades and content areas, the percentage was small, although in a few grades and content areas, the percentage was larger. In particular, more than one percent of students obtained the HOSS in Language Arts grade 8 (3.80%), Social Studies grade 4 (1.53%), and Science grade 8 (2.21%). The percentage scoring at the HOSS may be reduced by including some additional difficult items in these grades and content areas, or by including more items on the test.

### 7.3.3 Test Characteristic Curves

Test characteristic curves (TCCs) are provided in Figures 7-6 through 7-10. These curves model the relationship between student ability and expected scoring outcomes at the test level. By following the plotted line for any grade level and content area, one can observe the estimated scoring outcome (the estimated proportion of the maximum correct score) plotted as a function of examinee ability. These curves are based on the IRT models, methods, and scaling processes described above. The vertical relationship across grade levels that can be observed in the TCCs reflects the typical growth pattern: as grade level increases, ability level is also expected to increase across the ability range.

Although the TCCs, overall, show the expected separation across grades, the separation is somewhat less for Reading than for the other content areas. In addition, the Reading curves overlap in grades 4 and 5 and in grades 7 and 8. Although scale overlap is generally not considered the optimal pattern for a vertically scaled assessment, on Reading assessments this is not uncommon. On the WKCE Reading scales, the cut scores for grades 4 and 5 are closer together than the cut scores across these grades for Mathematics. Because the item difficulties in the WKCE tests were chosen, in part, to minimize the standard error around the critical *Proficient* cut score, the proximity of the cut scores in grades 4 and 5 would be expected to yield curves with relatively little separation. The proximity of the curves for grades 7 and 8, however, is less easily explained. Given the greater separation between the scales at these grades, the observed overlap of the TCCs may indicate that the grade 8 assessment would benefit from the addition of some more difficult items. This consideration, however, must be balanced by the need to keep form difficulty comparable each year to meet the assumptions for alternate parallel forms.

## Part 8: Test Results

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Part 8 presents a classical item analysis and summary of student results for the Fall 2013 WKCE administration. The summary results cover four types of scores: raw scores, scale scores, performance level results, and scores based on each of the content standards within each content area called “standardized performance indicator” (SPI) scores. Combined, the classical item analysis and the four forms of scores offer the reader several vantage points from which to understand and evaluate the WKCE testing program. The AERA, APA, & NCME (1999) standards addressed in Part 8 include: 1.5, 3.18, 4.3, 4.5, 4.6, 4.7, 4.19, 7.1, 7.10, 13.15, and 13.19.

### 8.1 Classical Item Analysis: Item Level Statistics

Three statistics are frequently used in item analysis at the item level: the proportion correct ( $p$ -value), the item-total correlation coefficient, and the omit rate for the item.

The  $p$ -value is an indication of the difficulty of an item. The  $p$ -value for a MC item represents the proportion of students who answered the item correctly. If all students answered a given MC item correctly, its  $p$ -value would be 1.0. If only 30% of students answered the question correctly, the  $p$ -value would be 0.30. The lower the  $p$ -value is the more difficult the item. Item  $p$ -value is a good indication of difficulty, as it takes student performance into account and it makes comparing items in terms of a common statistic very simple. A test made up of items well distributed across the range of item difficulty levels is desirable because it supports the assessment of students at all ability levels.

The  $p$ -value for a CR item represents the mean proportion of possible raw score points that students actually obtained for the item. A  $p$ -value of 0.33 for a given CR item would indicate that, on average, students obtained one-third of the possible points for the item. If the  $p$ -value were 0.75, this would indicate a much easier item where, on average, students scored 75% of the maximum possible points for the item. As such, the  $p$ -value indicates difficulty for CR items as well, with lower  $p$ -values indicating more difficult items.

The item-total correlation indicates the extent to which individual test items provide reliable measurement of the construct being measured by the total test, and it is an index of the item’s ability to discriminate between high-ability and low-ability students. For dichotomously scored MC items, the item-total correlations are computed as point-biserial correlations between the score on the item and the score on the remaining items in the test. For CR items, the item-total correlations are computed as Pearson product-moment correlations between the score on the item and the score on the remaining items in the test.<sup>4</sup> The item-total correlation coefficients can range from -1.0 to +1.0. A large positive value (such as 0.40) indicates a strong relationship

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<sup>4</sup> For both the point-biserial and the Pearson correlations, the studied item is excluded from the computation of the total score so as to not artificially inflate the correlation statistic. This effect would be most noticeable for CR items worth several points.

between a score on an individual item and the total score, with students who earn high scores on the test tending to score higher on the item than students with low scores on the total test. A low positive value (such as 0.10) indicates a weak relationship between scores on the item and the total score, while a negative value indicates that students who do well on the total test tend to score lower on the item than students who do poorly on the total test.

For MC items, the point-biserial correlation between each distractor and the total score was also calculated. In most cases, items will have negative correlations for each distractor and the total score. However, a weak positive correlation for a distractor does not necessarily mean that the item is defective, provided that the distractor correlation is substantially smaller than the item-total correlation for the correct response. In some cases, it may simply mean that the particular distractor is attractive to moderate-ability students and unattractive to low-ability students.

The omit rate is also computed for each item, reflecting the percentage of students who did not respond to the item. A high omit rate can indicate an especially difficult item or, if located near the end of the test, it can indicate what is referred to as a “speeded” test, where students have insufficient time to respond to all items.

For the Fall 2013 WKCE administration, items were flagged for further investigation according to the following rules:

- The  $p$ -value was less than 0.30 for MC items. Such a  $p$ -value indicates a difficult item, where fewer than 30% of students obtained the correct answer.
- The item-total correlation was less than 0.15 for the correct answer. A low value may indicate that the item is not providing a high degree of discrimination between high-ability and low-ability students, and, in addition, it may be an indication that the correct answer is in question.
- A distractor had a positive correlation with the total test score.
- The omit rate was greater than 5%.

Flagging an item for investigation is just one aspect of a complete evaluation of an item, and flagged items are not necessarily defective. It is desirable to include a small number of items with very high  $p$ -values (especially easy items) or very low  $p$ -values (especially difficult items) in order to provide more reliable measurement at the extreme high and low levels of ability, and to fully represent the range of difficulty for particular content standards. In this case, the flagging of  $p$ -values is a useful way of verifying that the number of extremely easy or difficult items is relatively small and consistent with the purposes of the test. Thus, flagged items do not necessarily indicate a challenge to test validity because items have been found to be appropriate during item reviews.

Omit rates may reflect a number of different properties, and an item that is omitted by more than 5% of the students (the WKCE flagging criterion) is not necessarily problematic. Omit rates are typically higher for CR items than for MC items because students who are fairly certain they do not know the answer may be inclined to simply skip the item altogether rather than

taking the time to form a response. Items with high omit rates are referred to content specialists for further review in order to ensure there is no unintended ambiguity in the items. If these flagged items are judged to be clear and provide a valid measurement of the intended knowledge, skill, or ability, then they are retained on the test.

Items flagged for a low item-total correlation or for a positive distractor-total correlation are more troublesome because these statistics show the relationship of each option to the construct being measured. In determining whether these items should be retained or removed from scoring, it is important to consider the relative magnitude of the correlation between the correct response and the total score and that of the distractor and the total score. In most cases, removing an item with a modest item-total correlation and negative correlations for all of the distractors will actually lower the reliability of the total test, so it is generally preferable to retain these items. The same is true of an item with a small positive correlation for one of the distractors and a much larger positive correlation for the correct response. However, an item that exhibits a low correlation for the correct response in combination with a positive correlation for one or more distractors is likely to degrade the measurement and lower the reliability of the test. Such items should be removed from scoring.

Overall, 39 items were flagged on the WKCE 2013 operational tests as meeting the investigational criteria bulleted on the previous page. Of the 39 flagged items that were scored, the number flagged for each of the four criteria is consistent with previous administrations.

Table 8-A shows the number of scored items in the Fall 2013 WKCE operational tests flagged for these conditions by grade and content area. Because some items were flagged for more than one condition, the number of flags may be greater than the number of flagged items.

Table 8-A. Summary of Flagged Operational Items on the Fall 2013 WKCE

Content	Grade	# of Items Flagged	Number of Flags*			
			Correlation <0.15	Distractor Correlation >0	Omit >5%	p-value <0.30
RD	3	1		1		
	4	1		1		
	5	3		2		1
	6	2		2		
	7	5	1	4		1
	8	4	3	3		
	10	3		2	1	
MA	3	1		1		
	4	1				1
	5	2	1	2		
	6	4	1	2		1
	7	1			1	
	8	0				
	10	2			2	1
LA	4	1		1		
	8	0				
	10	1		1		
SS	4	1		1		
	8	2		2		
	10	2	1	2		1
SC	4	1	1	1		
	8	1		1		
	10	0				
<b>Total</b>		39	8	29	4	6

\*Note that number of flags may be greater than number of flagged items.

The flagged items were referred to CTB’s content specialists for further review to ensure that the items were unambiguous and the answer keys correct. As part of this review, CTB’s content experts also evaluated each flagged item against the WKCE depth-of-knowledge (DOK) criteria to ensure that the cognitive demands of the item reflected the skills and knowledge that the item was designed to measure. Tables 8-B, 8-C, and 8-D provide more information about the flagged items.

Table 8-B. Fall 2013 WKCE Reading Items Flagged for Classical Item Analysis Statistics

Grade	Content	Item	Item Type	<i>p</i> -Value	Corr	Omit Rate	Flags				
							Corr	Distractor	Omit	<i>p</i> -Value	
3	RD	32	MC	0.47	0.42	2.06%		+	0.03		
4	RD	10	MC	0.54	0.24	0.18%		+	0.06		
5	RD	11	MC	0.61	0.34	0.89%		+	0.06		
	RD	33	CR	0.26	0.38	1.48%					+
	RD	42	MC	0.40	0.32	0.24%		+	0.04		
6	RD	14	MC	0.59	0.22	1.36%		+	0.04		
	RD	39	MC	0.61	0.18	0.20%		+	0.01		
7	RD	7	MC	0.36	0.22	0.20%		+	0.03		
	RD	8	MC	0.62	0.11	0.25%	+	+	0.00		
	RD	21	MC	0.38	0.31	2.03%		+	0.09		
	RD	52	MC	0.33	0.16	0.33%		+	0.01		
	RD	56	CR	0.19	0.46	1.49%					+
8	RD	1	MC	0.59	0.30	0.06%		+	0.00		
	RD	3	MC	0.76	0.09	0.13%	+				
	RD	10	MC	0.47	0.15	0.72%	+	+	0.00		
	RD	38	MC	0.63	0.13	0.68%	+	+	0.04		
10	RD	1	MC	0.51	0.38	0.10%		+	0.02		
	RD	10	MC	0.69	0.25	0.26%		+	0.06		
	RD	43	CR	0.49	0.53	5.82%				+	

Table 8-C. Fall 2013 WKCE Mathematics Items Flagged for Classical Item Analysis Statistics

Grade	Content	Item	Item Type	<i>p</i> -Value	Corr	Omit Rate	Flags				
							Corr	Distractor	Omit	<i>p</i> -Value	
3	MA	35	MC	0.58	0.34	0.92%		+	0.03		
4	MA	29B	CR	0.24	0.38	2.59%					+
5	MA	21	MC	0.45	0.41	0.44%		+	0.06		
	MA	29	MC	0.78	0.08	0.52%	+	+	0.02		
6	MA	11	MC	0.95	0.11	0.24%	+				
	MA	20	MC	0.42	0.47	0.32%		+	0.02		
	MA	22B	CR	0.26	0.43	0.82%					+
	MA	49	MC	0.57	0.27	0.44%		+	0.06		
7	MA	12	MC	0.72	0.40	7.83%				+	
10	MA	27	CR	0.47	0.62	5.20%				+	
	MA	38	CR	0.29	0.60	8.34%				+	+

Table 8-D. Fall 2013 WKCE Language Arts, Science, & Social Studies Items Flagged for Classical Item Analysis Statistics

Grade	Content	Item	Item Type	<i>p</i> -Value	Corr	Omit Rate	Flags				
							Corr	Distractor	Omit	<i>p</i> -Value	
4	LA	26	MC	0.58	0.34	1.41%		+	0.08		
10	LA	23	MC	0.59	0.23	1.01%		+	0.04		
4	SC	40	MC	0.46	0.14	2.54%	+	+	0.10		
8	SC	20	MC	0.58	0.35	2.07%		+	0.01		
4	SS	33	MC	0.48	0.28	2.05%		+	0.03		
8	SS	18	MC	0.64	0.24	0.28%		+	0.03		
	SS	40	MC	0.33	0.31	1.35%		+	0.00		
10	SS	16	MC	0.21	0.11	0.25%	+	+	0.05		+
	SS	41	MC	0.58	0.22	0.40%		+	0.00		

### 8.1.1 Flagging for a Positive Distractor Correlation

The distractor correlation coefficients are provided in these tables for items that were flagged because of positive distractor correlations. The distractor correlations tend to be very small and are generally much smaller than the item-total correlations for the correct answer key. All items flagged for a positive distractor had a distractor less than or equal to 0.10. These items were judged to be acceptable on the basis of their other statistics and were retained in order to meet the WKCE test blueprints.

### **8.1.2 Flagging for the Item-Total Correlation**

Eight items were flagged for item-total correlations  $<0.15$ , and all of the flagged items were 0.12 or above except for five items (Reading grades 7 and 8 (0.11 and 0.09), Mathematics grades 5 and 6 (0.08 and 0.11), and Social Studies grade 10 (0.11). Although these items, with correlation coefficients ranging from 0.08 to 0.15, are fairly low, the fact that they are positive indicates that the items are contributing information about student ability. These items, therefore, were retained in order to meet the WKCE blueprints.

### **8.1.3 Flagging for $p$ -Value**

Six items were flagged for  $p$ -values  $<0.30$ , and all six of these items had  $p$ -values between 0.19 and 0.29. While these statistics indicate items that were very difficult, the number of items flagged for difficulty was very small. Only one of the test forms had more than one item flagged for difficulty.

### **8.1.4 Flagging for Omit Rate**

Four items were flagged for omit rates greater than 5%. All of the items flagged for omit rates were highly discriminating items. With the exception of one item in Mathematics grade 10 that had a borderline  $p$ -value (0.29), all of the other items flagged for high omit rates had consistently good statistics. All were retained to meet the WKCE blueprints.

### **8.1.5 Supplemental Tables on Classical Item Analysis**

Tables 8-1 through 8-23 present more comprehensive results from the classical item analysis for all of the items retained in each grade and content area. Readers may note that the results presented in these tables may differ slightly from testing results presented on DPI's website due to slight differences in the decision rules defining which students are included or excluded from summary results. Official final results are based on the application of detailed inclusion rules, such as whether the student moved into a school and how long he or she was in one school or another over the course of the year.

The item analysis tables show the item number, which can be used to understand the location of test items as students actually encountered them in test booklets. The item analysis tables also indicate item type (MC or CR). Items removed from the scoring of these tests are not included in these tables.

Table 8-24 summarizes the number of flagged items across grade and content areas. As indicated above, relatively few items were flagged. The item analysis indicated that the  $p$ -values of the items in the operational tests were well distributed throughout the range of difficulty levels, with point-biserial correlations reasonably high for most items.

### 8.1.6 Speededness

The degree to which a test is speeded can be evaluated by examining the percentage of students who fail to respond to the final items on a test or the last items in a timed section. One criterion of test speededness currently in use in the testing industry is a rule introduced by Educational Testing Services, which formulates that at least 80% of the test takers should be able to answer all items and all test takers should be able to answer at least 75% of the items (Swineford, 1956). However, a more stringent requirement is often applied, considering tests to be unspeded only if at least 95% of the examinees attempt the final item. As shown in Table 8-E, WKCE tests satisfy this more stringent requirement, with more than 95% of the examinees attempting the final item in each of the five WKCE content areas.

Table 8-E. Percentage of Students Attempting Last Operational Item in Test

Content	Grade						
	3	4	5	6	7	8	10
Reading	98.10%	97.57%	98.99%	99.01%	98.51%	99.60%	99.35%
Mathematics	98.66%	99.44%	99.14%	99.33%	99.69%	99.16%	99.32%
Language Arts		97.41%				97.82%	96.95%
Social Studies		98.88%				98.65%	98.98%
Science		97.46%				99.13%	99.44%

### 8.2 Raw Score Results

Raw score results based on all students who took the Fall 2013 WKCE assessment are presented in Table 8-25. In order to facilitate interpretation of the raw score results, Table 8-25 provides the maximum possible score, the number of students, a measure of test difficulty, the standard deviation (SD) of raw scores, the skewness of the raw score distribution, kurtosis, the minimum observed score, the maximum observed score, reliability (Cronbach's alpha), and the SEM for raw scores. These measurements are further explained below. Readers can refer to Table 3-1 for a count of the number of items in the test and the number of raw score points corresponding to each item.

The mean raw score should be understood by grade and content area and specifically in the context of the maximum possible score points. In Reading, for example, the maximum possible raw score ranges from 56 to 60, and in Mathematics it ranges from 56 to 62.

Test difficulty is computed as the mean raw score divided by the maximum possible score points. Test difficulty ranges from 0 to 1.0. A larger test difficulty value indicates a mean raw score that is closer to the maximum possible score and therefore indicates an easier test. A smaller test difficulty value indicates a mean raw score that is further from the maximum possible score and, therefore, indicates a more difficult test. Consider an example: the test difficulty statistic would be 0.90 if a mean score of 45 were obtained on a test with a maximum

possible score of 50. This would be considered an easier test. On the other hand, test difficulty would be 0.50 if a mean raw score of 25 were obtained on the same test. This would then be considered a more difficult test. In Reading grade 5, the test difficulty statistic (0.66) was obtained by taking the mean raw score of 39.80 and dividing it by 60.

Table 8-25 also shows the skewness and kurtosis statistics for each distribution of raw scores. Skewness and kurtosis describe the shape of a distribution. When a distribution is perfectly normal, skewness is zero. A negative skew indicates a long tail on the left side of the distribution because of the presence of some low scores and (because the mean is sensitive to extreme scores) that most student scores are clustered on the high end of the scale. A positive skew indicates a distribution with some extreme high scores and a corresponding increase in the number of scores below the mean. Kurtosis describes a distribution in terms of its shape relative to a perfectly normal distribution. When a distribution is perfectly normal, kurtosis is zero. A negative kurtosis statistic indicates a distribution that is flatter than a perfectly normal curve, and a positive kurtosis statistic indicates a distribution that has more scores in the center of the score distribution (making it peaked) than a perfectly normal curve. Table 8-25 reveals that in most cases the WKCE students are not normally distributed along the test scale in each grade and content area. Although this has implications for practitioners who wish to use WKCE raw scores in statistical analyses (normality of the data cannot be assumed), from a criterion-referenced testing standpoint, it indicates that students on the whole are mastering the Wisconsin Model Academic Standards.

In addition, Table 8-25 shows the minimum observed score is zero where any student failed all items for each test. The maximum observed score is equal to the maximum number of points possible on the test where any student obtained the full scores for all items. For example, as displayed in Table 8-25, in Mathematics grade 8, there is at least one student who failed all items and at least one student who obtained a perfect raw score of 62.

A reliable test is one with high reliability as represented by statistics such as Cronbach's alpha and a low SEM. When interpreting reliability statistics, readers should note that test length (number of items and score points) is one of the important factors that influence reliability statistics and SEM. These concepts are described further in Part 9: Reliability. For present purposes, the reader should note that measurement error is associated with every test score. A student's true score is the hypothetical average score that would result if the test could be administered repeatedly without the effects of practice or fatigue. Obtained scores should not be regarded as absolute, but as one point within a range that, with a certain degree of probability, includes a student's true score.

The raw score results for each content area are summarized and discussed below using the measurements described above. The raw score results are discussed with reference to the total student population and in terms of subgroup comparisons based on gender, race/ethnicity, socioeconomic status, disability status, and English language proficiency. These subgroup comparisons draw from Tables 8-26 through 8-34.

## **Reading**

- Test difficulty ranged from 0.64 to 0.70.
- Standard deviations ranged from 9.93 to 12.46 raw score points.
- Alpha was relatively high in every grade (0.90 to 0.94).
- SEM ranged from 3.02 to 3.18.

## **Mathematics**

- Test difficulty ranged from 0.60 to 0.72, with generally lower difficulty in lower grades and higher difficulty in higher grades.
- Standard deviations ranged from 10.36 to 12.87 raw score points.
- Alpha was relatively high in every grade (0.92 to 0.93).
- SEM ranged from 2.98 to 3.46.

## **Language Arts**

- Test difficulty ranged from 0.61 to 0.73.
- Standard deviations ranged from 5.59 to 7.03 raw score points.
- Alpha ranged from 0.83 to 0.88. As discussed in Part 9, alpha is influenced by test length. All else being equal, shorter tests will tend to have lower reliability than longer tests. The reliability levels are consistent with prior years and are within the expected range given the length of the tests.
- SEM ranged from 2.04 to 2.59.

## **Social Studies**

- Test difficulty ranged from 0.65 to 0.76.
- Standard deviations ranged from 6.05 to 9.23 raw score points.
- Alpha ranged from 0.86 to 0.90. This is consistent with prior years and within the expected range for the length of the tests.
- SEM ranged from 2.24 to 2.95.

## **Science**

- Test difficulty ranged from 0.63 to 0.76.
- Standard deviations ranged from 6.97 to 10.08 raw score points.

- Alpha ranged from 0.88 to 0.91. Alpha was lower in grades 4 and 8 and slightly higher in grade 10. As noted previously, alpha is influenced by test length. Grade 10 has more items than grades 4 and 8 so higher reliability is expected. The alpha levels are consistent with prior years and within expected ranges given the lengths of the tests.
- SEM ranged from 2.37 to 3.02.

### **Subgroup Performance Patterns in Raw Score Results**

Overall, the raw score results show some consistent performance patterns by subgroups, that is, in terms of gender, race/ethnicity, socioeconomic status, disability status, and English language proficiency. Results can be seen in Tables 8-26 through 8-34.

- In Reading, female students, as a group, had a slightly higher mean raw score than male students in each grade level, with differences ranging from 1.61 points in grade 4 to 3.24 points in grade 8.
- In Mathematics, the raw score differences between genders were very small, ranging from 0.01 point in grade 8 to 0.86 point in grade 7. Although in some grades male students showed the higher raw score and in other grades female students showed the higher raw score, small differences like these suggest that the two groups may be best understood as showing similar performance in each grade.
- In Language Arts, female students, as a group, had a slightly higher mean raw score than male students in each grade level, with differences ranging from 1.40 points in grade 4 to 2.46 points in grade 10.
- In Social Studies, the raw score differences between genders were very small, ranging from 0.16 point in grade 8 to 0.47 point in grade 4. Small differences like these suggest that the two groups may be best understood as showing similar performance in each grade.
- In Science, male students had a slightly higher mean raw score than female students in each grade level, with differences ranging from 0.05 point in grade 4 to 1.28 points in grade 10.

In all grades and content areas, the raw score results showed consistent performance patterns by ethnicity. In every grade and content area, White students, as a group, had the highest mean raw score, followed by Asian students, American Indian students, Hispanic students, and African American students. American Indian students had a slightly higher mean raw score than Hispanic students. Differences between the mean raw scores of American Indian and Hispanic students were all equal to or less than 0.55 points in Language Arts, 1.13 points in Social Studies, 1.22 points in Mathematics, 1.65 points in Science, and 2.29 in Reading.

In every grade and content area, the mean raw score was higher among those students who were not economically disadvantaged than among those who were economically disadvantaged. The mean raw score difference between the two groups ranged from 3.90 points in Language Arts grade 4 to 10.12 points in Mathematics grade 8.

There were also differences in mean raw scores between students with disabilities and those without disabilities in all grades and content areas. The mean raw score of students without disabilities was consistently higher than the mean raw score of students with disabilities, with differences ranging from 4.42 points in Social Studies grade 4 to 15.08 points in Mathematics grade 8.

In every grade and content area, students who were fully English proficient showed a markedly higher mean raw score than students who were limited English proficient. As might be expected, these differences were generally largest in Reading, where fully English proficient students scored 9.38 to 14.50 points higher (in grades 3 and 10, respectively) than students who were limited English proficient. Mean raw score differences ranged from 5.67 to 13.67 points in Mathematics, 4.14 to 8.49 points in Language Arts, 4.17 to 11.18 points in Social Studies, and 5.27 to 12.46 points in Science.

### **8.3 Summary Statistics for Scale Scores**

The WKCE program reports scale scores as well as raw scores. The scale score of a student in a given content area represents the student's level of achievement in that content area. Higher scale scores indicate higher levels of achievement, and lower scale scores indicate lower levels of achievement. Scale scores are based on the entire set of scored operational items per grade and content area.

Summary descriptive statistics based on the scale score results are described below. Results for all students are described, as are results based on gender, race/ethnicity, socioeconomic status, disability status, and English language proficiency. Table 8-36 is the summary scale score table based on census data. The table shows the mean scale score, the standard deviation of the scale scores, skewness and kurtosis, the minimum and maximum observed scale scores, and LOSS and HOSS for all content areas and grades based on the census data. The LOSS and HOSS, as discussed in Part 7, identify the lower and upper limits of the scale score range. These values were established when the current scales were developed and do not change from one administration to another. The results for gender, race/ethnicity, socioeconomic status, disability status, and English language proficiency are drawn from Tables 8-37 through 8-45.

#### **Reading**

- Mean scale score increased by grade level, ranging from 457.55 to 549.90.
- Standard deviations ranged from 40.52 to 64.80 scale score points.
- In each grade level, student scores spanned the full-scale score range from the LOSS to the HOSS.

## **Mathematics**

- Mean scale score increased by grade level, ranging from 435.32 to 564.59.
- Standard deviations ranged from 45.76 to 52.02 scale score points.
- In each grade level, student scores spanned the full-scale score range from the LOSS to the HOSS.

## **Language Arts**

- Mean scale score increased by grade level, ranging from 293.52 to 449.59.
- Standard deviations ranged from 31.87 to 42.63 scale score points.
- In each grade level, student scores spanned the full-scale score range from the LOSS to the HOSS.

## **Social Studies**

- Mean scale score increased by grade level, ranging from 297.07 to 448.51.
- Standard deviations ranged from 27.28 to 45.58 scale score points.
- In each grade level, student scores spanned the full-scale score range from the LOSS to the HOSS.

## **Science**

- Mean scale score increased by grade level, ranging from 298.84 to 452.06.
- Standard deviations ranged from 32.54 to 49.57 scale score points.
- In each grade level, student scores spanned the full-scale score range from the LOSS to the HOSS.

## **Subgroup Performance Patterns in Scale Score Results**

The scale score results, like the raw score results, showed some consistent performance patterns in terms of subgroups. The results for gender, race/ethnicity, socioeconomic status, disability status, and English language proficiency are drawn from Tables 8-37 through 8-45.

## **Gender**

- In terms of gender, male students, as a group, showed a slightly lower mean scale score in Reading than female students in each grade level. The difference ranged from 6.52 to 15.62 scale score points.
- In Mathematics, the differences between genders were very small, from 0.14 scale score point to 3.02 scale score points, and male and female students alternated between the higher and lower score groups.
- In Language Arts, female students scored from 7.61 to 13.87 scale score points higher than male students.
- There were small differences between scale scores by gender in Social Studies, from 0.38 scale score point to 1.77 scale score points, and male and female students alternated between the higher and lower score groups.
- In Science, female students, as a group, showed a slightly lower mean scale score than male students in grades 8 and 10. The differences across grades ranged from 0.08 to 5.17 scale score points.

## **Race/Ethnicity**

- The scale score results showed some consistent performance differences by ethnicity.
- In every grade and content area, White students, as a group, had the highest mean scale score, followed by Asian students, American Indian students, Hispanic students, and African American students, in that order.
- As was noted in the context of the raw score results, the differences in mean scale scores for American Indian students and Hispanic students were often very small. In more than two-thirds of the grades and content areas, differences were less than seven scale score points.

## **Socioeconomic Status**

- Economically disadvantaged students, as a group, scored lower than students who were not economically disadvantaged across all grades and content areas. Differences ranged from 17.70 scale score points in Social Studies grade 4 to 44.44 scale score points in Reading grade 10.
- For almost every grade and content area, the mean scale score of students who were economically disadvantaged was more than one-half standard deviation lower than the mean scale score of students who were not economically disadvantaged.

## Disability Status

- Students with disabilities and students without disabilities showed consistent and large differences in mean scale score by group. Differences ranged from 18.01 scale score points in Social Studies grade 4 to 83.89 scale score points in Reading grade 10.
- For every grade and content area, the mean scale score of students with disabilities was more than one-half standard deviation lower than the mean scale score of students without disabilities.

## English Language Proficiency

- Students who were fully English proficient and students who were limited English proficient showed consistent and large differences in mean scale score by group. Differences ranged from 17.39 scale score points in Social Studies grade 4 to 86.67 scale score points in Reading grade 10.
- For every grade and content area, the mean scale score of limited English proficient students was more than one standard deviation lower than the mean scale score of fully English proficient students.

## 8.4 Cut Scores and Performance Level Classifications

Student performance on the WKCE is reported in terms of four performance categories: *Minimal*, *Basic*, *Proficient*, and *Advanced*. These performance categories are established through “cut scores.”

Standard 4.19 of the *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 1999) indicates that “[w]hen proposed score interpretation involves one or more cut scores, the rationale and procedures used for establishing cut scores should be clearly documented” (p. 59). In terms of the validity of the WKCE, it is essential to understand that the cut scores were established in a collaborative, participatory process. The two key activities in that process were *standard setting* and *descriptor writing*. Simply speaking, standard setting is a collaborative process of setting cut scores, and descriptor writing is a collaborative process of establishing a plain-language description of what students must know in order to be classified within each of the performance levels established through cut scores.

Performance level descriptors describe the content-based expectations regarding what Wisconsin students should know and be able to do in each grade/content area. Descriptors and cut scores together define, in qualitative and quantitative terms, the differences between a student who is *Proficient* and a student who is not. The Wisconsin Model Academic Standards guided the standard setting and descriptor writing process. These guided participatory processes served to ensure that the performance levels reported for the WKCE reflect the achievement standards and abilities intended by the Wisconsin legislature, teachers, citizens, and DPI.

CTB performed a special study in which the previous WKCE assessments (those that existed until the Fall 2005 WKCE administration) were linked to the current WKCE assessments (those that began with the Fall 2005 WKCE administration) as an important part of setting the cut scores. For details of the linking study, the standard setting activities, and the descriptor writing process, please refer to the Fall 2005 Technical Report (Part 11) and the Fall 2006 Technical Report (Parts 8 and 12), which can be found in Appendices 3 and 2, respectively, of the Fall 2010 WKCE Technical Manual available from the DPI at: [http://oea.dpi.wi.gov/oea\\_publications](http://oea.dpi.wi.gov/oea_publications). Interested readers can also refer to the WKCE 2005 Cut Score Development Report, which can be located at [http://oea.dpi.wi.gov/oea\\_publications](http://oea.dpi.wi.gov/oea_publications).

In 2012 the DPI adjusted cut scores on the WKCE for Reading and Mathematics to better meet the state's policy goals for its students. Therefore, comparisons to the 2011 percentages in each performance level for these subject areas are not appropriate.

Table 8-46 shows the cut scores for each content and grade level. Tables 8-47 through 8-51 show the percentage of all students in each performance category, as well as subgroup comparisons by gender, race/ethnicity, socioeconomic status, disability status, and English language proficiency. The results for each content area and grade are summarized below. For ease of reference, Tables 8-52 through 8-56 provide the scale score ranges that define performance levels together with the percentage of students in each performance level.

## Reading

- Across all grade levels, approximately 36% of students were either *Proficient* or *Advanced*.
- Approximately 6% of the total student population was classified as *Advanced* in Reading.
- Across all grade levels, approximately 64% of students were below *Proficient*. The difference ranged from 58% below *Proficient* in grade 10 to 67% below *Proficient* in grade 5.

## Mathematics

- Across grade levels, over 48% of the student population was either *Proficient* or *Advanced* in Mathematics.
- The proportion of students who were *Advanced* was between 9% and 12%
- Across all grade levels, approximately 52% of students were below *Proficient*. The difference ranged from 48% below *Proficient* in grade 4 to 54% below *Proficient* in grades 8 and 10.

## Language Arts

- At least 64% of the student population was either *Proficient* or *Advanced* in Language Arts.
- In grades 4 and 10, over 72% of students were either *Proficient* or *Advanced*, and in grade 8, 64% of students were either *Proficient* or *Advanced*.
- In grades 4 and 10, 23% and 28% of students, respectively, were below *Proficient*, but in grade 8, 36% of students were below *Proficient*.

## Social Studies

- Most of the total student population was either *Proficient* or *Advanced* in Social Studies. The proportion of *Proficient* or *Advanced* students was 93% in grade 4, 81% in grade 8, and 78% in grade 10.
- A large proportion of students were *Advanced*, especially in grade 4: 67% in grade 4, 44% in grade 8, and 47% in grade 10.
- The proportion of students classified as below *Proficient* was 7% in grade 4, 19% in grade 8, and 22% in grade 10.

## Science

- More than 74% of students were either *Proficient* or *Advanced* in Science.
- The percentage of students classified as *Advanced* increased from 24% in grade 4, 34% in grade 8, and to 40% in grade 10.
- The proportion of students classified as below *Proficient* was 24% in grade 4, 19% in grade 8, and 26% in grade 10.

## Subgroup Patterns in Performance Level Results

The performance level results varied by subgroup: gender, race/ethnicity, socioeconomic status, disability status, and English language proficiency. The main subgroup performance patterns are described below. These comparisons are based on Tables 8-47 through 8-51.

In terms of gender, a higher percentage of female students, as a group, were classified as *Proficient* or above in Reading than male students. Conversely, there were a higher percentage of male students than female students in the lowest performance level category in Reading. In Mathematics, the percentage of both genders was approximately equal in the *Proficient* reporting category and in the lowest performance category. However, the percentage of male students was slightly higher than the percentage of female students in the *Advanced* category for most grades. In Language Arts, there was a markedly higher percentage of female students than male students

who were in *Advanced* category, and lower percentages of female students than male students in the lowest performance category. In Social Studies, the percentage of female students who were *Proficient* or above was slightly higher than the percentage of male students, except in grade 10. There were also slightly more male than female students in the lowest performance category. In Science, the percentages of both genders were approximately equal in *Proficient* or above, although in every grade there were higher percentages of female students who were classified as *Proficient* and there were higher percentages of male students who were classified as *Advanced*.

There were some consistent patterns in performance by ethnicity across grades and content areas. First, in terms of the *Proficient* or above category, the prevailing tendency was that there were higher percentages of White students, as a group, to be classified as *Proficient* or *Advanced*, followed by Asian students, American Indian students, Hispanic students, and African American students. The inverse sequence was found at the *Minimal* performance level.

There were consistent differences in performance between economically disadvantaged students and not economically disadvantaged students. In every grade and content area, there were much higher percentages of students who were not economically disadvantaged classified as *Proficient* or above. There were much higher percentages of students who were economically disadvantaged who were classified in the lowest performance category.

Performance level results showed a similar pattern in comparisons of students who were fully English proficient with students who were limited English proficient. In every grade and content area, there was generally a higher percentage of students who were fully English proficient classified as *Proficient* and much higher percentages of students who were fully English proficient classified as *Advanced*. There were much lower percentages of fully English proficient students who were classified in the lowest performance category in all grades and content areas.

Performance level results showed that there were higher percentages of students without disabilities who were classified as *Proficient* or above, and there were much higher percentages of students without disabilities in the reporting category *Advanced*. There were also much lower percentages of students without disabilities in the lowest performance level than students with disabilities. This pattern was evident in all grades and all content areas.

## **8.5 Standard Performance Indicators for Content Standards**

In addition to raw scores and scale scores, teachers and educational decision-makers frequently need diagnostic information to inform instructional strategies. Diagnostic information also helps to identify individual student strengths and weaknesses. This kind of information can be derived from scores on subsets of test items that estimate how much a student knows in a clearly defined skill domain. These skill domains are called content standards (or standards or objectives). Scores on subsets of test items at the content standard level are called standard performance indicator (SPI) scores. The purpose of reporting SPI scores on the WKCE assessments is to show the relationship between the overall achievement being measured (represented by the test score) and the skills within each of the content standards associated with

the overall content area. Teachers may use the SPI scores for individual students as indicators of strengths and weaknesses, but the SPI scores are best corroborated by other evidence, such as homework, class participation, diagnostic test scores, or observation. District and school administrators may compare their results by content standard and grade level with the state mean percentage to better understand their strengths and weaknesses within a particular content area and grade level.

An SPI score can be interpreted as an estimate of the number of items a student would be expected to answer correctly if there had been 100 similar items for a given reporting category. For example, an SPI of 77 for a given reporting category means that if the student was given 100 similar items, the student would be expected to answer 77 of them correctly. These are criterion-referenced scores, in that they estimate how much a student knows in a clearly defined skill domain (i.e., the criterion). Technical readers can refer to *TerraNova 2<sup>nd</sup> Edition Technical Report* (CTB/McGraw-Hill, 2000) for details of the estimation procedures for SPI.

This approach, identifying student proficiency on each content standard, relates to the Wisconsin Model Academic Standards. The SPI provides a more reliable estimate of student achievement on each content standard than is possible by simply reporting percent correct. However, *the SPI information should be used for low-stakes purposes because the SPI cannot be considered stable for any content standard with a small number of items.*

Readers should note that the average difficulty of items will vary across content standards and grades. Content standards vary in their complexity, level of abstraction, and cognitive demand. Some standards may be intrinsically more difficult than others, and the difficulty of individual items is determined, in part, by the difficulty of the content domain being measured. The current test blueprints do not specify the average difficulty level of items for each content standard within grades or across grades. If the difficulty of the items varies across years, grades, and content standards, the mean SPI scores will be affected by differences in item difficulty as well as differences in student ability. *Thus, differences in SPI scores across years, grades, or content standards should not be seen as reliable indicators of differences in student ability since these differences may be explained in whole or in part by differences in the difficulty of the items themselves.* However, comparisons across years, grades, or content standards are appropriate for assessing the relative difficulty of the items, and comparisons of individual student scores or of group mean scores on a single SPI can provide useful information about the *relative* strengths and weaknesses of individual students or groups on these standards.

Tables 8-57 through 8-61 identify the content standards, the number of MC and CR items within each standard, the total number of possible points per standard, the mean raw score, the mean *p*-value, the standard deviation of the raw scores, the mean SPI score, and the standard deviation of SPI scores for all content areas across grades. Table 8-62 identifies the SPI cut scores for each content area reporting category and grade level. The results from Tables 8-57 through 8-61 are summarized below.

## Reading

Table 8-57 presents mean *p*-values and SPI scores for Reading across content standards and grades. The mean of the mean Reading SPI scores across grades and content standards was 67.26%, indicating that the items were moderately difficult for examinees. Results show that the mean *p*-values and SPI scores varied across standards in all grades. Mean SPI scores ranged from 46.82% to 83.50%. In general, the difference between the lowest and highest mean SPI scores was greatest in grade 3 (28.11%). The difference was smallest in grade 4 (9.49%), while content standard 1 (Determines Meaning) and content standard 2 (Understands Text) were the most difficult standards at all grades.

## Mathematics

Table 8-58 presents Mathematics *p*-values and SPI scores across grades and content standards. The mean of the mean Mathematics SPI scores across grades and content standards was 66.60%, indicating a moderate degree of difficulty. Results show that the mean *p*-values and SPI scores varied across standards in all grades. Mean SPI scores ranged from 48.99% to 81.05%, with the largest difference observed in grade 4 (where SPI scores ranged from 52.15% to 79.77%). Differences between the highest and lowest mean SPI scores ranged from 9.15% (grade 10) to 27.62% (grade 4). Content standards B (Number Operations) and C (Geometry) were the most difficult in grades 3-6. Content standard F (Algebraic Relationships) was the most difficult in grades 7 and 8. Content standard A (Mathematical Process) was the most difficult in grade 10.

## Language Arts

Table 8-59 presents Language Arts *p*-values and SPI scores across grades and content standards. The mean of the mean Language Arts SPI scores across grades and content standards was 63.80%, indicating a moderate degree of difficulty. Mean SPI scores ranged from 56.15% to 77.40%, with differences between the highest and lowest mean SPI scores of 8.84% in grade 4, 12.25% in grade 8, and 2.23% in grade 10. The mean *p*-values and SPI scores indicated that content standard B (Writing) was the most difficult standard in grades 4 and 8 and content standard D (Language) was the most difficult standard in grade 10.

## Social Studies

Table 8-60 presents Social Studies *p*-values and SPI scores across grades and content standards. The mean of the mean Social Studies SPI scores across grades and content standards was 70.90%. While this number is somewhat higher than the mean for the other content areas, this is largely the result of the relatively low difficulty of the grade 4 items, with most of the other grades exhibiting more moderate difficulty. Mean SPI scores ranged from 57.31% to 79.62%, with differences between the highest and lowest mean SPI scores of 7.76% in grade 4, 13.59% in grade 8, and 20.64% in grade 10. The mean *p*-values and SPI scores indicated that the

most difficult content standard varied between the three Social Studies grades. In grades 4 and 10, the most difficult standard was D (Economics) and in grade 8 the most difficult standard was A (Geography).

## Science

Table 8-61 presents Science *p*-values and SPI scores across grades and content standards. The mean of the mean Science SPI scores across grades and content standards was 69.68%. Across all grades and content standards, mean SPI scores ranged from 55.72% to 82.88%, with differences between the highest and lowest mean SPI scores of 5.78% in grade 4, 17.12% in grade 8, and 11.71% in grade 10. The mean *p*-values and SPI scores indicated that Standard G/H (Applied and Social Perspective) was most difficult in grade 4. Content standard C (Science Inquiry) was most difficult in grade 8, and content standard A/B (Connections & Nature and Science) was most difficult in grade 10.

## Summary of Student Performance Indicator Results

Overall, the mean SPI scores across grades and content standards range in difficulty. There are, however, a few instances of high SPI scores:

- Grade 10 Reading standard 1 (Determines Meaning)
- Grades 3, 4, and 6 Mathematics standard C (Geometry) and B (Number Operations)
- Grade 8 Language Arts standards B (Writing)
- Grades 4 and 10 Social Studies Standard D (Economics)
- Grade 8 Science standards C (Science Inquiry) and G/H (Applied and Social Perspectives)

The mean SPI scores are consistent with those found in previous years, suggesting that some of the differences in mean SPI scores across content standards may reflect the differential difficulty of the standards themselves and not merely variations in the difficulty of the particular items that were selected for the test forms. Nevertheless, it is important to note that some variation in difficulty of the items across content standards within and across grades and test forms is inevitable, and that some of that variation is independent of any intrinsic differences in the difficulty of the standards themselves. For this reason, the SPI scores should be interpreted with caution and should not be used to make comparisons of student performance across testing years or grade levels.

## Summary of Student Achievement Results

In the WKCE, the purpose of the Reading, Mathematics, Language Arts, Social Studies, and Science assessments is to demonstrate student achievement through test scores in the respective content areas. The results presented in Part 8, together with the validity evidence, indicate that the scale scores and performance levels reported in the WKCE program are valid

and reliable evidence of student achievement in the tested content areas and grades. As such, these test scores can be used to classify students, schools, districts, and the state with respect to how much achievement is shown for each content area. Classroom teachers may use these scores as evidence of student achievement in these content areas. District and school administrators may use this information for activities such as planning curricula. At the state level, the overall results can be drawn upon for accountability and reporting purposes associated with *No Child Left Behind* or school improvement initiatives.

## Part 9: Reliability

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Part 9 of the Technical Report builds upon existing analyses of the summary results by providing additional estimates of the reliability of those results. Reliability can be defined as the consistency of an assessment when the testing procedure is repeated with the same testing target group. A reliable assessment is one that would produce stable scores if the same group of students were to take the same test repeatedly, without any fatigue or memory of the test. As detailed below, the reliability of the Fall 2013 WKCE was estimated in four ways:

1. Internal consistency was assessed for all multiple-choice (MC) and constructed-response (CR) items using Cronbach's alpha.
2. Standard error of measurement (SEM) was calculated for raw score and scale score.
3. Classification consistency and classification accuracy were estimated for the performance level classifications.
4. Inter-rater reliability was estimated for all of the CR items.

The present chapter addresses AERA, APA, & NCME (1999) standards 2.1, 2.2, 2.10, 2.11, 2.14, and 2.15.

Standard 2.1 advises providing reliability estimates and the SEM for all total scores and subscores reported, standard 2.2 advises reporting SEM in both raw score and scale score units, and standard 2.11 advises that reliability and SEM should be assessed for all population subgroups. To meet these standards, this chapter of the report presents raw score reliability coefficients and SEMs for the five WKCE content areas, for each reported content standard for the total group of examinees, and for subgroups identified by gender, race/ethnicity, socioeconomic status, disability status, and English language proficiency. The scale score conditional SEMs are provided in Section 7.3.1.

Standard 2.15 advises that when testing measures are used to make categorical decisions, the reliability of those decisions should be estimated. In the present context, standard 2.15 applies specifically to performance level determinations, such as who is *Proficient* or *Advanced*. As described below, the Fall 2013 WKCE adhered to this standard by applying a detailed analysis of classification consistency and classification accuracy—two related measures used to evaluate the reliability of the performance level classifications used in the WKCE program. This analysis also addresses standard 2.14 by providing a conditional SEM for the cut scores that separate the performance levels.

Standard 2.10 advises reporting measures of inter-rater consistency where subjective judgment is involved in scoring. As we saw in Part 5, CR items were scored by human raters; the process thus involved subjective judgment. As this section will show, a detailed assessment of inter-rater consistency was applied to the WKCE. The assessment conducted is termed inter-rater reliability; it measures the reliability of human raters as they score CR items.

Combined, Cronbach’s alpha, SEM, classification consistency, classification accuracy, and inter-rater reliability provide several forms of evidence bearing on the reliability of the WKCE. Cronbach’s alpha and the SEM operate at the content level: they provide estimates of reliability for student scores in Reading or Mathematics, for example. Classification consistency and classification accuracy operate on the associated performance level classifications. These are of particular interest in the context of NCLB and the associated AYP requirements. Inter-rater reliability probes further, looking at individual items and evaluating the reliability of the human raters as they assign scores, item by item.

## 9.1 Measures of Internal Consistency and SEM

Cronbach’s alpha is a frequently used measure of internal consistency for tests consisting of MC and CR items. Cronbach’s alpha ( $\alpha$ ) is computed as

$$\hat{\alpha} = \frac{k}{k-1} \left( 1 - \frac{\sum \sigma_i^2}{\sigma_x^2} \right),$$

where  $k$  = number of items,  $\sigma_x^2$  = the total score variance, and  $\sigma_i^2$  = the variance of item  $i$  (Crocker & Algina, 1986). SEM is defined as

$$SEM = SD \sqrt{1 - reliability},$$

where SD represents the standard deviation of the raw score distribution and reliability represents Cronbach’s alpha.

Cronbach’s alpha and the SEM are shown in Tables 9-1 and 9-2, respectively. These tables include information for all students and for the subgroup categories of gender, race/ethnicity, socioeconomic status, disability status, and English language proficiency.

As indicated in Table 9-1, reliability was highest in Reading and Mathematics. Looking at all examinees together in the “Total” column, reliability ranges from 0.90 to 0.94 across grades for Reading, from 0.92 to 0.93 for Mathematics, from 0.83 to 0.88 for Language Arts, from 0.86 to 0.90 for Social Studies, and from 0.88 to 0.91 for Science. The results are similar to last year; in the 2012 administration, the total reliability ranged from 0.89 to 0.93 across grades for Reading, from 0.90 to 0.94 for Mathematics, from 0.82 to 0.85 for Language Arts, from 0.87 to 0.90 for Social Studies, and from 0.86 to 0.88 for Science. Ideally, we would like all reliability coefficients to be 0.90 or above. However, for relatively short tests that are designed to measure a fairly broad range of content, this is not always a realistic expectation. If 0.90 is considered a conservative criterion for an acceptable level of reliability, as measured by Cronbach’s alpha, then grades 4, 8, and 10 Language Arts, grades 4 and 8 Social Studies, and grades 4 and 8 Science tests would not meet this criterion. The reliability coefficients for these tests are consistent with the small number of items (and score points) and the diversity of the content being assessed. Applying the Spearman-Brown prophecy formula to these results indicates that

to achieve the 0.90 reliability threshold, the current 30-item test in Language Arts in grade 4, the 29-item test in grade 8, and the 32-item test in grade 10, would need to be increased in length to 56, 36, and 47 items, respectively; the current 40-item test in Science grades 4 and 8 would both need to increase to 50 items; and the current 36-item test in Social Studies grade 4 and the 40-item test in grade 8 would need to be increased to 53 and 45 items, respectively.

Table 9-1 shows that many of the subgroup reliability coefficients were similar to, albeit slightly lower than, the total reliability coefficients. Reliability coefficients are particularly sensitive to the score distribution and variance, so this result is consistent with the generally larger standard deviations (as previously discussed in Part 8 of this report and summarized in Tables 8-26 through 8-34) among many of these subgroups.

The differences in reliability among most subgroups on most tests were quite small. Differences between male and female students were within 0.03 of one another for all grades and content areas.

The difference between disabled and not disabled and economically disadvantaged and not disadvantaged students was within 0.07 of one another. Most differences among the five racial/ethnic groups also were quite small, within 0.04 of one another for all grades and content areas except Mathematics grade 10, where the reliability for Asian students was 0.05 higher than the reliability for African American students and Language Arts grade 4, where the reliability of Asian students was 0.05 higher than that of American Indian students. The greatest differences were between fully English proficient and limited English proficient students, with consistently lower reliability among limited English proficient students.

Table 9-2 presents the raw score SEM for the total population and for the subgroups described above. These values provide important information for raw score interpretation since we can expect that an individual's obtained score will fall within two standard errors of his or her true score approximately 95% of the time. Although there were some observable differences in SEM for the different subgroups, all differences were within one-half of a score point. The SEMs for Reading and Mathematics were slightly larger than those for the other content areas. Because these SEMs are on the raw score scale, this result is consistent with the fact that the Reading and Mathematics tests have more raw score points and larger raw score standard deviations than the other content areas. For every grade and content area, the conditional SEM for individual scale scores are provided in the scoring tables previously discussed in Part 7 (Tables 7-2 through 7-24). The SEM at the *Proficient* cut score was low in all grades and content areas. The SEMs are also plotted in Figures 7-1 through 7-5, with the locations of the cut scores shown in each plot so that the associated SEMs can be easily located.

Reliability, as measured by Cronbach's alpha, was also computed for each content standard within each content area. Table 9-3 shows these reliability coefficients by content standard. The last column presents the reliability for the total content area (with all content standards) for all examinees. It is clear that the reliability per content standard is lower than that for the total test per content area. As discussed above, the number of items (or score points) has a close relationship with reliability, and a smaller number of items (or score points) is generally associated with lower reliability. As discussed in Part 2 of this report, and summarized in Tables

2-1 through 2-5, the targeted number of items per content standard ranged from 5 to 23 items for Reading,<sup>5</sup> 6 to 15 items for Mathematics, 5 to 20 items for Language Arts, 5 to 13 items for Social Studies, and 6 to 10 items for Science. A lower level of reliability statistics per content standard is therefore expected. The generally lower level of reliability per standard is one of the reasons why the information based on the content standards should be used for low-stakes purposes only (this issue was previously discussed in the context of SPI).

By content standard, the reliability ranges were as follows (Table 9-3):

- For Reading, reliability indices by content standard ranged from 0.52 (for standard 4 in grade 3 with 5 items) to 0.88 (for standard 2 in grade 3, with 20 items).
- For Mathematics, reliability indices by content standard ranged from 0.55 (for standard C in grade 5 with 10 items) to 0.78 (for standard B in grade 3, with 12 items).
- For Language Arts, reliability indices by content standard ranged from 0.36 (for standard D in grade 4 with 5 items) to 0.83 (for standard B in grade 8, with 19 items).
- For Social Studies, reliability indices by content standard ranged from 0.49 (for standard E in grade 8, with 5 items) to 0.70 (for standard B in grade 8 with 13 items).
- For Science, reliability indices by content standard ranged from 0.32 (for standard D in grade 4, with 6 items) to 0.73 (for standards G/H in grade 10 with 10 items).

The SEM associated with each content standard is presented in Table 9-4 by content area and grade level. Some differences in SEM by content standard can be observed. As indicated by the discussion above, these SEMs were smaller than those for the total test and are generally consistent with the number of items within each content standard.

In summary, the reliability indices, as measured by Cronbach's alpha at the test level, are in a reasonable range given the number of items in each test. As described above, readers should also note that because the reliability is influenced by the number of items, lower reliability for the content standards with fewer items is to be expected.

## 9.2 Classification Consistency and Accuracy

One of the primary goals of education policy is to improve the performance of all students, with a specific goal of having all students become *Proficient*. Because of this heavy emphasis on moving all students to levels of academic achievement at or above each state's self-defined *Proficient* category, the consistency and accuracy of the classification of students into

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<sup>5</sup> Note that content standard 4 at grade 3 contains 5 items but is worth 7 points because it includes four MC items and one 3-point CR item. Therefore, the point values for Reading range from 7 to 25 points.

these performance categories is of particular interest. The following section describes how the consistency and accuracy of these classifications were evaluated, and provides evidence supporting the validity of these classifications.

Conceptually, classification consistency is defined as the extent to which two classifications of a single student agree, either based on two independent administrations of the same test or one administration of two parallel test forms. However, it is difficult to obtain data from repeated administrations of the same form because of the cost, time, and student memory from prior administrations. It is also difficult to construct two psychometrically parallel forms. For these reasons, the common practice is to estimate classification consistency from a single administration.

A contingency table representing the probability of particular classification outcomes under specific scenarios is a convenient way to measure classification consistency. The table below is a contingency table of  $(H+1) \times (H+1)$ , where H is the number of cut scores. Three cut scores yield a  $4 \times 4$  contingency table, as can be seen below in Table 9-A.

It is common to report two indices of classification consistency: the classification agreement “P” and the coefficient kappa. Hambleton and Novick (1973) proposed P as a measure of classification consistency, where P is defined as the sum of diagonal values of the contingency table:

$$P = P_{11} + P_{22} + P_{33} + P_{44}.$$

Table 9-A  
Contingency Table with Three Cut Scores

	Level 1	Level 2	Level 3	Level 4	Sum
Level 1	P <sub>11</sub>	P <sub>21</sub>	P <sub>31</sub>	P <sub>41</sub>	P <sub>.1</sub>
Level 2	P <sub>12</sub>	P <sub>22</sub>	P <sub>32</sub>	P <sub>42</sub>	P <sub>.2</sub>
Level 3	P <sub>13</sub>	P <sub>23</sub>	P <sub>33</sub>	P <sub>43</sub>	P <sub>.3</sub>
Level 4	P <sub>14</sub>	P <sub>24</sub>	P <sub>34</sub>	P <sub>44</sub>	P <sub>.4</sub>
Sum	P <sub>1.</sub>	P <sub>2.</sub>	P <sub>3.</sub>	P <sub>4.</sub>	1.0

To reflect statistical chance agreement, Swaminathan, Hambleton, and Algina (1974) suggest using Cohen’s kappa (1960) as

$$\text{kappa} = \frac{P - P_c}{1 - P_c},$$

where  $P_c$  is the chance probability of a consistent classification under two completely random assignments. Probability  $P_c$  is the sum of the probabilities obtained by multiplying the marginal probability of the first administration and the corresponding marginal probability of the second administration as

$$P_c = (P_{1.} \times P_{.1}) + (P_{2.} \times P_{.2}) + (P_{3.} \times P_{.3}) + (P_{4.} \times P_{.4}).$$

Landis and Koch (1977) suggest that values of kappa greater than 0.75 indicate “excellent agreement,” values between 0.40 and 0.74 represent “good agreement” beyond chance, and values below 0.40 denote “poor agreement.”

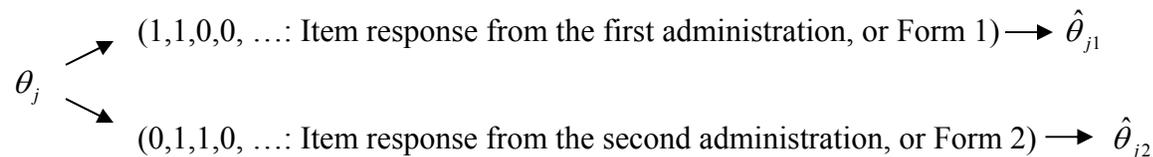
While classification *consistency* refers to the agreement between two observed scores, classification *accuracy* refers to the agreement between the observed score and the true score. Classification accuracy is defined as the extent to which the actual classifications of test takers agree with those that would be made on the basis of their true scores (Livingston & Lewis, 1995). It is common to estimate classification accuracy by assuming the psychometric model to find true scores corresponding to observed scores. For the WKCE, the method used to estimate classification accuracy and consistency is the Kolen and Kim (2004) method, described in the next section of this report.

### 9.2.1 Kolen and Kim’s Method for Pattern Scoring

As stated in Part 7, when item response theory (IRT) is applied to score examinees’ responses, two types of scoring are available: number-correct scoring and item-pattern scoring. WKCE uses item-pattern scoring. Many methods of estimating the consistency and accuracy of classification based on number-correct scoring have been suggested in the psychometric literature. However, there have been relatively few studies dealing with item-pattern scoring based on IRT. Kolen and Kim (2004) suggest a simple procedure for pattern scoring (KKM) based on IRT and simulated item responses. KKM requires a simulation of item responses as follows:

Step 1: Obtain item parameters ( $\mathbf{I}$ ) and the ability distribution weight ( $\hat{g}(\theta)$ ) at each quadrature point.

Step 2: Compute two ability estimates at each quadrature point. At a given quadrature point,  $\theta_j$ , 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  $\theta_j$ .



If two parallel (or alternative) forms (e.g., Form 1 and Form 2) are available, the two response patterns can be generated based on the item parameters from the two forms.

Step 3: Construct a classification matrix at each quadrature point. Determine the joint event for the cells in Table 9-B using the two ability estimates obtained from Step 2.

Table 9-B  
Classification Table for One Cut Point ( $C_1$ )<sup>6</sup>

		First administration or Form 1		
		$\hat{\theta}_{j1} \geq C_1$	$\hat{\theta}_{j1} < C_1$	
$\hat{\theta}_{j2} \geq C_1$			Second administration or Form 2	
	$\hat{\theta}_{j2} < C_1$			

Step 4: Repeat Steps 2 and 3  $R$  times and get average values over  $R$  replications.  $R$  should be a large number (e.g., 500) to obtain stable results.

Step 5: Multiply distribution weight ( $\hat{g}(\theta)$ ) by the average values in Step 4 for each quadrature point and sum across all quadrature points. From this, a final contingency table and classification consistency indices, such as kappa, can be computed.

Because examinees' abilities are estimated at each quadrature point, this quadrature point can be considered the true score. Therefore, classification accuracy is computed using both examinees' estimated abilities (observed scores) and quadrature point (true score). Just as 0.90 is generally considered the criterion for acceptable test score reliability, the criterion value of 0.90 is considered to be an acceptably high level of classification accuracy.

As can be seen in Tables 9-5 through 9-27, there are two tables for each grade and content area. The first table is a contingency table with all three cut scores, which was prepared based on the KKM procedure. The rows represent the first administration of an assessment, and the columns represent the second administration of the same assessment to the same students. As mentioned above, in the KKM procedure the score distributions for the first administration and the second administration are estimated using a simulation. So, the value in each cell represents the probability of belonging to a particular pair of performance levels in the first administration and the second administration. For example, in Reading grade 3, 0.31 represents the probability of belonging to *Minimal Performance* in both the first and second administrations. The 0.03 represents the probability of belonging to *Proficient* in the first administration and *Advanced* in the second administration. "Sum" is obtained simply by adding the four row values or the four column values. This "Sum" is not always identical to the sum of the values shown in the table because the values displayed have been rounded to two decimal places.

The second table shows indices for classification consistency and classification accuracy. Because there are four performance levels for the WKCE, there are three cut scores. The values in "All Cuts" were obtained by applying all three cuts together. In Table 9-5 for Reading grade 3,

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<sup>6</sup> This table is constructed for each quadrature point and replication. One, and only one, cell will have a value of one and zeros elsewhere.

when all three cuts were used for the computation, classification consistency (P) is 0.77, chance probability is 0.29, kappa ( $k$ ) is 0.67, and classification accuracy is 0.83. The values for “Cut 1” were obtained by applying only the first cut score. There are two levels whenever only one cut is applied (i.e., performance levels above and below the cut). It is clear that the values for P, kappa, and classification accuracy with all three cuts are smaller than those for any single cut point. The probability of assigning students to the incorrect performance level will increase with the number of cut scores.

Because the *Proficient* cut score is a criterion for AYP reports, the reliability values for this second cut need to be considered carefully. In Table 9-5, for example, the P for the second cut, which establishes the *Proficient* performance level, was 0.90, kappa was 0.78, and classification accuracy was 0.93. The interpretation of the values illustrated for Table 9-5 is the same for Tables 9-6 through 9-27.

When only the *Proficient* cut score was applied, P was greater than or equal to 0.87 and kappa was greater than or equal to 0.71 for all Reading and Mathematics tests. For Language Arts, the average P associated with the *Proficient* cut was 0.88 and the lowest kappa was 0.67. In Social Studies, the lowest P associated with the *Proficient* cut was 0.91 and the lowest kappa was 0.71. For Science, the lowest P was 0.90 and the lowest kappa was 0.73. According to Landis and Koch’s criteria for kappa (presented previously in this report in the discussion of classification consistency), all tests showed excellent agreement based on the cut for the *Proficient* performance level.

Figures 9-1 through 9-5 also show P, kappa, and classification accuracy when students were classified based on “All Cuts.” These values are provided in Tables 9-5 through 9-27, but the results are also provided in the plots for ease of understanding. As can be seen in the plots, all grades and content areas indicated classification consistency (P) based on all cuts over 0.72 for all grades in Reading, Mathematics, Social Studies, and Science. In Language Arts, P was 0.69, 0.68, and 0.71 in grades 4, 8, and 10, respectively. The values of kappa were greater than 0.54 for all grades and content areas. In summary, based on the Landis and Koch criteria, all test forms showed good agreement.

### 9.3 Inter-Rater Reliability for CR Items and Writing Prompts

The reliability of handscoring may be measured in a variety of ways. Two of the most effective ways are 1) tabulations of exact and adjacent agreement and 2) reliability coefficients. Reliability for CR items is typically examined by calculating indices of inter-rater agreement, the degree of reliability with which different human raters assign scores to a given student response. Two indices for inter-rater reliability, intraclass correlation and weighted kappa, are presented here.

**Notation:** To assess reliability, it is necessary to replicate the scoring process for a subset of papers. This is usually done with “blind double-reads.” Suppose that we have  $N$  responses, each of which is scored twice. We denote the two scores of response  $n$  by  $X_{n1}$  and  $X_{n2}$ , where

$n=1, 2, \dots, N$ . The resulting data may be presented in two ways, enumeration by response and cross-tabulation.

**Data Structure 1: Enumeration by Response.** Each row represents a single student response:

Response #	Score 1	Score 2	Mean Score
1	$X_{11}$	$X_{12}$	$\bar{X}_{1.}$
2	$X_{21}$	$X_{22}$	$\bar{X}_{2.}$
$\vdots$	$\vdots$	$\vdots$	$\vdots$
$\vdots$	$\vdots$	$\vdots$	$\vdots$
$N$	$X_{N1}$	$X_{N2}$	$\bar{X}_{N.}$
Column Mean	$\bar{X}_{.1}$	$\bar{X}_{.2}$	$\bar{X}_{..}$

where

$$\bar{X}_{1.} = (X_{11} + X_{12}) / 2$$

is the mean score for response 1 (similarly for responses 2, 3, ... $N$ ),

$$\bar{X}_{.1} = \frac{1}{N} \sum_{n=1}^N X_{n1} = (X_{11} + X_{21} + \dots + X_{N1}) / N$$

is the mean of Score 1 over all responses (similarly for Score 2), and

$$\bar{X}_{..} = \frac{1}{N} \sum_{n=1}^N (X_{n1} + X_{n2}) / 2$$

is the overall mean score across both scores of all responses.

**Data Structure 2: Cross-Tabulation of Score 1 and Score 2.** As an alternative, we may create a square table of counts for each Score 1 by Score 2 (i.e.,  $X_{n1} \times X_{n2}$ ) combination:

		Score 2				Row Total
		0	1	...	$m$	
Score 1	0	$n_{00}$	$n_{01}$	...	$n_{0m}$	$n_{0+}$
	1	$n_{10}$	$n_{11}$	...	$n_{1m}$	$n_{1+}$
	.	.	.	...	.	.
	.	.	.	...	.	.
	$m$	$n_{m0}$	$n_{m1}$	...	$n_{mm}$	$n_{m+}$
Column Total		$n_{+0}$	$n_{+1}$	...	$n_{+m}$	$n_{++}$

where  $m$  is the maximum score (for a rubric including zero) obtainable for the item;  $n_{ij}$  is the number of responses for which Score 1 =  $i$  and Score 2 =  $j$ ;  $n_{i+}$  is the number of responses for which Score 1 =  $i$ , and  $n_{+j}$  is the number of responses for which Score 2 =  $j$ .

Formulas for the two reliability coefficients of interest are then given:

1. **Intraclass Correlation**,  $\rho_{IC}$ , describes the percent of overall score variance accounted for by the variance of mean response scores:

$$\rho_{IC} = \frac{Var_n(\bar{X}_n)}{Var_n(X_{n1}, X_{n2})} = \frac{\frac{1}{N-1} \sum_{n=1}^N (\bar{X}_n - \bar{X}_{..})^2}{\frac{1}{2(N-1)} \sum_{n=1}^N [(X_{n1} - \bar{X}_{..})^2 + (X_{n2} - \bar{X}_{..})^2]}$$

If agreement is perfect,  $\rho_{IC} = 1$ . Always,  $0 \leq \rho_{IC} \leq 1$ .

2. **Weighted Kappa**,  $k$ , is used in many contexts as a measure of association in square contingency tables:

$$k = \frac{\sum_{i=0}^m \sum_{j=0}^m w_{ij} \frac{n_{ij}}{n_{++}} - \sum_{i=0}^m \sum_{j=0}^m w_{ij} \frac{n_{i+} n_{+j}}{n_{++}^2}}{1 - \sum_{i=0}^m \sum_{j=0}^m w_{ij} \frac{n_{i+} n_{+j}}{n_{++}^2}}, \text{ where } w_{ij} = 1 - \frac{(i-j)^2}{M^2}.$$

If agreement is perfect,  $k = 1$ . If agreement is what would be expected by chance,  $k = 0$ . Always,  $0 \leq k \leq 1$ .

Ordinal rating scales (e.g., 0, 1, 2) used in scoring CR items contain a certain level of chance agreement that is expected. Although the intraclass correlation is reported in this report, it does not take into account the possibility of chance agreement between the two raters, but Cohen's kappa does take this into consideration. In general, kappa will have values equal to or smaller than the intraclass correlation. If agreement is perfect, then the value of kappa is 1.0. If agreement is at chance levels, the value of kappa is zero. As noted in Section 9.2.1, Landis and Koch (1977) suggest that values of kappa greater than 0.75 indicate "excellent agreement," values between 0.40 and 0.74 represent "good agreement" beyond chance, and values below 0.40 denote "poor agreement." Specific criteria for intraclass correlation or weighted kappa are not established.

Tables 9-28 through 9-30 present the rater agreement statistics for CR items and the Writing prompt. The evidence supporting inter-rater reliability is presented in terms of the percentage of agreement between raters, two indices of inter-reliability, and the distributions of scores across score levels. In the table, "Perfect" agreement is defined as scores that are exactly the same. "Adjacent" agreement is defined as scores differing by one point. "Discrepant" cases are those cases where the scores of the two raters differed by more than one raw score point. The column for "Codes" reflects the number of students who received the condition codes A, B, C, or D, which indicate illegible responses, responses that are off-topic, blank responses, or in another language, respectively. "Mean" reflects mean score. "Number of Reads" is exactly two times the number of papers submitted for the purpose of computing inter-rater reliability, as each paper submitted for that purpose is scored twice. The "Frequency" column represents the scoring outcomes for the student responses based on the raw scores given by each of the two raters. For example, as shown in Table 9-28, for Reading grade 4, item 13, the perfect agreement, adjacent agreement, discrepant agreement, and codes are 70%, 26%, 2%, and 2%, respectively.

For Reading, Mathematics, and Writing, student responses were scored by a single rater. To calculate inter-rater reliability, 5% of the responses were scored by a second rater.

The inter-rater reliability results for Reading, Mathematics, and Writing are discussed separately in the following sections. Overall, the results indicate a high degree of reliability for scores on the handscored items in all three content areas.

## **Reading**

Inter-rater reliability results for Reading CR items are shown in Table 9-28. Overall, the rater agreement was very high. The mean percentage of non-discrepant ratings (i.e., perfect agreement plus adjacent scores), averaged across all items, was approximately 95%. As noted in Section 9.2.1, Landis and Koch (1977) suggest that values of kappa greater than 0.75 indicate "excellent agreement," values between 0.40 and 0.74 represent "good agreement" beyond chance, and values below 0.40 denote "poor agreement." The mean kappa across all items was approximately 0.77.

Each of the Reading CR items had a maximum possible score of 3. The percentage of discrepant (i.e., nonadjacent) ratings was 4% or less for each of the operational CR items.

The percentages of discrepant ratings for the Reading CR items are summarized below. For these operational CR items, the results were as follows:

- 1% discrepant ratings—3 items (21%)
- 2% discrepant ratings—9 items (64%)
- 3% discrepant ratings—1 items (7%)
- 4% discrepant ratings—1 items (7%)

The percentage of responses with condition codes ranged from 1% to 7% across all items; the percentage exceeded 3% for only one item. The mean intraclass correlation, averaged across all items, was 0.89. Intraclass correlations ranged from 0.82 to 0.93, and weighted kappa ranged from 0.64 to 0.86.

## **Mathematics**

Table 9-29 provides the inter-rater reliability results for the Mathematics CR items. Overall, the rater agreement was high. The mean percentage of non-discrepant ratings (i.e., perfect agreement plus adjacent scores), averaged across all items, was approximately 97% for operational items. The mean kappa across all items was approximately 0.93.

Treating the two-part CR items as separate items, the maximum possible points per CR item ranges from one to two points. The percentage of discrepant (i.e., nonadjacent) ratings was 5% or less for all operational CR items.

The percentages of discrepant ratings for the Mathematics CR items are summarized below. For these operational CR items, the results were as follows:

- No discrepant ratings—28 items (61%)
- 1% discrepant ratings—8 items (17%)
- 2% discrepant ratings—7 items (15%)
- 3% discrepant ratings—2 items (4%)
- 5% discrepant ratings—1 items (2%)

The percentage of responses with condition codes ranged from 1% to 9% across all items; the percentage exceeded 3% for 4 items. The mean intraclass correlation, averaged across all items, was 0.96. Intraclass correlations ranged from 0.89 to 1.0, and weighted kappa ranged from 0.78 to 1.

## Writing

Table 9-30 shows inter-rater reliability results for the Writing prompts. As indicated previously, the Writing prompts were scored on two rubrics, the Composing Rubric (six points) and the Conventions Rubric (three points). Table 9-30 shows that the rate of perfect agreement was lower on the 6-point Composing Rubric than on the 3-point Conventions Rubric. The difference is due to the difference in score points. Perfect agreement is, as discussed previously, less likely with a higher number of possible score points than with a lower number of possible score points. Adjacent and discrepant modes of agreement were, as may also be expected, more common where there were more possible score points. Perfect agreement ranged from 59% to 66% on the Composing Rubric and from 80% to 94% on the Conventions Rubric. Adjacent agreement ranged from 32% to 36% on the Composing Rubric and from 5% to 17% on the Conventions Rubric. The percentage of discrepant (i.e., nonadjacent) ratings for the Writing prompt in grades 4, 8, and 10 ranged from 1% to 2% for the Composing Rubric and was 0% for the Conventions Rubric. Codes were generated in 1% to 3% of the cases. Intraclass correlation ranged from 0.81 to 0.91, and weighted kappa ranged from 0.63 to 0.82.

## Summary

Overall, the analyses discussed in this section of the report indicate acceptable levels of reliability for the WKCE assessments. The internal consistency reliability estimates, as measured by Cronbach's alpha coefficient, are reasonable given the number of items in each test. The analyses of classification consistency and accuracy indicated acceptable levels of consistency and accuracy of student proficiency level classifications, and the SEM around the *Proficient* cut score was low in every grade and content area. The levels of rater agreement were high and the discrepancy rates low, with acceptably high values for the weighted kappa and intraclass correlations. Finally, the results of the inter-rater reliability analyses indicate a high degree of reliability for scores on the hand-scored items in the WKCE Reading, Mathematics, and Writing assessments.

## Part 10: Validity

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The *Standards for Educational and Psychological Testing* (AERA, APA, & NCME, 1999) defines validity as “the degree to which evidence and theory support the interpretations of test scores entailed by proposed uses of tests. Validity is, therefore, the most fundamental consideration in developing and evaluating tests” (p. 9). The purpose of test score validation is not to validate the test itself, but to validate interpretations of the test scores for particular purposes or actions. Test score validation is not a quantifiable property but an ongoing process, beginning at initial conceptualization and continuing throughout the entire assessment process. Every aspect of an assessment provides evidence in support of (or a challenge to) its validity, including design, content specifications, item development, psychometric quality, and inferences made from the results.

As the Technical Report has progressed chapter by chapter, it has moved through the phases of the testing cycle. Each part of the Technical Report detailed the procedures and processes applied in the WKCE, as well as their results. Each part also highlighted the meaning and significance of the procedures, processes, and results in terms of validity or a relationship to the *Standards*. Part 10 addresses three final issues in validity: the issues of bias, construct validity, and test integrity. The analyses presented here add to the perspectives provided in Parts 2 through 9. Below is a brief review.

Part 2 of the Technical Report described the involvement of Wisconsin educators, DPI, and CTB in the test development process. As indicated in Part 2, the test development process and the involvement of Wisconsin educators in that process formed an important part of the validity of the entire WKCE. The knowledge, expertise, and professional judgment offered by Wisconsin educators ultimately ensured that the content of the WKCE formed an adequate and representative sample of appropriate content, and that the content formed a legitimate basis upon which to derive valid conclusions about student achievement.

Part 3 of the Technical Report addressed the issue of test form development. Part 3 provided a general discussion of CTB’s test book creation and editing process, the process of selecting operational test items, and the process of obtaining DPI approvals. The test design process and the participation of Wisconsin educators in the process of test selection, including item content and bias reviews, provide a solid rationale for having confidence in the content and design of the WKCE and using it as a tool from which to derive valid inferences about Wisconsin student performance. Parts 2 and 3 together provided evidence to support the content validity of the WKCE and addressed AERA/APA/NCME (1999) standards 1.2, 1.6, 3.1, 3.2, 3.3, 3.5, 3.6, 3.7, 3.9, 3.11, 3.16, 6.4, 6.15, 7.3, 7.4, 7.7, 13.3, and 13.5.

Part 4 of the Technical Report described the process, procedures, and policies that guided the administration of the WKCE, including accommodations, security, and the written procedures provided to test administrators and school personnel. The following AERA, APA, & NCME (1999) standards were addressed: 1.13, 3.3, 3.19, 3.20, 3.21, 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7, 6.11, 6.15, 9.1, 10.1, and 10.2. The process, procedures, and policies detailed in that section contributed to the validity of the WKCE assessments by reducing the impact of

construct-irrelevant variables (such as non-standardized administration methods, limitations associated with student disabilities, security breaches, etc.) on test performance.

Part 5 of the Technical Report demonstrated adherence to AERA/APA/NCME AERA, APA, & NCME (1999) standards 3.22, 3.23, 3.24, 5.8, and 5.9. It described how MC items and CR items were scored, the handscoring process, the training and selection of readers, the scoring rubrics used for scoring CR items, and the resulting score distributions. The procedures described in that section contributed to the validity of the WKCE assessments by preventing hardware- or software-related errors in machine scoring, and reducing construct-irrelevant score variance associated with variations in raters' interpretation and application of scoring rubrics.

Part 6 described the sample data used for calibration and scaling, referring the reader to information found in the 2010 WKCE Technical Report (and the 2008 WKCE Technical Report for Reading Grade 10).

Part 7 of the Technical Report described the calibration and equating methods, as well as processes and procedures for deriving scale scores from response patterns. Some references to introductory and advanced discussions of IRT were provided. Several axes upon which to evaluate the calibration and equating procedures, such as the models and data used, the software applied, the vertical relationship across grades, the successful estimation of parameters, the fit, the SEM, and the IRT scoring method, were all discussed. Part 7 of this report thereby addressed AERA, APA, & NCME (1999) standards 1.13, 4.1, 4.2, 4.3, 4.10, 4.11, 7.1, 7.2, and 7.10. These processes and procedures contributed to the validity of the WKCE by providing the opportunity to identify and eliminate items that were not contributing to the accurate and reliable measurement of the intended constructs, and by ensuring that valid comparisons of the WKCE test scores can be made within and across years.

Part 8 presented classical item analysis data, raw score results, scale score results, performance level information, and SPI scores. Scale score results provided a basic quantitative reference to student performance as derived through the IRT models applied. The performance level information reflected the performance level requirements of the NCLB policy environment, as well as interests of parents, students, and educators. The SPI scores then probed further, assessing specific skills and abilities. Combined, scale scores, performance levels, and SPI scores provided a comprehensive set of tools to assess Wisconsin student performance by content and grade level and by gender, race/ethnicity, socioeconomic status, disability status, and English language proficiency. Part 8 thus addressed AERA, APA, & NCME (1999) standards 1.5, 3.18, 4.3, 4.5, 4.6, 4.7, 4.19, 7.1, 7.10, 13.15, and 13.19. The analyses addressed in Part 8 contributed to the validity of the WKCE by providing further opportunity to identify and eliminate items that were not contributing to the accurate and reliable measurement of the intended constructs.

Part 9 demonstrated adherence to AERA, APA, & NCME (1999) standards through several analyses of the reliability of the Fall 2013 WKCE. It presented a reliability analysis using Cronbach's alpha, SEM results, a detailed analysis of classification consistency and classification accuracy, and a full analysis of inter-rater reliability. The Fall 2013 WKCE Technical Report thereby addressed AERA, APA, & NCME (1999) standards 2.1, 2.2, 2.10, 2.11, 2.14, and 2.15. Reliability is a prerequisite to score validity, and the analyses in that section

contributed to the WKCE validity evidence by establishing the reliability of the WKCE test scores and proficiency classifications.

In the subsequent pages, Part 10 will, as stated, present additional metrics with which to evaluate the validity of the WKCE program. As described below, the WKCE program formally assessed the issue of test bias through an analysis of differential item functioning (DIF). It is possible for items to function differently among different population groups, and it is also possible that results for an item do not reflect student ability, but instead reflect irrelevant information influenced by demographic factors. The DIF analysis provided below serves to determine if that possibility occurred and to what degree, item by item, for each of the categories of gender, race/ethnicity, socioeconomic status, disability status, and English language proficiency. This analysis specifically addresses standards 7.1, 7.2, and 7.3.

The present chapter also provides estimations of construct validity. Two measures are provided: correlations among content area objectives and principal components analysis. Both of these measures are provided to demonstrate the existence of a single, underlying trait or ability for each content area, such as Reading ability or Mathematics ability. The presence of a single, underlying trait is a fundamental issue when scaling and analyzing results through IRT models. As such, these analyses are essential elements in assessing the validity of the WKCE. Finally, this chapter outlines the erasure analysis procedures that were employed to ensure the integrity of test scores by identifying test papers that may have been fraudulently altered.

## **10.1 Differential Item Functioning**

An empirical differential item functioning (DIF) approach was used to examine potential item bias, and to determine if item performance differences between identifiable subgroups were due to extraneous or construct-irrelevant information, making the items unfairly difficult for a particular subgroup in the student population. An item was flagged for DIF when there was a significant difference in the scores between a focal group of students and a reference group of students, both groups at the same overall ability level. Thus, an item flagged for DIF is more difficult for a particular group of students than would be expected based on their total test scores.

DIF analyses were conducted based on gender, race/ethnicity, socioeconomic status, disability status, and English language proficiency groups. For the DIF analysis by gender, the reference group is male, meaning that the results for female students are considered with reference to male student performance. In the DIF analysis for race/ethnicity, the reference group is White. This means that the performance of students of each race/ethnicity is considered with reference to the performance of White students. The DIF analysis on socioeconomic status defines students identified as not economically disadvantaged as the reference group, and students identified as economically disadvantaged as the focal group. The DIF analysis for disability status uses students identified as not disabled as a reference group to assess DIF within the student population identified as disabled. The DIF analysis for ELP compares item functioning among students identified as fully English proficient to those identified as limited English proficient. Students identified as fully English proficient are the reference group, and those identified as limited English proficient are the focal group.

Three kinds of DIF statistics were used: Linn-Harnisch, Mantel (or Mantel-Haenszel), and standardized mean difference. Each of these DIF methods can be used to determine if identified groups of examinees with the same underlying level of ability had the same probability of correctly responding to the item. The Mantel-Haenszel method is applied to MC items only. The Linn-Harnisch method is used for both MC and CR items. The Mantel statistic and standardized mean difference are applied to CR items. These DIF statistics and the flagging criteria are described in detail below.

### (1) Linn-Harnisch (L-H)

Because the WKCE was built using item response theory (IRT), an appropriate procedure for examining item bias should reflect the IRT model. Several IRT-based procedures are available, such as a procedure that tests the equality of item parameters across groups (Lord, 1980) or any of the procedures that assess the differences in the area between the item characteristic curves (e.g., Linn, Levine, Hastings, & Wardrop, 1981). However, these procedures require a minimum of 800 to 1,000 cases in each group to make reliable comparisons. A procedure that still relies on the predictions of the three-parameter model but does not require as many cases has been suggested by Linn and Harnisch (1981).

To take an example, in the case of gender DIF analyses, item parameters (e.g., discrimination, location, and guessing) and the scale score ( $\theta$ ) for each examinee were estimated using the three-parameter logistic model for MC items and the two-parameter partial credit model for CR items. The sample was then divided into male and female gender subgroups. The members in each group were sorted into ten equal score categories (deciles) based upon their location in the scale score ( $\theta$ ) range. The expected proportion correct for each group based on the model prediction was compared to the observed (actual) proportion correct obtained by the group. The proportion of students in decile  $g$  who are expected to answer item  $i$  correctly is:

$$P_{ig} = \frac{1}{n_g} \sum_{j \in g} P_{ij},$$

where  $n_g$  is the number of examinees in decile  $g$ . To compute the proportion of students expected to answer item  $i$  correctly (overall deciles) for a specific subgroup, the following statistic was computed

$$P_{i\cdot} = \frac{\sum_{g=1}^{10} n_g P_{ig}}{\sum_{g=1}^{10} n_g}.$$

The corresponding observed proportion correct for examinees in a decile ( $O_{ig}$ ) is the number of examinees in decile  $g$  who answered item  $i$  correctly divided by the number of students in the decile ( $n_g$ ). That is,

$$O_{ig} = \frac{\sum_{j \in g} u_{ij}}{n_g},$$

where  $u_{ij}$  is the dichotomous score for item  $i$  for examinee  $j$ . The corresponding formula to compute the observed proportion answering each item correctly (over all deciles) for a subgroup is given by

$$O_{i\cdot} = \frac{\sum_{g=1}^{10} n_g O_{ig}}{\sum_{g=1}^{10} n_g}.$$

After the values are calculated for these variables, the difference between the subgroup's observed proportion correct and expected proportion correct can be computed. The decile group difference ( $D_{ig}$ ) for the observed and expected proportions correctly answering item  $i$  in decile  $g$  is

$$D_{ig} = O_{ig} - P_{ig},$$

and the overall group difference ( $D_i$ ) between the observed and expected proportions correct for item  $i$  in the complete group (over all deciles) is

$$D_i = O_i - P_i.$$

These indices are indicators of the degree to which subgroup members performed better or worse than expected on each item based on the parameter estimates from all subgroups. Differences for decile groups provide an index for each of the ten regions on the scale score ( $\theta$ ) range. The decile group difference ( $D_{ig}$ ) can be either positive or negative. Use of the decile group differences, as well as the overall group difference, allows one to detect items that give a large positive difference in one range of  $\theta$  and a large negative difference in another range of  $\theta$ , yet have a small overall difference.

DIF is defined in terms of the decile group and total target subsample differences, the  $D_{i-}$  (sum of the negative group differences) and  $D_{i+}$  (sum of the positive group differences) values, and the corresponding standardized difference score for the subsample (Linn & Harnisch, 1981, p. 112). The standardized difference score ( $Z_{ig}$ ) for ability group  $g$  is computed as

$$Z_{ig} = \frac{1}{n_g} \sum_{j \in g} \left[ \frac{U_{ij} - P_{ij}}{\sqrt{P_{ij}(1 - P_{ij})}} \right],$$

where  $U_{ij} = 1$  when student  $j$  answers item  $i$  correctly, and  $U_{ij} = 0$  otherwise. The standardized difference over all the ability groups is

$$Z_i = \frac{\sum_g n_g Z_{ig}}{\sqrt{\sum_g n_g^2}}$$

Items for which  $|D_i| \geq 0.10$  and  $|Z_i| \geq 2.58$  are flagged for DIF. If  $D_i$  is positive, the item is biased in favor of the focal group. If  $D_i$  is negative, the item is biased against the focal group.

## (2) Mantel and Mantel-Haenszel (M-H)

The Mantel (1963) and Mantel-Haenszel (1959) chi-square statistics are used to evaluate potential bias in individual items by examining item-level differences between different groups of students (e.g., students classified by gender, ethnicity, disability, or other variables of interest), controlling for differences in the relevant ability or abilities measured by the test. In this procedure, subgroups are matched by their raw total test score using a contingency table with  $K$  levels. The Mantel statistic is computed by first dividing students into  $K$  levels of ability on the total test, then comparing the performance of these matched groups using the formula

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

where  $F_k$  is the sum of scores for the focal group at the  $k$ th level of the matching variable, and  $E(F_k)$  is the expected sum of scores for the focal group at the  $k$ th level of the matching variable.

For dichotomous items, the Mantel statistic is equivalent to the Mantel-Haenszel statistic without the continuity correction (Zwick, Donoghue, & Grima, 1993). With the continuity correction added (Holland & Thayer, 1986), the Mantel-Haenszel statistic has the form

$$\text{Mantel - Haenszel } \chi^2 = \frac{(|\sum_k F_k - \sum_k E(F_k)| - 1/2)^2}{\sum_k \text{Var}(F_k)},$$

with all terms defined as in the prior equation.

In addition to the Mantel-Haenszel chi-square statistic, the delta statistic ( $\Delta_{MH}$ ) was computed for all MC items (Holland & Thayer, 1985). To compute delta, the odds ratio  $\alpha$  is first computed as

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

where

$N_{r1k}$  is the number of correct responses in the reference group at ability level  $k$ ,  
 $N_{f0k}$  is the number of incorrect responses in the focal group at ability level  $k$ ,  
 $N_k$  is the total number of responses,  
 $N_{f1k}$  is the number of correct responses in the focal group at ability level  $k$ , and  
 $N_{r0k}$  is the number of incorrect responses in the reference group at ability level  $k$ .

The  $\Delta_{MH}$  statistic is then computed as

$$\Delta_{MH} = -2.35 \ln(\alpha_{MH}).$$

Positive values of  $\Delta_{MH}$  indicate items that favor the focal group, whereas negative values of  $\Delta_{MH}$  indicate items that favor the reference group. WKCE MC items were flagged for DIF using the following criteria (Zwick et al., 1993):

- A= No DIF: Non-significant Mantel-Haenszel  $\chi^2$  or  $|\Delta_{MH}| < 1.0$
- B= Weak to moderate DIF: Mantel-Haenszel  $\chi^2$  is significantly greater than zero ( $p < 0.05$ ) and  $1.0 < |\Delta_{MH}| < 1.5$
- C= Large DIF: Mantel-Haenszel  $\chi^2$  is significantly greater than zero ( $p < 0.05$ ) and  $|\Delta_{MH}|$  exceeds 1.5

For CR items, an effect size (ES) statistic based on the Mantel Haenszel  $\chi^2$  was used. ES is obtained by dividing the standardized mean difference (SMD) statistics by the standard deviation of the item (detailed description of these procedures can be found in Zwick et al., 1993). WKCE items are flagged using the same rules that are used in The National Assessment of Educational Progress (NAEP):

- No DIF: Non-significant Mantel  $\chi^2$  or  $|ES| < 0.17$
- Weak to moderate DIF: Mantel  $\chi^2$  is significant ( $p < 0.05$ ) and  $0.17 \leq |ES| < 0.25$
- Large DIF: Mantel  $\chi^2$  is significant ( $p < 0.05$ ) and  $|ES| \geq 0.25$

A positive DIF value indicates that the item favors the focal group, while a negative value indicates that the item disadvantages the focal group.

### (3) Standardized Mean Difference (SMD)

A standardized mean difference statistic (SMD) was also computed for CR items. The SMD is an effect size index of DIF which is relatively easy to interpret (Zwick et al., 1993). The SMD compares the means of the reference and focal groups, adjusting for the distribution of reference and focal group members on the conditioning (i.e., matching) variable (Zwick et al., 1993). SMD is computed as (Zwick, et al., 1993)

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

where

$p_{Fk}$  = proportion of the focal group members at the  $k$ th level of the matching variable,  
 $m_{Fk} = 1/N_{F1k}$ , where  $N_{F1k}$  is the number of correct responses in the focal group at ability level  $k$ , and  
 $m_{Rk} = 1/N_{R1k}$ , where  $N_{R1k}$  is the number of correct responses in the reference group at ability level  $k$ .

A negative SMD value indicates an item on which the focal group has a lower mean than the reference group. A positive SMD value indicates an item on which the reference group has a lower mean than the focal group. An item is flagged when

$$|ES - SMD| \geq 0.25.$$

## Results

Tables 10-1 through 10-7 show items flagged based on the criteria described previously. Readers may note that some items are flagged by both Linn-Harnisch and Mantel-Haenszel methods and some only by one of the methods. For the Linn-Harnisch, Mantel, and Mantel-Haenszel methods, the summary flag information in the DIF tables is always expressed with reference to the focal group. That means that negative flags (such as -B or -C, as described above) indicate that an item disadvantages the focal group, such as female students, African American students, or economically disadvantaged students. A positive flag indicates that the item favors the focal group. The B flag represents a lower threshold for DIF. Only items that were flagged with a C flag were included in the tables described below. Readers can see

B-flagged items in the tables, but that occurs because those items were also flagged with a C flag.

The DIF results for gender are presented in Table 10-1; results for race/ethnicity are presented in Tables 10-2 through 10-5; English language proficiency (ELP) results are presented in Table 10-6; and results based on disability status are presented in Table 10-7. No items were flagged for DIF for socioeconomic status.

Each DIF table references the grade and content area of the items flagged for DIF, as well as the test form, the item number, and the item type. The tables present Linn-Harnisch statistics (D+, D-, and Z) first, then the SMD, and finally the Mantel or Mantel-Haenszel statistic ( $\Delta_{MH}$ ). MH is only computed for the focal group. After specifying these statistics for each item, two final columns provide a summary flag status. There is a column “LH Flag” to indicate where any of the Linn-Harnisch statistics produced a flag and a “MH Flag” column to indicate where either  $\Delta_{MH}$  or the SMD produced a flag.

In Table 10-1, looking at all items and all grades and content areas, 8 items were flagged for gender DIF. Five items were flagged in the Reading tests, while no items were flagged in the Mathematics or Science tests. Note that three of the eight items flagged by Linn-Harnisch indicate that the DIF favors (rather than disadvantages) female students.

The other DIF results in Tables 10-2 through 10-7 can be understood in the same fashion. Note that a single item can be flagged for multiple subgroup categories, such as for ethnicity and language proficiency. Readers should also note that Linn-Harnisch DIF statistics cannot be computed unless the sample sizes are at least 50, with at least five students per group in each decile. In some cases (as noted in the DIF table for American Indian students) the size of the tested population was too small to include valid Linn-Harnisch DIF statistics. DIF results for focal groups containing fewer than 100 students may be unstable and should be interpreted with caution.

The Fall 2013 WKCE tests were developed using procedures to minimize item and test bias. Expertise in this area is not, however, a substitute for statistical analyses of the items. Combined, the DIF statistical analyses discussed above and the expert reviews provide an appropriate set of tools with which to minimize the extraneous or construct-irrelevant information associated with item bias, or DIF, in the WKCE. However, in large-scale assessments, such as the WKCE, it is expected that some items will show DIF. All of the items in the Fall 2013 WKCE flagged for DIF were notated as such in the classical item analyses and in the item pool so that content experts would be able to reevaluate these items in future item selection activities. Items with DIF (particularly items flagged for strong DIF) are to be avoided in future selections.

## 10.2 Construct Validity

Construct validity can be defined as the extent to which tests measure the skills or constructs they intend to measure, and it is the central concept underlying the Fall 2013 WKCE assessment validation process. Evidence for construct validity is comprehensive and integrates evidence from both content- and criterion-related validity. The WKCE test development process included specifications, item writing, review, and test construction.

Threats to construct validity include the unintended measurement of variables unrelated to the desired constructs and multidimensionality of the tests. To ensure that the test items are focused on the desired constructs, standardized procedures are employed to select items with sound statistical properties to align the items to content standards, and to ensure that each test form meets the WKCE blueprint. A test can be said to be unidimensional when all of the items in the test measure the same underlying ability or trait.

Analyses of the internal structure of a test can indicate the extent to which the relationships among test items and components conform to the construct the test purports to measure. For educational assessments that are designed to measure a single construct or content domain, the correlations among content standards within a test can be expected to be relatively high. Tables 10-8 through 10-12 show the correlations among content standards for each WKCE content area. The correlation coefficients here reflect the degree of linear relationship and direction between any two given content standards. The correlation can range from +1 to -1. A correlation of +1 indicates a perfect positive linear relationship, and a correlation of -1 indicates a perfect negative linear relationship between two content standards. A correlation of zero means there is no linear relationship. In general, the size of the correlation coefficient is influenced by the number of items or score points and by the score variance. Readers are cautioned not to confuse correlation with causation. The presence of a high correlation between two content standards should not be taken as an indication that there is a causal relationship between them.

As may be observed in Tables 10-8 through 10-12, correlations among content standards were generally higher in Reading than in the other content areas. The correlations among content standards ranged from 0.55 to 0.85 in Reading, from 0.52 to 0.75 in Mathematics, from 0.41 to 0.72 in Language Arts, from 0.50 to 0.66 in Social Studies, and from 0.40 to 0.70 in Science. Although it may be tempting to try to interpret the differences in magnitude within and across content areas, it is important to note that these correlations are highly dependent upon the numbers of items and the score variance for the different standards. The important finding is that within each content area the correlations among content standards are low enough to indicate that the standards are, as intended, somewhat distinct from one another, but high enough to indicate that the individual standards are measuring related components of a single content area.

WKCE test items are calibrated using unidimensional IRT models, which posit that the test items are measuring an essentially unidimensional construct. To assess the dimensionality of the WKCE assessments, a principal components analysis was conducted for each content area and grade. Principal components analysis is a statistical technique commonly used to evaluate dimensionality by detecting patterns of relationships among items. This method is useful in determining whether the observed scores on a test can be explained largely or entirely in terms of a much smaller number of components. For example, if answering the Mathematics items in a

Mathematics test required a lot of reading ability, the Mathematics test would not be only a measure of mathematics ability, it would be a measure of reading ability as well. Such a test would be said to be multidimensional rather than essentially unidimensional. One way of evaluating the dimensions detected in the analysis is by examining the eigenvectors and eigenvalues. In principal components analysis, the eigenvectors correspond to factors, and the eigenvalues correspond to the variance explained by these factors. The sum of the eigenvalues is equal to the number of items in the test. The eigenvalues can be ordered from first to last in terms of the amount of the common variance that each explains. Data are generally considered to be unidimensional if the second eigenvalue is less than or equal to 1.0. Previous research shows that the examination of the ratio of the first two (i.e., the two largest) eigenvalues can be useful in determining the existence of dominant factors. Specifically, where large ratios exist between the first and second eigenvalues, a single dominant factor can be said to exist. Although the definition of “large” in the present context is subjective, the results in Table 10-13 show that the eigenvalue of the first factor, in almost every case, is at least five times as large as the eigenvalue of the second factor.

As may be seen in Table 10-13, the ratios of the first two eigenvalues range from 3.86 to 8.04. The eigenvalues are proportional to the amount of common variance explained by each component, so these ratios indicate that the variance explained by the first component alone is approximately 4 to 8 times greater than the variance explained by the second component. The eigenvalue ratios ranged from 5.92 to 8.02 in Reading, from 5.93 to 7.46 in Mathematics, from 3.86 to 5.52 in Language Arts, from 4.83 to 5.39 in Social Studies, and from 5.03 to 8.04 in Science. These ratios suggest that the unidimensionality of each of the WKCE content assessments is sufficient to meet the requirements of a unidimensional IRT calibration model.

Overall, these results provide support for the construct validity of the WKCE assessments. The correlations among content standards and the presence of a single dominant factor for each test confirm that the content standards are sufficiently unidimensional to be combined into a single score.

### **10.3 Test Integrity: Erasure Analysis**

The Fall 2013 WKCE test results were subjected to a special program that analyzed erasures on MC items. The focus of the analysis was on those cases where an incorrect answer choice was erased and replaced with the correct choice. These answer changes are referred to as wrong-to-right (WTR) answer changes. The WTR answer change analyses included a statistical test of the null hypothesis (H0) that the mean WTR answer changes for a test administration group constituted a random sample from the state distribution of WTR answer changes. The hypothesis was tested against the right-sided alternative (H1), that the mean number was too high to be explained by random sampling. Test administration groups (schools) for which the null hypothesis was rejected were flagged. To be flagged, the test administration group (school) erasure mean had to be 4 standard deviations above the state mean for erasures. The standard normal table shows that under random sampling the asymptotic probability of observing a sample mean more than four standard deviations above the population mean is around 0.0001, or one in ten thousand. A high rate of erasures can identify situations in which test integrity needs

to be examined further. Separate erasure analyses were performed by grade and content area within schools. A summary erasure report was provided to DPI for evaluation.

#### **10.4 Standardized Test Administration**

Unstandardized testing conditions can pose a serious threat to test validity by adding construct-irrelevant variance to the test scores. McCallin (2006) described a number of such threats to validity, including alterations in test administration requirements (e.g., changing time limits, modifying test instructions, giving hints to examinees), variability across test sites (e.g., differences in facilities/equipment, inadvertent posting of instructional aids in classrooms), interruptions during test sessions (e.g., power outages, relocation of students during testing, disturbances, or other distractions), test administrator practices that may exacerbate test anxiety in particular students, practices that elicit test wiseness, and security breaches that may result in the exposure of test forms or items. Construct-irrelevant variance may exert a systematic effect on the scores of individual students or groups of students, resulting in an overestimation or underestimation of their true ability.

The standardized WKCE test administration procedures described in Part 4 of this report were designed to address these potential threats to validity through the use of comprehensive security measures and the provision of detailed Test Administration Manuals and other training materials for District Assessment Coordinators, School Assessment Coordinators, and test administrators.

## **Part 11: Summary Recommendations**

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Results and key findings of the Fall 2013 WKCE test administration are presented throughout the body of this report. Test difficulty in comparison to the student ability may warrant further attention in subsequent administrations as explained below.

Table 8-25 reveals that in most grades and content areas the WKCE students are not normally distributed along the raw score scale. This is indicated by the negative values of the skewness statistics, and this occurs because many students are answering most of the test items correctly. From a criterion-referenced testing perspective, the clustering of student scores on the high end of the raw score scale indicates that students on the whole are tending to demonstrate the knowledge, skills, and abilities specified in the Wisconsin Model Academic Standards.

From a measurement perspective, the WKCE may provide limited growth information for students in the highest performance level because large numbers of students are scoring in regions of the scale with the most amount of error. To measure these students with precision, more difficult items need to be added to the test. That is, for these students the test serves as a general measure of student skill; however, DPI would expect to see less fluctuation in scores for individual students in this highest performing group from year to year if more difficult items were added to the assessment.

For these reasons, the DPI may wish to consider increasing the difficulty of the WKCE tests. This will likely provide more specific information about the higher ability students and allow the opportunity for the students to show growth. Because equating requires that tests maintain a similar level of difficulty from year to year, increasing the test rigor would likely require a cut score review and an examination regarding whether or not a new test scale should be set.

DPI may also wish to consider pursuing a special study to explore the gaps in performance between students who use allowed accommodations and students who do not use accommodations. Although this document provides a summary review of the number and percent of students that are provided standard accommodations, a special study would allow a more thorough understanding of whether these gaps in performance are caused by “true” differences in ability or they are functions of inadequate accommodations or support to students.

## Fall 2013 WKCE Technical Report: References

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## **Fall 2013 Tables and Figures**

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Table 2-1  
Target Reading Test Blueprint: Grades 3–8, 10\*

	Category Title	Grade 3		Grade 4		Grade 5		Grade 6		Grade 7		Grade 8		Grade 10	
		MC	CR	MC	CR	MC	CR	MC	CR	MC	CR	MC	CR	MC	CR
1	Determines meaning of words or phrases in context	12	0	12	0	11	0	10	0	10	0	10	0	7	0
1.1	Uses context clues to determine meaning of words or phrases	8		8		8		7		7		7		5	
1.2	Uses knowledge of word structure to determine meaning of words	2		3		2		2		2		2		1	
1.3	Uses word reference materials to determine meaning of words and phrases	2		1		1		1		1		1		1	
2	Understands Text	20	0	19	0	17	0	15	0	14	0	14	0	7	0
2.1	Demonstrates understanding of literal meaning by identifying stated information in literary text	9		9		7		7		6		6		2	
2.2	Demonstrates understanding of literal meaning by identifying stated information in informational text	9		8		7		6		6		6		3	
2.3	Demonstrates understanding of explicitly stated sequence of events in literary and informational text	2		2		3		2		2		2		2	
3	Analyzes Text	18	1	18	1	18	1	18	1	19	1	19	1	22	1
3.1	Analyzes literary text	8		8		8		8		8		8		7	
3.2	Analyzes informational text	8		8		8		8		8		8		7	
3.3	Analyzes author's use of language in literary and informational text	2		2		2		2		3		3		8	
4	Evaluates and Extends Text	4	1	5	1	8	1	11	1	11	1	11	1	14	1
4.1	Evaluates and extends literary text	2		2		3		4		4		4		4	
4.2	Evaluates and extends informational text	1		2		3		4		4		4		5	
4.3	Evaluates and extends author's use of language in literary and informational text	1		1		2		3		3		3		5	
	Number of Items	54	2	54	2	54	2	54	2	54	2	54	2	50	2
	Total Score Points for Test	60		60		60		60		60		60		56	

\*Note: The CR items do not report out to any single subskill.

Table 2-2  
Target Mathematics Test Blueprint: Grades 3–8, 10\*

	Category Title	Grade 3		Grade 4		Grade 5		Grade 6		Grade 7		Grade 8		Grade 10	
		MC	CR	MC	CR	MC	CR	MC	CR	MC	CR	MC	CR	MC	CR
A	Mathematical Processes	3	3	3	3	3	3	3	3	3	3	3	3	7	1
Aa	Reasoning														
Ab	Communication														
Ac	Connections														
Ad	Representation														
Ae	Problem Solving														
B	Number Operations and Relationships	11	1	11	0	11	0	12	0	12	0	7	0	7	0
Ba	Number Concepts	6		5		5		6		6		4		4	
Bb	Number Computation	5		6		6		6		6		3		3	
C	Geometry	9	1	8	1	9	1	9	1	10	2	8	1	8	1
Ca	Describing Figures	4		3		3		2		3		2		4	
Cb	Spatial Relationships and Transformations	4		4		4		4		4		4		2	
Cc	Coordinate System	1		1		2		3		3		2		2	
D	Measurement	8	0	8	1	9	1	9	1	9	0	11	1	9	1
Da	Measurable Attributes	3		3		4		2		3		2		1	
Db	Direct Measurement	4		4		3		3		3		3		2	
Dc	Indirect Measurement	1		1		2		4		3		6		6	
E	Statistics and Probability	7	1	7	1	9	1	8	1	8	1	8	1	9	0
Ea	Data Analysis and Statistics	5		4		6		5		5		5		4	
Eb	Probability	2		3		3		3		3		3		5	
F	Algebraic Relationships	8	1	9	1	10	1	10	1	9	1	14	1	10	1
Fa	Patterns, Relations, and Functions	4		5		5		5		2		7		5	
Fb	Expressions, Equations, and Inequalities	2		2		3		2		3		6		4	
Fc	Properties	2		2		2		3		4		1		1	
	Number of Items	46	4	46	4	51	4	51	4	51	4	51	4	50	4
	Total Score Points for Test	57		57		62		62		62		62		58	

\*Note: The CR items do not report out to any single subskill. The items in “A: Mathematical Processes” also do not report out to any single subskill.

Table 2-3  
Target Language Arts Test Blueprint: Grades 4, 8, 10

Content Standard		Grade 4		Grade 8		Grade 10	
		MC	Prompt	MC	Prompt	MC	Prompt
B	Writing	19	1	18	1	15	1
D	Language	5	0	6	0	9	0
F	Research and Inquiry	6	0	6	0	6	0
	Number of Items	30	1	30	1	30	1
	Total Number of Points	30	9	30	9	30	9

Table 2-4  
Target Social Studies Test Blueprint: Grades 4, 8, 10

Content Standard		Grade 4	Grade 8	Grade 10
A	Geography	9	10	10
B	History	8	13	12
C	Political Science	7	6	12
D	Economics	7	6	8
E	Behavioral Science	7	5	8
	Total Number of MC Items	38	40	50

Table 2-5  
Target Science Test Blueprint: Grades 4, 8, 10\*

Content Standard		Grade 4	Grade 8	Grade 10
A	Science Connections	4	4	5
B	Nature of Science	4	3	5
C	Science Inquiry	7	8	10
D	Physical Science	6	6	7
E	Earth and Space	6	6	6
F	Life and Environment	6	6	7
G	Science Applications	4	4	5
H	Personal/Social Perspectives	3	3	5
	Total Number of MC Items	40	40	50

\*Note: Standard A, Science Connections, and Standard B, Nature of Science, are combined to form a reporting category; Standard G, Science Applications, and Standard H, Personal/Social Perspectives, are combined to form a reporting category.

Table 2-6  
Actual Reading Test Blueprint: Grades 3–8, 10\*

	Category Title	Grade 3		Grade 4		Grade 5		Grade 6		Grade 7		Grade 8		Grade 10	
		MC	CR	MC	CR	MC	CR	MC	CR	MC	CR	MC	CR	MC	CR
1	Determines meaning of words or phrases in context	12	0	12	0	11	0	10	0	10	0	10	0	7	0
1.1	Uses context clues to determine meaning of words or phrases	10		7		6		6		6		5		5	
1.2	Uses knowledge of word structure to determine meaning of words	0		4		2		3		4		3		0	
1.3	Uses word reference materials to determine meaning of words and phrases	2		1		3		1		0		2		2	
2	Understands Text	20	0	19	0	17	0	14	0	14	0	14	0	7	0
2.1	Demonstrates understanding of literal meaning by identifying stated information in literary text	9		9		7		3		5		7		1	
2.2	Demonstrates understanding of literal meaning by identifying stated information in informational text	9		7		7		8		5		4		6	
2.3	Demonstrates understanding of explicitly stated sequence of events in literary and informational text	2		3		3		3		4		3		0	
3	Analyzes Text	18	1	18	1	18	1	19	1	19	1	19	1	22	1
3.1	Analyzes literary text	8		6	1	6		9	1	8		9		8	
3.2	Analyzes informational text.	8	1	7		8	1	6		8	1	6		9	
3.3	Analyzes author’s use of language in literary and informational text.	2		5		4		4		3		4	1	5	1
4	Evaluates and Extends Text	4	1	5	2	11	1	11	1	11	1	11	1	14	1
4.1	Evaluates and extends literary text	2		0		4		4	1	4		4		5	
4.2	Evaluates and extends informational text	1	1	3	1	2	1	5		5		3	1	7	1
4.3	Evaluates and extends author’s use of language in literary and informational text	1		2		2		2		2	1	3		2	

Table 2-6 Cont'd  
 Actual Reading Test Blueprint: Grades 3–8, 10

	Category Title	Grade 3		Grade 4		Grade 5		Grade 6		Grade 7		Grade 8		Grade10	
		MC	CR	MC	CR	MC	CR	MC	CR	MC	CR	MC	CR	MC	CR
	Number of Items	54	2	54	2	54	2	54	2	54	2	54	2	50	2
	Total Score Points for Test	60		60		60		60		60		60		56	

\* Note: The CR items do not report out to any single subskill.

Table 2-7  
Actual Mathematics Test Blueprint: Grades 3–8, 10\*

	Category Title	Grade 3		Grade 4		Grade 5		Grade 6		Grade 7		Grade 8		Grade 10	
		MC	CR	MC	CR	MC	CR	MC	CR	MC	CR	MC	CR	MC	CR
A	Mathematical Processes	3	3	3	3	3	3	3	3	3	3	3	3	7	1
Aa	Reasoning														
Ab	Communication														
Ac	Connections														
Ad	Representation														
Ae	Problem Solving														
B	Number Operations and Relationships	11	1	11	0	11	0	12	0	12	0	7	0	7	0
Ba	Number Concepts	6		5		5		6		6		5		4	
Bb	Number Computation	5		6		6		6		6		2		3	
C	Geometry	9	2	9	1	9	1	9	1	10	2	8	1	8	1
Ca	Describing Figures	1		2		2		2		3		1		5	
Cb	Spatial Relationships and Transformations	6		5		5		4		4		4		1	
Cc	Coordinate System	2		2		2		3		3		3		2	
D	Measurement	8	0	8	1	9	1	9	1	9	0	11	1	9	1
Da	Measurable Attributes	3		2		4		2		3		3		1	
Db	Direct Measurement	3		4		3		3		3		3		0	
Dc	Indirect Measurement	2		2		2		4		3		5		8	
E	Statistics and Probability	8	0	7	1	9	1	8	1	8	1	8	1	9	0
Ea	Data Analysis and Statistics	4		5		6		5		5		4		4	
Eb	Probability	4		2		3		3		3		4		5	
F	Algebraic Relationships	7	1	8	1	10	1	10	1	9	1	14	1	10	1
Fa	Patterns, Relations, and Functions	3		3		5		5		2		6		3	
Fb	Expressions, Equations, and Inequalities	2		3		3		2		3		3		6	
Fc	Properties	2		2		2		3		4		5		1	
	Number of Items	46	4	46	4	51	4	51	4	51	4	51	4	50	4
	Total Score Points for Test	57		57		62		62		62		62		58	

\*The items in “A: Mathematical Processes” do not report out to any single subskill. Note also that some CR items in Grades 3–8 report out to more than one standard. The total number of CR items is 4 per grade even though some items are associated with more than one standard.

Table 2-8  
Actual Language Arts Test Blueprint: Grades 4, 8, 10

Content Standard		Grade 4		Grade 8		Grade 10	
		MC	Prompt	MC	Prompt	MC	Prompt
B	Writing	20	1	17	1	15	1
D	Language	4	0	6	0	9	0
F	Research and Inquiry	6	0	7	0	6	0
Total Number of Items		30	1	30	1	30	1
Total Number of Points		30	9	30	9	30	9

Table 2-9  
Actual Social Studies Test Blueprint: Grades 4, 8, 10

Content Standard		Grade 4	Grade 8	Grade 10
A	Geography	9	10	10
B	History	8	13	12
C	Political Science	7	6	12
D	Economics	7	6	8
E	Behavioral Science	7	5	8
Total Number of MC Items		38	40	50

Table 2-10  
Actual Science Test Blueprint: Grades 4, 8, 10\*

Content Standard*		Grade 4	Grade 8	Grade 10
A	Science Connections	4	4	5
B	Nature of Science	4	3	5
C	Science Inquiry	7	8	10
D	Physical Science	6	6	7
E	Earth and Space	6	6	6
F	Life and Environment	6	6	7
G	Science Applications	4	4	5
H	Personal/Social Perspectives	3	3	5
Total Number of MC Items		40	40	50

\*Note: Standard A, Science Connections, and Standard B, Nature of Science, are combined to form a reporting category; Standard G, Science Applications, and Standard H, Personal/Social Perspectives, are combined to form a reporting category.

Table 2-11  
Item Development Each Year and Total to Date\*

	MC items for 2004	CR items for 2004	MC items for 2005	CR items for 2005	MC items for 2006	CR items for 2006	MC items for 2007	CR items for 2007	MC items for 2008	CR items for 2008	MC items for 2009	CR items for 2009	Total MC to date	Total CR to date
<b>Grade 3</b>														
Reading	411	52	23	2	30	4	40	3	52	4	51	7	607	72
Math	317	36	33	14	18	2	30	4	28	11	52	6	478	73
Total	728	88	56	16	48	6	70	7	80	15	103	13	1085	145
<b>Grade 4</b>														
Reading	380	56	32	3	34	3	25	4	54	4	52	7	577	77
Math	265	35	45	9	29	1	26	4	28	13	54	11	447	73
Language Arts	0	0	0	10	0	0	0	0	0	0	0	0	0	10
Science	0	0	0	0	123	34	0	0	0	0	0	0	123	34
Total	645	91	77	22	186	38	51	8	82	17	106	18	1147	194
<b>Grade 5</b>														
Reading	433	59	36	6	29	5	29	7	44	4	52	7	623	88
Math	305	49	38	11	26	3	30	5	28	13	53	8	480	89
Total	738	108	74	17	55	8	59	12	72	17	105	15	1103	177
<b>Grade 6</b>														
Reading	511	56	32	5	42	5	37	6	46	5	50	7	718	84
Math	310	41	53	16	7	2	28	4	30	12	41	8	469	83
Total	821	97	85	21	49	7	65	10	76	17	91	15	1187	167
<b>Grade 7</b>														
Reading	359	44	35	4	38	4	25	5	50	4	50	7	557	68
Math	305	34	32	23	20	0	28	4	31	10	40	6	456	77
Total	664	78	67	27	58	4	53	9	81	14	90	13	1013	145
<b>Grade 8</b>														
Reading	365	44	30	4	34	4	25	4	44	4	50	7	548	67
Math	289	51	47	25	20	2	28	4	32	17	40	8	456	107
Language Arts	0	0	0	10	0	0	0	0	0	0	0	0	0	10
Science	0	0	0	0	125	34	0	0	0	0	0	0	125	34
Total	654	95	77	39	179	40	53	8	76	21	90	15	1129	218
<b>Grade 10</b>														
Reading	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Math	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Language Arts	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Science	0	0	0	0	18	8	0	0	0	0	0	0	18	8
Total	0	0	0	0	18	8	0	0	0	0	0	0	18	8
<b>TOTALS</b>														
Reading	2,459	311	188	24	207	25	181	29	290	25	305	42	3,630	456
Mathematics	1,791	246	248	98	120	10	170	25	177	76	280	47	2,786	502
Language Arts	0	0	0	20	0	0	0	0	0	0	0	0	0	20
Science	0	0	0	0	266	76	0	0	0	0	0	0	266	76
Grand Total	4,250	557	436	142	593	111	351	54	467	101	585	89	6,682	1,054

\*Note: This table includes 17 Fall 2009 Math items rejected by DPI prior to the Content and Bias Review.

Table 3-1  
Fall 2013 Test Configuration

Content	Grade	No. of OP MC Items	No. of OP CR Items					Total Score Point	Total OP (MC + CR) Items
			1 point	2 point	3 point	4 point	6 point		
Reading	3	54			2			60	56
	4	53*			2			59	55
	5	54			2			60	56
	6	54			2			60	56
	7	54			2			60	56
	8	54			2			60	56
	10	50			2			56	52
Mathematics**	3	46	3	4				57	53
	4	46	3	4				57	53
	5	51	3	4				62	58
	6	51	3	4				62	58
	7	51	3	4				62	58
	8	51	3	4				62	58
	10	48*	0	4				56	52
Language Arts***	4	30						30	30
	8	29*						29	29
	10	30			1		1	39	32
Social Studies	4	36*						36	36
	8	40						40	40
	10	50						50	50
Science	4	40						40	40
	8	40						40	40
	10	50						50	50

\* One item was dropped in Reading grade 4 and in Language Arts grade 8. Two items were dropped in Social Studies grade 4 and Mathematics grade 10. See Part 7 for more information.

\*\* Some Mathematics items include two parts, Part A and Part B. Each part is counted as an item above.

\*\*\* For Language Arts grade 10, the two CR items are from the grade 10 Writing prompt. The Writing prompt in grade 10 is part of the scale score for Language Arts in grade 10.

Table 3-2  
Unique Items Field Tested Each Year and Total to Date

	MC 2004	CR 2004	MC 2005	CR 2005	MC 2006	CR 2006	MC 2007	CR 2007	MC 2008	CR 2008	MC 2009	CR 2009	Total MC to Date	Total CR to Date
<b>Grade 3</b>														
Reading	242	12	24	2	27	2	40	4	40	4	40	4	413	28
Math	252	24	15	2	32	4	34	5	31	8	40	4	404	47
Total	494	36	39	4	59	6	74	9	71	12	80	8	817	75
<b>Grade 4</b>														
Reading	294	12	24	2	32	3	40	4	40	4	40	4	470	29
Math	231	29	15	2	32	4	34	4	28	8	40	4	380	51
Language Arts	0	0	0	6	0	0	0	0	0	0	0	0	0	6
Science	0	0	0	0	40	0	0	0	0	0	0	0	40	0
Social Studies	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	525	41	39	10	104	7	74	8	68	12	80	8	890	86
<b>Grade 5</b>														
Reading	235	14	24	2	28	2	29	6	40	4	40	4	396	32
Math	257	34	15	2	32	4	40	4	34	6	40	4	418	54
Total	492	48	39	4	60	6	69	10	74	10	80	8	814	86
<b>Grade 6</b>														
Reading	259	14	24	1	33	3	35	5	40	4	40	4	431	31
Math	252	33	15	2	32	4	32	4	30	5	32	4	393	52
Total	511	47	39	3	65	7	67	9	70	9	72	8	824	83
<b>Grade 7</b>														
Reading	259	14	24	1	17	2	35	4	40	4	40	4	415	29
Math	243	33	15	2	32	4	32	3	33	4	32	4	387	50
Total	502	47	39	3	49	6	67	7	73	8	72	8	802	79
<b>Grade 8</b>														
Reading	274	14	24	1	33	4	32	5	40	4	40	4	443*	32
Math	234	33	15	2	40	4	32	4	32	5	32	4	385	52
Language Arts	0	0	0	6	0	0	0	0	0	0	0	0	0	6
Science	0	0	0	0	40	0	0	0	0	0	0	0	40	0
Social Studies	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	508	47	39	9	113	8	64	9	72	9	72	8	868	90
<b>Grade 10</b>														
Reading	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Math	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Language Arts	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Science	0	0	0	0	10	0	0	0	0	0	0	0	10	0
Social Studies	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	10	0	0	0	0	0	0	0	10	0
<b>TOTALS</b>														
Grand Totals	3,032	266	234	33	460	40	415	52	428	60	456	48	5025	499

\* In the 2008 Technical Report, this subtotal was incorrect by 2 MC items. The totals in 2008, however, were correct. This subtotal error was corrected in the 2009 report.

Table 4-1  
Test Accommodations

Accommodation	Grade	N Count	Content Area	Number of Students	Percent of Total
Used a Scribe	3	59672	Reading	866	1.45
		59816	Mathematics	1072	1.79
	4	60360	Reading	868	1.44
		60464	Mathematics	929	1.54
		60400	Science	358	0.59
		60352	Language Arts	329	0.55
		60512	Writing	442	0.73
		60384	Social Studies	367	0.61
	5	59776	Reading	695	1.16
		59840	Mathematics	749	1.25
	6	59424	Reading	423	0.71
		59504	Mathematics	410	0.69
	7	60776	Reading	351	0.58
		60840	Mathematics	348	0.57
	8	61544	Reading	275	0.45
		61584	Mathematics	262	0.43
		61512	Science	146	0.24
		61464	Language Arts	144	0.23
		61720	Writing	297	0.48
		61472	Social Studies	137	0.22
	10	63192	Reading	148	0.23
		63168	Mathematics	137	0.22
		62992	Science	96	0.15
62888		Language Arts	104	0.17	
63584		Writing	164	0.26	
62896		Social Studies	98	0.16	

Table 4-1  
 Test Accommodations Cont'd

Accommodation	Grade	N Count	Content Area	Number of Students	Percent of Total
<b>Provided Extra Time</b>	3	59672	Reading	6936	11.62
		59816	Mathematics	7105	11.88
	4	60360	Reading	7598	12.59
		60464	Mathematics	7690	12.72
		60400	Science	7459	12.35
		60352	Language Arts	7454	12.35
		60512	Writing	7320	12.10
		60384	Social Studies	7444	12.33
	5	59776	Reading	7175	12.00
		59840	Mathematics	7279	12.16
	6	59424	Reading	6503	10.94
		59504	Mathematics	6590	11.07
	7	60776	Reading	6785	11.16
		60840	Mathematics	6859	11.27
	8	61544	Reading	6849	11.13
		61584	Mathematics	6826	11.08
		61512	Science	6599	10.73
		61464	Language Arts	6656	10.83
		61720	Writing	6565	10.64
		61472	Social Studies	6625	10.78
10	63192	Reading	4906	7.76	
	63168	Mathematics	4941	7.82	
	62992	Science	4780	7.59	
	62888	Language Arts	4847	7.71	
	63584	Writing	4758	7.48	
	62896	Social Studies	4813	7.65	

Table 4-1  
 Test Accommodations Cont'd

<b>Accommodation</b>	<b>Grade</b>	<b>N Count</b>	<b>Content Area</b>	<b>Number of Students</b>	<b>Percent of Total</b>
<b>Read Test Questions and Content to Student</b>	3	59672	Reading	0	0.00
		59816	Mathematics	6022	10.07
	4	60360	Reading	0	0.00
		60464	Mathematics	6708	11.09
		60400	Science	6475	10.72
		60352	Language Arts	5947	9.85
		60512	Writing	6066	10.02
		60384	Social Studies	6432	10.65
	5	59776	Reading	0	0.00
		59840	Mathematics	5812	9.71
	6	59424	Reading	0	0.00
		59504	Mathematics	4958	8.33
	7	60776	Reading	0	0.00
		60840	Mathematics	4981	8.19
	8	61544	Reading	0	0.00
		61584	Mathematics	4685	7.61
		61512	Science	4562	7.42
		61464	Language Arts	4244	6.90
		61720	Writing	4482	7.26
		61472	Social Studies	4555	7.41
	10	63192	Reading	0	0.00
		63168	Mathematics	2710	4.29
		62992	Science	2735	4.34
		62888	Language Arts	2658	4.23
		63584	Writing	2749	4.32
		62896	Social Studies	2738	4.35

Table 4-1  
 Test Accommodations Cont'd

Accommodation	Grade	N Count	Content Area	Number of Students	Percent of Total
<b>Used DPI-Provided Test Translation</b>	3	59672	Reading	0	0.00
		59816	Mathematics	1205	2.01
	4	60360	Reading	0	0.00
		60464	Mathematics	1081	1.79
		60400	Science	1009	1.67
		60352	Language Arts	0	0.00
		60512	Writing	791	1.31
		60384	Social Studies	991	1.64
	5	59776	Reading	0	0.00
		59840	Mathematics	670	1.12
	6	59424	Reading	0	0.00
		59504	Mathematics	356	0.60
	7	60776	Reading	0	0.00
		60840	Mathematics	304	0.50
	8	61544	Reading	0	0.00
		61584	Mathematics	287	0.47
		61512	Science	267	0.43
		61464	Language Arts	0	0.00
		61720	Writing	241	0.39
		61472	Social Studies	255	0.41
	10	63192	Reading	0	0.00
		63168	Mathematics	67	0.11
		62992	Science	65	0.10
		62888	Language Arts	0	0.00
		63584	Writing	54	0.08
		62896	Social Studies	65	0.10

Table 4-1  
Test Accommodations Cont'd

Accommodation	Grade	N Count	Content Area	Number of Students	Percent of Total
<b>Used Locally Provided Test Translation</b>	3	59672	Reading	0	0.00
		59816	Mathematics	0	0.00
	4	60360	Reading	0	0.00
		60464	Mathematics	156	0.26
		60400	Science	145	0.24
		60352	Language Arts	0	0.00
		60512	Writing	107	0.18
		60384	Social Studies	132	0.22
	5	59776	Reading	0	0.00
		59840	Mathematics	0	0.00
	6	59424	Reading	0	0.00
		59504	Mathematics	0	0.00
	7	60776	Reading	0	0.00
		60840	Mathematics	0	0.00
	8	61544	Reading	0	0.00
		61584	Mathematics	32	0.05
		61512	Science	21	0.03
		61464	Language Arts	0	0.00
		61720	Writing	18	0.03
		61472	Social Studies	24	0.04
	10	63192	Reading	0	0.00
		63168	Mathematics	39	0.06
		62992	Science	37	0.06
		62888	Language Arts	0	0.00
63584		Writing	32	0.05	
62896		Social Studies	31	0.05	

Table 4-1  
 Test Accommodations Cont'd

<b>Accommodation</b>	<b>Grade</b>	<b>N Count</b>	<b>Content Area</b>	<b>Number of Students</b>	<b>Percent of Total</b>
<b>Used DPI-Provided Glossary of Terms</b>	3	59672	Reading	0	0.00
		59816	Mathematics	0	0.00
	4	60360	Reading	0	0.00
		60464	Mathematics	429	0.71
		60400	Science	402	0.67
		60352	Language Arts	0	0.00
		60512	Writing	0	0.00
		60384	Social Studies	386	0.64
	5	59776	Reading	0	0.00
		59840	Mathematics	0	0.00
	6	59424	Reading	0	0.00
		59504	Mathematics	0	0.00
	7	60776	Reading	0	0.00
		60840	Mathematics	0	0.00
	8	61544	Reading	0	0.00
		61584	Mathematics	153	0.25
		61512	Science	134	0.22
		61464	Language Arts	0	0.00
		61720	Writing	0	0.00
		61472	Social Studies	125	0.20
	10	63192	Reading	0	0.00
		63168	Mathematics	48	0.08
		62992	Science	52	0.08
		62888	Language Arts	0	0.00
		63584	Writing	0	0.00
		62896	Social Studies	45	0.07

Table 4-1  
Test Accommodations Cont'd

Accommodation	Grade	N Count	Content Area	Number of Students	Percent of Total
Used Text Talker	3	59672	Reading	0	0.00
		59816	Mathematics	11	0.02
	4	60360	Reading	0	0.00
		60464	Mathematics	6	0.01
		60400	Science	4	0.01
		60352	Language Arts	7	0.01
		60512	Writing	4	0.01
		60384	Social Studies	4	0.01
	5	59776	Reading	0	0.00
		59840	Mathematics	15	0.03
	6	59424	Reading	0	0.00
		59504	Mathematics	7	0.01
	7	60776	Reading	0	0.00
		60840	Mathematics	8	0.01
	8	61544	Reading	0	0.00
		61584	Mathematics	6	0.01
		61512	Science	7	0.01
		61464	Language Arts	6	0.01
		61720	Writing	6	0.01
		61472	Social Studies	5	0.01
	10	63192	Reading	0	0.00
		63168	Mathematics	26	0.04
		62992	Science	27	0.04
		62888	Language Arts	30	0.05
63584		Writing	23	0.04	
62896		Social Studies	28	0.04	

Table 4-1  
Test Accommodations Cont'd

Accommodation	Grade	N Count	Content Area	Number of Students	Percent of Total
<b>Signed Test Questions and Content to Student</b>	3	59672	Reading	0	0.00
		59816	Mathematics	34	0.06
	4	60360	Reading	0	0.00
		60464	Mathematics	20	0.03
		60400	Science	16	0.03
		60352	Language Arts	16	0.03
		60512	Writing	14	0.02
		60384	Social Studies	15	0.02
	5	59776	Reading	0	0.00
		59840	Mathematics	27	0.05
	6	59424	Reading	0	0.00
		59504	Mathematics	23	0.04
	7	60776	Reading	0	0.00
		60840	Mathematics	29	0.05
	8	61544	Reading	0	0.00
		61584	Mathematics	13	0.02
		61512	Science	15	0.02
		61464	Language Arts	15	0.02
		61720	Writing	14	0.02
		61472	Social Studies	15	0.02
	10	63192	Reading	0	0.00
		63168	Mathematics	10	0.02
		62992	Science	8	0.01
		62888	Language Arts	9	0.01
63584		Writing	10	0.02	
62896		Social Studies	8	0.01	

Table 4-1  
 Test Accommodations Cont'd

Accommodation	Grade	N Count	Content Area	Number of Students	Percent of Total
<b>Used Another DPI-Approved Accommodation</b>	3	59672	Reading	1777	2.98
		59816	Mathematics	1925	3.22
	4	60360	Reading	1869	3.10
		60464	Mathematics	1958	3.24
		60400	Science	1750	2.90
		60352	Language Arts	1756	2.91
		60512	Writing	1749	2.89
		60384	Social Studies	1740	2.88
	5	59776	Reading	1849	3.09
		59840	Mathematics	2009	3.36
	6	59424	Reading	1496	2.52
		59504	Mathematics	1603	2.69
	7	60776	Reading	1661	2.73
		60840	Mathematics	1682	2.76
	8	61544	Reading	1203	1.95
		61584	Mathematics	1267	2.06
		61512	Science	1198	1.95
		61464	Language Arts	1174	1.91
		61720	Writing	1175	1.90
		61472	Social Studies	1198	1.95
	10	63192	Reading	682	1.08
		63168	Mathematics	688	1.09
		62992	Science	677	1.07
		62888	Language Arts	672	1.07
63584		Writing	680	1.07	
62896		Social Studies	674	1.07	

Table 4-1  
 Test Accommodations Cont'd

Accommodation	Grade	N Count	Content Area	Number of Students	Percent of Total
Used DPI-Provided Braille Test	3	59672	Reading	0	0.00
		59816	Mathematics	0	0.00
	4	60360	Reading	22	0.04
		60464	Mathematics	22	0.04
		60400	Science	22	0.04
		60352	Language Arts	22	0.04
		60512	Writing	22	0.04
		60384	Social Studies	22	0.04
	5	59776	Reading	5	0.01
		59840	Mathematics	5	0.01
	6	59424	Reading	7	0.01
		59504	Mathematics	7	0.01
	7	60776	Reading	9	0.01
		60840	Mathematics	9	0.01
	8	61544	Reading	0	0.00
		61584	Mathematics	0	0.00
		61512	Science	0	0.00
		61464	Language Arts	0	0.00
		61720	Writing	0	0.00
		61472	Social Studies	0	0.00
	10	63192	Reading	10	0.02
		63168	Mathematics	10	0.02
		62992	Science	10	0.02
		62888	Language Arts	10	0.02
63584		Writing	10	0.02	
62896		Social Studies	10	0.02	

Table 4-1  
 Test Accommodations Cont'd

<b>Accommodation</b>	<b>Grade</b>	<b>N Count</b>	<b>Content Area</b>	<b>Number of Students</b>	<b>Percent of Total</b>
<b>Used a Non-Allowed Accommodation</b>	3	59672	Reading	0	0.00
		59816	Mathematics	0	0.00
	4	60360	Reading	0	0.00
		60464	Mathematics	0	0.00
		60400	Science	0	0.00
		60352	Language Arts	0	0.00
		60512	Writing	0	0.00
		60384	Social Studies	0	0.00
	5	59776	Reading	0	0.00
		59840	Mathematics	0	0.00
	6	59424	Reading	0	0.00
		59504	Mathematics	0	0.00
	7	60776	Reading	0	0.00
		60840	Mathematics	0	0.00
	8	61544	Reading	0	0.00
		61584	Mathematics	0	0.00
		61512	Science	0	0.00
		61464	Language Arts	0	0.00
		61720	Writing	0	0.00
		61472	Social Studies	0	0.00
	10	63192	Reading	0	0.00
		63168	Mathematics	0	0.00
		62992	Science	0	0.00
		62888	Language Arts	0	0.00
63584		Writing	0	0.00	
62896		Social Studies	0	0.00	

Table 5-1  
Reading Rubric, Grades 3–8 and 10

*Reading items at all grade levels were scored using item-specific scoring guides that are based on a generic, 0–3 holistic rubric.*

**3 points**

- The response demonstrates *thorough understanding* of the reading concept embodied in the task.
- The response is *accurate, complete, insightful, and fulfills all the requirements* of the task.
- Necessary support and/or examples are included.
- Information is clearly *text-based*.

**2 points**

- The response demonstrates *partial understanding* of the reading concept embodied in the task.
- The response is *accurate* and *fulfills most of the requirements* of the task.
- Necessary support and/or examples may not be complete or clearly text-based.

**1 point**

- The response demonstrates *an incomplete understanding* of the reading concept embodied in the task.
- The response provides *some information that is text-based*, but does not fulfill the requirements of the task.
- Information provided is *too general or too simplistic*.
- Necessary support and/or examples may be incomplete or omitted.

**0 points**

- The response demonstrates *no understanding* of the reading concept embodied in the task.
- The response is *inaccurate, confused, or irrelevant*.
- The student has written a response but *failed to respond to the task*.

Table 5-2  
Mathematics Rubric, Grades 3–8 and 10

**Generic Rubric for Mathematics for 2-point Constructed Response Items**

<b>2 points</b>	<p>The student demonstrates a thorough understanding of the mathematical concepts and/or procedures represented in the problem. The student states appropriate mathematical responses and/or uses procedures and/or concepts to explain or justify a response. The student provides clear and complete explanations and interpretations containing words, calculations, or symbols, when specified in the item stem.</p> <p>The response may contain minor flaws that do <u>not</u> detract from the demonstration of a thorough understanding of the problem.</p>
<b>1 point</b>	<p>The student demonstrates only a partial understanding of the mathematical concepts and/or procedures represented in the problem. The response lacks an appropriate mathematical response or reflects the lack of an essential understanding of the underlying mathematical concepts used in the item.</p> <p>The response contains errors related to the misinterpretation of important aspects of the problem, misuse of mathematical procedures and/or concepts, or misinterpretation of results.</p>
<b>0 points</b>	<p>The student provides completely incorrect responses, explanations, or justifications, or ones that cannot be interpreted, for all responses required in the item.</p>

**Generic Rubric for Mathematics for 3-point Constructed Response Items**

*Mathematics 3-point constructed response items have two parts. Part A is scored as correct/incorrect. Part B is scored using the 2-point holistic rubric below.*

<b>2 points</b>	<p>The student demonstrates a thorough understanding of the mathematical concepts and/or procedures represented in the problem. The student uses appropriate mathematical procedures and/or concepts to explain or justify the response to Step A, and provides clear and complete explanations and interpretations containing words, calculations, or symbols, unless otherwise specified in the item stem.</p> <p>The response may contain minor flaws that do <u>not</u> detract from the demonstration of a thorough understanding of the problem.</p>
<b>1 point</b>	<p>The student demonstrates only a partial understanding of the mathematical concepts and/or procedures represented in the problem. The response lacks an essential understanding of the underlying mathematical concepts used to provide the response to Step A.</p> <p>The response contains errors related to the misinterpretation of important aspects of the problem, misuse of mathematical procedures and/or concepts, or misinterpretation of results.</p>
<b>0 points</b>	<p>The student provides a completely incorrect explanation or justification, or one that cannot be interpreted.</p>

Table 5-3  
Writing Rubric, Conventions of Written English, Grade 4

**3 points      Advanced Control**

The response demonstrates advanced control of a wide range of conventions identified in the 4<sup>th</sup> grade Wisconsin Model Academic Standards in English Language Arts:

- Uses parts of speech effectively, including nouns, pronouns, and adjectives
- Uses adverbials effectively, including words and phrases
- Employs principles of agreement related to number, gender, and case
- Capitalizes proper nouns, titles, and initial words of sentences
- Uses punctuation marks and conjunctions, as appropriate, to separate sentences and connect independent clauses
- Uses commas correctly to punctuate appositives and lists
- Spells correctly in general and even on difficult words
- Uses word order and punctuation marks to distinguish statements, questions, exclamations, and commands
- Makes errors that are infrequent and minor

**2 points      Proficient Control**

The response demonstrates proficient control of the essential conventions identified in the 4<sup>th</sup> grade Wisconsin Model Academic Standards in English Language Arts:

- Generally controls grammar and usage (principles of agreement, noun and verb forms, superlative and comparative forms)
- Capitalizes proper nouns, titles, and initial words of sentences
- Uses end-stop punctuation correctly most of the time; internal punctuation (commas, apostrophes) is sometimes missing or wrong.
- Generally uses correct spelling with common words but more difficult words are problematic
- Makes errors typical of those commonly found in a rough draft; errors do not significantly distract the reader

**1 point      Minimal Control**

The response demonstrates minimal control of the essential conventions identified in the 4<sup>th</sup> grade Wisconsin Model Academic Standards in English Language Arts:

- Contains numerous serious end-stop punctuation errors, resulting in fragments, comma splices, run-ons
- Shows poor control of subject/verb agreement, possessive forms, capitalization, superlatives, and comparatives
- Spelling errors are frequent, even on common words
- Makes errors that are frequent, varied, and distracting

Table 5-4  
Writing Rubric, Composing, Grade 4

Wisconsin Writing Grade 4 Rubric 6-Point Scoring Guide						
Elements of Rubric	Purpose & Focus	Organization & Coherence	Development of Content	Sentence Fluency	Word Choice	
<i>Element Description</i>	Consistently focuses on the topic and maintains a unified purpose  Demonstrates understanding of the requirements of the assigned task	Uses a logical plan of development with an effective beginning, middle, and end  Keeps relationships among ideas clear  Paragraphs logically and uses appropriate transitional devices	Expands and supports main ideas with specific details, examples, and/or reasons that are 1) clearly related to the topic and purpose, and 2) effective for audience	Uses varied sentence structures, creating a fluent, effective, and readable style	Controls word choice with respect to both denotation and connotation  Demonstrates attention to context (audience, purpose, situation, tone)  Evidences some control over figurative language for rhetorical effect (e.g. metaphors, similes)	
<i>Positive Descriptors</i>	Focused, unified, controlled, relevant	Well organized, integrated, smooth, controlled, coherent	Thorough, specific, well-developed, well-supported, well-illustrated, insightful, convincing	Fluid, varied, controlled, effective	Vivid, precise, concrete, concise	
<i>Negative Descriptors</i>	Rambling, loosely related, redundant, irrelevant, lacks purpose	Disorganized, hard to follow, mechanical, illogical shifts, incoherent	Vague, general, simplistic, superficial, incomplete, illogical, inadequately supported, lacks illustration	Choppy, simple, repetitive, garbled, ineffective, awkward	Awkward, imprecise, vague wordy, repetitive	
Rubric Holistic Scoring Scale						
Scores	6	5	4	3	2	1
<i>Description</i>	Exemplary control of the domain	Advanced control of the domain	Proficient control of the domain	Adequate control of the domain	Basic control of the domain	Minimal control of the domain

Table 5-5  
Writing Rubric, Conventions of Written English, Grade 8

**3 points      Advanced Control**

The response demonstrates advanced control of a wide range of conventions identified in the 8<sup>th</sup> grade Wisconsin Model Academic Standards in English Language Arts:

- Uses words, phrases, and clauses effectively, including coordinate and subordinate conjunctions, relative pronouns, and comparative adjectives
- Uses correct tenses to indicate the relative order of events
- Employs principles of agreement, including subject-verb, pronoun-noun, and preposition-pronoun
- Punctuates compound, complex, and compound-complex sentences correctly
- Employs the conventions of capitalization
- Spells frequently used words correctly and uses effective strategies for spelling unfamiliar words
- Makes errors that are infrequent and minor

**2 points      Proficient Control**

The response demonstrates proficient control of the conventions identified in the 8<sup>th</sup> grade Wisconsin Model Academic Standards in English Language Arts:

- Generally controls grammar and usage (principles of agreement, noun and verb forms, pronoun reference, superlative, and comparative forms)
- Generally uses phrases, dependent, and independent clauses clearly and correctly
- Capitalizes most words correctly; control over more sophisticated capitalization skills may be spotty
- Uses end-stop punctuation correctly most of the time; internal punctuation (commas, apostrophes, semicolons) is sometimes missing or wrong
- Generally uses correct spelling with grade-level words and reasonable phonetic approaches to more difficult words
- Makes errors typical of those commonly found in a rough draft; errors do not seriously distract the reader

**1 point      Minimal Control**

The response demonstrates minimal control of the conventions identified in the 8<sup>th</sup> grade Wisconsin Model Academic Standards in English Language Arts:

- Contains numerous serious end-stop or internal punctuation errors, resulting in fragments, comma splices, run-ons
- Shows poor control of grammar and usage (principles of agreement; verb and/or noun forms including possessives; pronoun reference; superlative and comparative forms; appropriate use of phrases/independent, dependent clauses, capitalization)
- Frequently misspells words, even those on grade-level
- Makes errors that are frequent, varied, and distracting

Table 5-6  
Writing Rubric, Composing, Grade 8

Wisconsin Writing Grade 8 Rubric 6-Point Scoring Guide					
Elements of Rubric	Purpose & Focus	Organization & Coherence	Development of Content	Sentence Fluency	Word Choice
<i>Element Description</i>	Clearly presents and maintains a unified purpose, focus, and/or thesis  Demonstrates understanding of the requirements of the assigned task	Frames the discussion with an effective introduction and conclusion  Creates a logical structure of development for the topic, thesis, and purpose  Uses transitional strategies (from idea to idea, paragraph to paragraph, and sentence to sentence)	Demonstrates <i>quality</i> of invented content (e.g. of explanations, arguments, rationale, ideas, details, examples, illustrations)  Demonstrates <i>thoroughness</i> in the elaboration of content	Demonstrates use of varied syntactic structures including simple, compound, complex, and compound/complex sentences  Evidences some control over stylistic effects (e.g. variety, readability)	Controls word choice with respect to both denotation and connotation  Demonstrates attention to context (audience, purpose, situation, tone)  Evidences some control over figurative language for rhetorical effect (e.g. similes, metaphors, personification)
<i>Positive Descriptors</i>	Focused, unified, controlled, relevant	Well organized, integrated, smooth, controlled, coherent	<u>Quality</u> : clear, convincing, accurate, effective, well-reasoned, insightful <u>Thoroughness</u> : specific, well-developed, well-supported, well-illustrated	Fluid, varied, controlled, effective	Apt, discriminating, vivid, precise, concrete, concise
<i>Negative Descriptors</i>	Rambling, loosely related, redundant, irrelevant, lacks purpose	Disorganized, hard to follow, mechanical, illogical shifts, incoherent	<u>Quality</u> : vague, imprecise, inaccurate, simplistic, poorly reasoned, superficial <u>Thoroughness</u> : incomplete, general, inadequately developed, inadequately supported, lacks illustration	Choppy, monotonous, garbled, ineffective, awkward	Inappropriate, clichéd, awkward, imprecise, vague, wordy

Table 5-6 Cont'd  
 Writing Rubric, Composing, Grade 8

<b>Rubric Holistic Scoring Scale</b>						
<b>Scores</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<b><i>Description</i></b>	Exemplary control of the domain	Advanced control of the domain	Proficient control of the domain	Adequate control of the domain	Basic control of the domain	Minimal control of the domain

Table 5-7  
Writing Rubric, Conventions of Written English, Grade 10

**3 points      Advanced Control**

The response demonstrates advanced control of a wide range of conventions identified in the 12<sup>th</sup> grade Wisconsin Model Academic Standards in English Language Arts:

- Uses words, phrases, and clauses effectively, including interrelated clauses in complex sentences
- Uses correct tenses, including conditionals, to indicate the relative order and relationship of events
- Employs principles of agreement, including subject-verb, pronoun-noun, and preposition-pronoun
- Punctuates compound, complex, and compound-complex sentences correctly, including appropriate use of colons, hyphens, dashes, ellipses, and italics; punctuates dialogue correctly; follows citation conventions
- Employs the conventions of capitalization
- Spells frequently used words correctly and uses effective strategies for spelling unfamiliar words
- Makes errors that are infrequent and minor

**2 points      Proficient Control**

The response demonstrates proficient control of essential conventions identified in the 12<sup>th</sup> grade Wisconsin Model Academic Standards in English Language Arts:

- Generally controls grammar and usage (principles of agreement, noun and verb forms, pronoun references, superlative, and comparative forms)
- Generally uses phrases, dependent, and independent clauses clearly and correctly
- Uses end-stop punctuation correctly most of the time; internal punctuation (commas, apostrophes, semicolons, colons) is sometimes missing or wrong; sometimes fails to punctuate dialogue correctly or to accurately follow citation conventions
- Employs the conventions of capitalization
- Generally uses correct spelling with grade-level words and reasonable phonetic approaches to more difficult words
- Makes errors typical of those commonly found in a rough draft; errors do not seriously distract the reader

**1 point      Minimal Control**

The response demonstrates minimal control of essential conventions identified in the 12<sup>th</sup> grade Wisconsin Model Academic Standards in English Language Arts

- Contains numerous serious end-stop or internal punctuation errors, resulting in fragments, comma splices, run-ons
- Shows poor control of grammar and usage (principles of agreement, verb and/or noun forms; pronoun reference; superlative and comparative forms)
- Shows poor control of spelling, even on grade-level words
- Makes errors that are frequent, varied, and distracting

Table 5-8  
Writing Rubric, Composing, Grade 10

Wisconsin Writing Grade 10 Rubric 6-Point Scoring Guide					
Elements of Rubric	Purpose & Focus	Organization & Coherence	Development of Content	Sentence Fluency	Word Choice
<i>Element Description</i>	<p>Explicitly states, or strongly implies, a thesis or unifying purpose which firmly guides the paper</p> <p>Demonstrates understanding of the requirements of the assigned task</p>	<p>Frames the discussion with an effective introduction and conclusion</p> <p>Creates a logical structure of development for the topic, thesis, and purpose</p> <p>Uses effective and varied transitional strategies (from idea to idea, paragraph to paragraph, and sentence to sentence)</p>	<p>Demonstrates <b>quality</b> of invented content (e.g. of explanations, arguments, rationale, ideas, details, examples, illustrations)</p> <p>Demonstrates <b>thoroughness</b> in the elaboration of content</p>	<p>Demonstrates syntactic control of simple, compound, complex, and compound/complex sentences</p> <p>Evidences some control over stylistic effects (e.g. flow, cadence, parallelism, variety, readability, judicious use of active and passive voice, effective repetition)</p>	<p>Controls word choice with respect to both denotation and connotation</p> <p>Demonstrates attention to context (audience, purpose, situation, tone)</p> <p>Evidences some control over figurative language for rhetorical effect (e.g. metaphors, similes, hyperbole, analogies)</p>
<i>Positive Descriptors</i>	Focused, unified, controlled, relevant	Well organized, integrated, smooth, controlled, coherent	<p><u>Quality</u>: clear, precise, accurate, effective, well-reasoned, insightful</p> <p><u>Thoroughness</u>: complete, specific, well-developed, well-supported, well-illustrated</p>	Fluid, varied, controlled, effective, skilled	Apt, discriminating, vivid, precise, concrete, concise
<i>Negative Descriptors</i>	Rambling, loosely related, redundant, irrelevant, lacks purpose	Disorganized, hard to follow, mechanical, illogical shifts, incoherent	<p><u>Quality</u>: vague, imprecise, inaccurate, simplistic, poorly reasoned, superficial</p> <p><u>Thoroughness</u>: incomplete, general, inadequately developed, inadequately supported, lacks illustration</p>	Choppy, monotonous, garbled, ineffective, awkward	Inappropriate, clichéd, awkward, imprecise, vague, wordy

Table 5-8 Cont'd  
 Writing Rubric, Composing, Grade 10

<b>Rubric Holistic Scoring Scale</b>						
<b>Scores</b>	<b>6</b>	<b>5</b>	<b>4</b>	<b>3</b>	<b>2</b>	<b>1</b>
<i>Description</i>	Exemplary control of the domain	Advanced control of the domain	Proficient control of the domain	Adequate control of the domain	Basic control of the domain	Minimal control of the domain

Table 5-9  
Score Distribution for Reading CR Items\*

Grade	Test Book Item No.	N	Scores				Condition Codes**			
			0	1	2	3	A	B	C	D
3	31	59627	12531	25234	15138	4676	1678	91	26	253
	56	59627	14673	27824	13450	2203	1132	150	21	174
4	13	60338	13235	28383	15342	2312	950	15	10	91
	56	60338	23751	11427	20190	3217	1467	42	8	236
5	33	59745	19896	32050	6026	823	883	17	5	45
	50	59745	13306	21817	22764	1144	685	6	7	16
6	38	59394	9884	15491	24771	8124	1067	8	1	48
	56	59394	6858	21378	24580	5935	589	11	1	42
7	36	60738	13214	10413	27478	8671	832	4	5	121
	56	60738	34273	18185	6606	718	907	9	3	37
8	19	61502	7909	23387	21994	7136	1050	1	3	22
	40	61502	14649	14335	26755	4432	1314		7	10
10	12	63166	17357	22342	18880	3207	1334	7	7	32
	43	63166	12687	15927	20805	10003	3675	26	8	35

\* This is the score distribution of the first read.

\*\* A: No response or no attempt, B: Illegible, C: Another Language, D: Off-topic.

\*\*\* Item dropped from scoring.

Table 5-10  
Score Distribution for Mathematics CR Items\*

Grade	Test Book Item No.	Part	N	Scores			Condition Codes**			
				0	1	2	A	B	C	D
3	10		59790	9685	23731	25830	512	2	28	2
	25	A	59790	31156	27732		877	3	8	14
	25	B	59790	23986	17358	16651	1719	8	32	36
	28	A	59790	1695	57428		651	2	6	8
	28	B	59790	14683	2895	41089	1061	6	39	17
	44	A	59790	18405	40616		751	1	12	5
	44	B	59790	38058	5228	14939	1515	2	37	11
4	13		60422	29849	9429	20835	306	2	1	
	20	A	60422	31412	28714		295	1		
	20	B	60422	28497	19691	10607	1599	5	20	3
	29	A	60422	16590	43157		673	1	1	
	29	B	60422	38842	11446	8517	1564	9	38	6
	41	A	60422	18032	42015		367		3	5
	41	B	60422	15203	12544	31734	901	7	23	10
5	12	A	59788	25242	34146		387	5	4	4
	12	B	59788	10437	31348	17426	552	7	9	9
	19		59788	4477	19201	35791	319			
	23	A	59788	35566	23899		318	1	3	1
	23	B	59788	35490	2887	20916	475		15	5
	46	A	59788	8092	51263		431			2
	46	B	59788	3841	2868	52531	527	2	11	8
6	10	A	59443	22005	37176		257	2	3	
	10	B	59443	19132	4351	35580	364	3	9	4
	22	A	59443	4572	54657		212		2	
	22	B	59443	30460	26608	1865	486	2	19	3
	35	A	59443	38923	20134		380		3	3
	35	B	59443	25996	17276	15445	700		17	9
	53		59443	14849	22588	21496	510			
7	4	A	60820	17160	43178		479		3	
	4	B	60820	16370	8453	35027	944	4	18	4
	29	A	60820	29315	30782		723			
	29	B	60820	14929	7967	36816	1073	7	23	5
	32	A	60820	31691	28608		519	1	1	
	32	B	60820	22037	35965	1611	1171	5	19	12
	51		60820	24856	21697	13756	494	1	2	14

\* This is the score distribution of the first read.

\*\* A: No response or no attempt, B: Illegible, C: Another Language, D: Off-topic.

Table 5-10 Cont'd  
Score Distribution for Mathematics CR Items\*

Grade	Test Book Item No.	Part	N	Scores			Condition Codes**			
				0	1	2	A	B	C	D
8	9	A	61534	6953	54238		329	3	10	1
	9	B	61534	12714	2840	45360	596	1	19	4
	20	A	61534	32073	28536		921	1	2	1
	20	B	61534	17045	16129	27021	1311	9	14	5
	40	A	61534	30142	30726		663		2	1
	40	B	61534	28168	3839	28343	1148	11	22	3
	53		61534	37302	6980	15440	1796	7	4	5
10	27		63152	22109	19391	18341	3282		14	15
	33		63152	10825	17532	33426	1315	9	22	23
	38		63152	39815	2432	15618	5267	1	1	18
	52		63152	23019	15845	21856	2402	2	11	17

\* This is the score distribution of the first read.

\*\* A: No response or no attempt, B: Illegible, C: Another Language, D: Off-topic.

Table 5-11  
Score Distribution for Grades 4, 8, and 10 Writing: Composing Rubric

Grade	Rater	Total N	Scores						Condition Codes**			
			1	2	3	4	5	6	A	B	C	D
4	Rater 1	3040	57	364	1242	1088	250	12	22			4
	Rater 2	3040	67	348	1279	1066	241	13	22			3
	Diff*	0	-10	16	-37	22	9	-1	0			1
8	Rater 1	3077	53	514	1322	930	173	15	37			29
	Rater 2	3077	52	513	1328	905	190	21	37			27
	Diff*	0	1	1	-6	25	-17	-6	0			2
10	Rater 1	3187	45	463	1138	1130	295	31	61			22
	Rater 2	3187	41	460	1176	1073	305	47	61			22
	Diff*	0	4	3	-38	57	-10	-16	0			0

\* Diff = N of Rater1 – N of Rater 2.

\*\* A: No response or no attempt, B: Illegible, C: Another Language, D: Off-topic.

Table 5-12  
Percentage Distribution of Scores, Grades 4, 8, and 10 Writing: Composing Rubric

Grade	Rater	Total N	Scores						Condition Codes**			
			1	2	3	4	5	6	A	B	C	D
4	Rater 1	3040	1.88	11.98	40.86	35.78	8.22	0.40	0.72	0.00	0.00	0.14
	Rater 2	3040	2.20	11.44	42.08	35.06	7.92	0.42	0.72	0.00	0.00	0.10
8	Rater 1	3077	1.72	16.70	42.96	30.22	5.62	0.48	1.20	0.00	0.00	0.94
	Rater 2	3077	1.68	16.68	43.16	29.42	6.18	0.68	1.20	0.00	0.00	0.88
10	Rater 1	3187	1.42	14.52	35.70	35.46	9.26	0.98	1.92	0.00	0.00	0.70
	Rater 2	3187	1.28	14.44	36.90	33.66	9.58	1.48	1.92	0.00	0.00	0.70

\*\* A: No response or no attempt, B: Illegible, C: Another Language, D: Off-topic.

Table 5-13  
Score Distribution, Grades 4, 8, and 10 Writing: Conventions Rubric

Grade	Rater	Total N	Scores			Condition Codes**		
			1	2	3	A	B	C
4	Rater 1	3040	108	2864	45	22		1
	Rater 2	3040	117	2855	45	22		1
	Diff*	0	-9	9	0	0	0	0
8	Rater 1	3077	82	2923	31	37		4
	Rater 2	3077	68	2920	48	37		4
	Diff*	0	14	3	-17	0	0	0
10	Rater 1	3187	41	2650	433	61		2
	Rater 2	3187	42	2641	441	61		2
	Diff*	0	-1	9	-8	0	0	0

\* Diff = N of Rater 1 – N of Rater 2.

\*\* A: No response or no attempt, B: Illegible, C: Another Language.

Table 5-14  
Percentage Distribution of Scores for Grades 4, 8, and 10 Writing: Conventions Rubric

Grade	Rater	Total N	Scores			Condition Codes**		
			1	2	3	A	B	C
4	Rater 1	3040	3.56	94.22	1.48	0.72	0.00	0.04
	Rater 2	3040	3.84	93.92	1.48	0.72	0.00	0.04
8	Rater 1	3077	2.66	95.00	1.00	1.20	0.00	0.12
	Rater 2	3077	2.20	94.90	1.56	1.20	0.00	0.12
10	Rater 1	3187	1.28	83.16	13.58	1.92	0.00	0.06
	Rater 2	3187	1.32	82.86	13.84	1.92	0.00	0.06

\*\* A: No response or no attempt, B: Illegible, C: Another Language.

Table 5-15

Score Distribution for Grades 4, 8, and 10 Writing: Total Score, Composing and Conventions Combined

Grade	Rater	Total N	Scores									
			0	1	2	3	4	5	6	7	8	9
4	Rater 1	3040	23	1	55	41	344	1226	1078	238	24	10
	Rater 2	3040	23	66	43	323	1264	1061	221	28	11	
	Diff*	0	0	-65	12	-282	-920	165	857	210	13	
8	Rater 1	3077	41	6	49	62	493	1308	923	171	10	14
	Rater 2	3077	41	2	52	56	488	1321	905	167	25	20
	Diff*	0	0	4	-3	6	5	-13	18	4	-15	-6
10	Rater 1	3187	63	3	40	39	448	1098	1001	270	197	28
	Rater 2	3187	63	1	45	31	447	1136	943	283	198	40
	Diff*	0	0	2	-5	8	1	-38	58	-13	-1	-12

\* Diff = N of Rater 1 – N of Rater 2.

Table 5-16

Percentage Distribution of Scores for Grades 4, 8, and 10 Writing: Total Score, Composing and Conventions Combined

Grade	Rater	Total N	Scores									
			0	1	2	3	4	5	6	7	8	9
4	Rater 1	3040	0.76	0.04	1.80	1.34	11.32	40.32	35.46	7.82	0.78	0.32
	Rater 2	3040	0.76	2.18	1.42	10.62	41.58	34.90	7.26	0.92	0.36	
8	Rater 1	3077	1.34	0.20	1.60	2.02	16.02	42.50	30.00	5.56	0.32	0.46
	Rater 2	3077	1.34	0.06	1.68	1.82	15.86	42.94	29.42	5.42	0.82	0.64
10	Rater 1	3187	1.98	0.10	1.26	1.22	14.06	34.46	31.40	8.48	6.18	0.88
	Rater 2	3187	1.98	0.04	1.42	0.98	14.02	35.64	29.58	8.88	6.22	1.26

Table 7-1  
Item Flagged Based on Yen's  $Q_1$

Content	Grade	Item Number	Type	N	Z	Critical Z
RD	5	18	MC	6400	18.15	17.07
RD	6	23	MC	6312	23.29	16.83
MA	4	41B	CR	6407	37.46	17.09
MA	4	49	MC	6434	26.94	17.16
MA	6	35A	CR	6244	22.97	16.65
MA	7	27	MC	6362	18.99	16.97
MA	10	50	MC	6947	21.10	18.53
MA	10	52	CR	6514	17.70	17.37
LA	10	32	CR	6895	18.47	18.39
SS	8	18	MC	6253	18.57	16.67
SS	10	17	MC	6850	20.57	18.27

Table 7-2  
Scoring Table for Reading Grade 3

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	270	126	31	434	7
1	270	126	32	436	7
2	270	126	33	438	7
3	270	126	34	440	7
4	270	126	35	442	7
5	270	126	36	444	7
6	270	126	<b>37</b>	<b>446</b>	<b>7</b>
7	270	126	38	448	7
8	270	126	39	450	7
9	270	126	40	452	7
10	270	126	41	455	7
11	337	59	42	457	7
12	362	34	43	459	7
13	374	22	44	462	7
14	382	17	45	464	7
15	388	14	46	467	8
16	393	12	47	470	8
17	397	11	48	473	8
18	401	10	<b>49</b>	<b>476</b>	<b>8</b>
19	404	10	50	479	9
20	407	9	51	483	9
21	410	9	52	488	10
22	413	8	53	493	11
23	416	8	54	499	12
24	418	8	55	506	14
25	420	8	<b>56</b>	<b>516</b>	<b>17</b>
26	423	8	57	529	21
27	425	7	58	551	30
28	427	7	59	588	45
29	429	7	60	640	73
30	431	7			

\* **Bold** represents SEM around cut score.

Table 7-3  
Scoring Table for Reading Grade 4

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	280	121	30	452	9
1	280	121	31	455	9
2	280	121	32	458	9
3	280	121	33	461	9
4	280	121	<b>34</b>	<b>464</b>	<b>9</b>
5	280	121	35	467	9
6	280	121	36	470	9
7	280	121	37	473	9
8	280	121	38	476	9
9	280	121	39	479	9
10	280	121	40	482	10
11	280	121	41	485	10
12	334	67	42	488	10
13	361	42	43	492	10
14	376	31	44	495	10
15	387	24	<b>45</b>	<b>499</b>	<b>11</b>
16	396	20	46	503	11
17	403	18	47	507	11
18	408	16	48	512	12
19	414	15	49	517	12
20	418	14	50	522	13
21	423	13	51	528	13
22	427	12	52	534	14
23	430	11	<b>53</b>	<b>541</b>	<b>16</b>
24	434	11	54	550	17
25	437	10	55	561	20
26	440	10	56	576	24
27	443	10	57	597	31
28	446	10	58	634	47
29	449	9	59	650	56

\* **Bold** represents SEM around cut score.

\*\* A suppressed item in Reading grade 4 reduced the maximum possible score from 60 to 59. See Part 8 for more information.

Table 7-4  
Scoring Table for Reading Grade 5

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	290	104	31	448	11
1	290	104	32	451	11
2	290	104	33	455	10
3	290	104	34	458	10
4	290	104	35	461	10
5	290	104	<b>36</b>	<b>464</b>	<b>10</b>
6	290	104	37	467	10
7	290	104	38	471	11
8	290	104	39	474	11
9	290	104	40	477	11
10	290	104	41	481	11
11	290	104	42	484	11
12	331	63	43	488	11
13	353	42	44	492	12
14	367	32	45	496	12
15	377	26	46	501	12
16	385	22	<b>47</b>	<b>505</b>	<b>12</b>
17	392	19	48	510	13
18	398	17	49	515	13
19	404	16	50	521	14
20	408	15	51	527	15
21	413	14	52	534	16
22	417	13	53	543	18
23	421	13	<b>54</b>	<b>552</b>	<b>20</b>
24	425	12	55	564	23
25	428	12	56	580	27
26	432	11	57	600	33
27	435	11	58	629	43
28	439	11	59	678	62
29	442	11	60	690	68
30	445	11			

\* **Bold** represents SEM around cut score.

Table 7-5  
Scoring Table for Reading Grade 6

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	300	95	31	461	11
1	300	95	32	464	11
2	300	95	33	468	11
3	300	95	34	471	11
4	300	95	35	475	11
5	300	95	36	478	11
6	300	95	<b>37</b>	<b>482</b>	<b>11</b>
7	300	95	38	485	11
8	300	95	39	489	11
9	300	95	40	493	11
10	300	95	41	497	11
11	300	95	42	501	12
12	300	95	43	505	12
13	333	62	44	509	12
14	358	41	45	513	12
15	374	32	46	517	12
16	385	27	47	522	12
17	395	22	<b>48</b>	<b>527</b>	<b>13</b>
18	402	20	49	532	13
19	409	18	50	537	13
20	415	16	51	543	14
21	420	15	52	549	15
22	425	14	53	557	16
23	430	13	54	565	17
24	434	13	<b>55</b>	<b>575</b>	<b>19</b>
25	438	12	56	588	23
26	442	12	57	605	28
27	446	11	58	629	36
28	450	11	59	671	54
29	453	11	60	730	93
30	457	11			

\* **Bold** represents SEM around cut score.

Table 7-6  
Scoring Table for Reading Grade 7

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	310	106	31	485	12
1	310	106	<b>32</b>	<b>488</b>	<b>11</b>
2	310	106	33	492	11
3	310	106	34	495	11
4	310	106	35	499	11
5	310	106	36	503	11
6	310	106	37	506	11
7	310	106	38	510	11
8	310	106	39	514	12
9	310	106	40	517	12
10	310	106	41	521	12
11	339	77	42	525	12
12	368	48	43	529	12
13	385	35	44	534	12
14	398	27	<b>45</b>	<b>538</b>	<b>13</b>
15	407	23	46	543	13
16	416	20	47	548	13
17	423	19	48	553	14
18	429	17	49	558	14
19	435	16	50	564	15
20	440	15	51	571	16
21	445	15	52	578	17
22	449	14	53	586	18
23	454	14	<b>54</b>	<b>595</b>	<b>19</b>
24	458	13	55	605	21
25	462	13	56	618	24
26	466	13	57	635	29
27	470	12	58	659	37
28	474	12	59	702	57
29	477	12	60	780	121
30	481	12			

\* **Bold** represents SEM around cut score.

Table 7-7  
Scoring Table for Reading Grade 8

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	330	91	31	482	12
1	330	91	32	486	12
2	330	91	33	490	12
3	330	91	<b>34</b>	<b>493</b>	<b>12</b>
4	330	91	35	497	12
5	330	91	36	501	12
6	330	91	37	505	12
7	330	91	38	509	12
8	330	91	39	513	12
9	330	91	40	517	13
10	330	91	41	521	13
11	330	91	42	526	13
12	330	91	43	530	13
13	336	85	44	535	14
14	369	53	45	540	14
15	388	39	46	545	14
16	401	31	<b>47</b>	<b>550</b>	<b>14</b>
17	412	25	48	556	15
18	420	22	49	561	15
19	428	20	50	568	16
20	434	18	51	574	16
21	440	17	52	582	17
22	445	16	53	590	19
23	450	15	54	600	20
24	455	14	55	611	23
25	459	13	<b>56</b>	<b>625</b>	<b>26</b>
26	463	13	57	643	31
27	467	13	58	670	41
28	471	12	59	717	63
29	475	12	60	790	116
30	479	12			

\* **Bold** represents SEM around cut score.

Table 7-8  
Scoring Table for Reading Grade 10

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	350	70	29	502	15
1	350	70	30	506	15
2	350	70	31	511	15
3	350	70	32	516	15
4	350	70	33	520	15
5	350	70	34	525	15
6	350	70	35	530	15
7	350	70	36	534	15
8	350	70	37	539	15
9	350	70	38	544	15
10	350	70	39	549	15
11	350	70	40	554	15
12	352	69	41	559	15
13	378	51	42	564	16
14	396	41	<b>43</b>	<b>570</b>	<b>16</b>
15	410	34	44	576	16
16	422	29	45	582	17
17	431	25	46	588	17
18	439	23	47	595	18
19	447	21	48	603	18
20	454	20	49	611	19
21	460	19	50	620	21
22	466	18	51	631	23
23	472	17	<b>52</b>	<b>645</b>	<b>27</b>
24	477	17	53	663	32
25	482	17	54	689	41
26	487	16	55	734	62
27	492	16	56	820	127
<b>28</b>	<b>497</b>	<b>16</b>			

\* **Bold** represents SEM around cut score.

Table 7-9  
Scoring Table for Mathematics Grade 3

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	220	80	<b>29</b>	<b>388</b>	<b>10</b>
1	220	80	30	391	10
2	220	80	31	395	10
3	220	80	32	398	10
4	220	80	33	401	10
5	220	80	34	404	10
6	220	80	35	408	10
7	220	80	36	411	10
8	220	80	37	414	10
9	220	80	38	418	10
10	243	60	39	421	10
11	275	41	40	424	10
12	294	32	41	428	11
13	307	27	42	432	11
14	317	23	43	435	11
15	325	21	<b>44</b>	<b>439</b>	<b>11</b>
16	333	19	45	443	11
17	339	17	46	448	11
18	345	16	47	452	12
19	350	15	48	457	12
20	355	14	49	462	12
21	359	13	50	467	13
22	363	13	51	474	14
23	367	12	52	481	15
24	371	12	53	489	17
25	375	11	<b>54</b>	<b>500</b>	<b>20</b>
26	378	11	55	516	26
27	382	11	56	542	39
28	385	11	57	630	116

\* **Bold** represents SEM around cut score.

Table 7-10  
Scoring Table for Mathematics Grade 4

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	240	116	<b>29</b>	<b>427</b>	<b>11</b>
1	240	116	30	431	11
2	240	116	31	434	10
3	240	116	32	437	10
4	240	116	33	440	10
5	240	116	34	443	10
6	240	116	35	447	10
7	240	116	36	450	10
8	240	116	37	453	10
9	240	116	38	456	10
10	271	85	39	459	10
11	307	50	40	463	10
12	327	37	41	466	10
13	341	30	42	470	10
14	352	25	43	473	11
15	361	22	<b>44</b>	<b>477</b>	<b>11</b>
16	368	20	45	481	11
17	375	19	46	486	12
18	381	17	47	490	12
19	387	16	48	495	13
20	392	15	49	501	14
21	397	14	50	507	15
22	401	14	51	514	16
23	405	13	52	522	17
24	409	13	<b>53</b>	<b>532</b>	<b>20</b>
25	413	12	54	545	24
26	417	12	55	563	30
27	420	12	56	595	45
28	424	11	57	650	86

\* **Bold** represents SEM around cut score.

Table 7-11  
Scoring Table for Mathematics Grade 5

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	270	80	32	461	13
1	270	80	33	465	12
2	270	80	34	469	12
3	270	80	35	472	12
4	270	80	36	476	12
5	270	80	37	479	12
6	270	80	38	483	11
7	270	80	39	486	11
8	270	80	40	490	11
9	270	80	41	493	11
10	270	80	42	496	11
11	270	80	43	500	11
12	294	63	<b>44</b>	<b>504</b>	<b>11</b>
13	324	45	45	507	11
14	343	37	46	511	11
15	358	31	47	515	11
16	370	28	48	518	12
17	380	25	49	523	12
18	388	23	50	527	12
19	396	22	51	531	12
20	403	20	52	536	13
21	410	19	53	541	13
22	416	18	54	547	14
23	421	17	<b>55</b>	<b>553</b>	<b>15</b>
24	426	16	56	560	16
25	431	16	57	568	18
26	436	15	58	578	20
27	441	15	59	590	23
28	445	14	60	608	29
<b>29</b>	<b>449</b>	<b>14</b>	61	640	44
30	453	13	62	680	73
31	457	13			

\* **Bold** represents SEM around cut score.

Table 7-12  
Scoring Table for Mathematics Grade 6

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	310	72	32	478	11
1	310	72	33	481	11
2	310	72	34	485	11
3	310	72	35	488	11
4	310	72	36	491	11
5	310	72	37	494	11
6	310	72	38	497	11
7	310	72	39	501	11
8	310	72	40	504	11
9	310	72	41	507	11
10	310	72	42	511	11
11	310	72	43	514	11
12	344	48	44	517	11
13	365	37	45	521	11
14	380	31	<b>46</b>	<b>525</b>	<b>11</b>
15	392	26	47	528	11
16	401	24	48	532	11
17	410	21	49	536	11
18	417	19	50	540	11
19	423	18	51	544	12
20	429	17	52	549	12
21	434	16	53	554	12
22	439	15	54	559	13
23	444	14	55	565	14
24	448	14	56	571	14
25	453	13	<b>57</b>	<b>579</b>	<b>16</b>
26	457	13	58	588	18
27	460	12	59	599	21
28	464	12	60	616	26
29	468	12	61	646	39
30	471	11	62	700	78
<b>31</b>	<b>475</b>	<b>11</b>			

\* **Bold** represents SEM around cut score.

Table 7-13  
Scoring Table for Mathematics Grade 7

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	330	105	32	510	10
1	330	105	33	513	10
2	330	105	34	515	10
3	330	105	35	518	10
4	330	105	36	521	10
5	330	105	37	524	10
6	330	105	38	527	10
7	330	105	39	530	10
8	330	105	40	533	10
9	330	105	41	535	10
10	359	76	42	538	10
11	390	47	43	541	10
12	408	35	<b>44</b>	<b>545</b>	<b>10</b>
13	421	28	45	548	10
14	431	24	46	551	10
15	439	21	47	554	10
16	447	19	48	558	11
17	453	17	49	562	11
18	458	16	50	566	11
19	464	15	51	570	12
20	468	14	52	574	12
21	473	13	53	579	12
22	477	13	54	585	13
23	481	12	55	590	14
24	484	12	<b>56</b>	<b>597</b>	<b>15</b>
25	488	12	57	605	16
26	491	11	58	615	18
27	494	11	59	628	22
28	498	11	60	646	27
<b>29</b>	<b>501</b>	<b>11</b>	61	676	39
30	504	11	62	710	58
31	507	10			

\* **Bold** represents SEM around cut score.

Table 7-14  
Scoring Table for Mathematics Grade 8

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	350	104	32	534	10
1	350	104	33	537	10
2	350	104	34	540	10
3	350	104	35	543	10
4	350	104	36	545	10
5	350	104	37	548	9
6	350	104	38	551	9
7	350	104	39	554	9
8	350	104	40	556	9
9	350	104	<b>41</b>	<b>559</b>	<b>9</b>
10	350	104	42	562	9
11	350	104	43	565	9
12	350	104	44	567	9
13	376	78	45	570	9
14	416	46	46	573	9
15	437	34	47	576	9
16	451	29	48	579	9
17	462	25	49	582	9
18	471	22	50	585	10
19	478	20	51	589	10
20	485	18	52	593	10
21	491	16	53	597	11
22	496	15	54	601	11
23	501	14	<b>55</b>	<b>606</b>	<b>12</b>
24	505	14	56	612	13
<b>25</b>	<b>510</b>	<b>13</b>	57	618	14
26	514	12	58	626	16
27	517	12	59	636	19
28	521	12	60	651	24
29	524	11	61	678	37
30	528	11	62	730	80
31	531	11			

\* **Bold** represents SEM around cut score.

Table 7-15  
Scoring Table for Mathematics Grade 10

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	410	87	29	556	10
1	410	87	30	559	10
2	410	87	31	562	9
3	410	87	32	565	9
4	410	87	33	567	9
5	410	87	34	570	9
6	410	87	35	573	9
7	410	87	<b>36</b>	<b>575</b>	<b>9</b>
8	410	87	37	578	9
9	410	87	38	581	9
10	410	87	39	583	9
11	410	87	40	586	9
12	445	53	41	589	9
13	469	34	42	592	9
14	483	27	43	595	9
15	493	23	44	598	9
16	502	19	45	601	9
17	508	18	46	604	9
18	514	16	47	608	10
19	520	15	48	611	10
20	524	14	49	616	11
<b>21</b>	<b>529</b>	<b>13</b>	<b>50</b>	<b>620</b>	<b>11</b>
22	533	12	51	626	12
23	537	12	52	633	14
24	540	11	53	641	16
25	544	11	54	653	20
26	547	10	55	674	29
27	550	10	56	750	96
28	553	10			

\* **Bold** represents SEM around cut score.

\*\* Two items were suppressed in Mathematics grade 10. This reduced the maximum possible score from 58 to 56. See Part 8 for more information.

Table 7-16  
Scoring Table for Language Arts Grade 4

Raw Score	Scale Score	SEM
0	140	118
1	140	118
2	140	118
3	140	118
4	140	118
5	140	118
6	140	118
7	223	35
8	238	21
9	248	15
<b>10</b>	<b>255</b>	<b>13</b>
11	260	12
12	266	11
13	270	10
14	275	10
<b>15</b>	<b>279</b>	<b>10</b>
16	283	10
17	288	10
18	292	9
19	296	9
20	300	9
21	304	9
<b>22</b>	<b>308</b>	<b>9</b>
23	313	9
24	317	9
25	322	9
26	328	10
27	335	12
28	345	15
29	362	22
30	420	73

\* **Bold** represents SEM around cut score.

Table 7-17  
Scoring Table for Language Arts Grade 8

Raw Score	Scale Score	SEM
0	250	90
1	250	90
2	250	90
3	250	90
4	250	90
5	250	90
6	253	87
7	303	37
8	319	23
9	328	18
10	336	15
11	342	13
12	348	12
13	353	11
14	357	11
<b>15</b>	<b>362</b>	<b>10</b>
16	366	10
17	370	10
18	375	10
19	379	10
20	384	10
<b>21</b>	<b>388</b>	<b>10</b>
22	393	10
23	399	11
24	405	11
25	411	12
<b>26</b>	<b>420</b>	<b>14</b>
27	431	16
28	449	23
29	520	86

\* Bold represents SEM around cut score.

\*\* A suppressed item in Language Arts grade 8 reduced the maximum possible score from 30 to 29. See Part 8 for more information.

Table 7-18  
Scoring Table for Language Arts Grade 10

Raw Score	Scale Score	SEM
0	290	63
1	290	63
2	290	63
3	290	63
4	290	63
5	290	63
6	290	63
7	330	31
8	349	23
9	361	21
10	371	19
11	379	18
12	387	17
<b>13</b>	<b>394</b>	<b>16</b>
14	400	15
15	406	14
16	411	14
17	416	13
18	421	13
19	426	12
<b>20</b>	<b>431</b>	<b>12</b>
21	436	12
22	440	12
23	445	11
24	449	11
25	454	12
26	458	12
27	463	12
28	468	12
29	474	13
30	480	13
<b>31</b>	<b>486</b>	<b>14</b>
32	493	15
33	501	16
34	511	17
35	523	20
36	538	23
37	560	29
38	597	42
39	630	57

\* **Bold** represents SEM around cut score.

Table 7-19  
Scoring Table for Social Studies Grade 4

Raw Score	Scale Score	SEM
0	170	75
1	170	75
2	170	75
3	170	75
4	170	75
5	170	75
6	170	75
7	170	75
8	210	35
9	224	21
10	233	15
11	239	12
<b>12</b>	<b>244</b>	<b>11</b>
13	248	10
14	252	9
15	256	8
16	259	8
17	262	8
<b>18</b>	<b>265</b>	<b>8</b>
19	268	7
20	271	7
21	274	7
22	276	7
23	279	7
24	282	7
25	285	7
<b>26</b>	<b>288</b>	<b>7</b>
27	291	7
28	294	7
29	297	8
30	301	8
31	306	9
32	311	10
33	318	12
34	328	15
35	346	24
36	400	70

\* **Bold** represents SEM around cut score.

\*\* Two items were suppressed in Social Studies grade 4. This reduced the maximum possible score from 38 to 36. See Part 8 for more information.

Table 7-20  
Scoring Table for Social Studies Grade 8

Raw Score	Scale Score	SEM
0	230	98
1	230	98
2	230	98
3	230	98
4	230	98
5	230	98
6	230	98
7	230	98
8	230	98
9	230	98
10	277	51
11	299	30
12	311	22
13	320	17
14	327	15
15	333	14
<b>16</b>	<b>338</b>	<b>13</b>
17	343	12
18	348	11
19	352	11
20	357	11
21	361	11
<b>22</b>	<b>365</b>	<b>11</b>
23	369	11
24	373	11
25	378	11
26	382	11
27	386	11
28	391	11
29	395	11
30	400	11
<b>31</b>	<b>405</b>	<b>11</b>
32	410	11
33	416	12
34	422	13
35	429	14
36	437	15
37	447	17
38	461	20
39	485	30
40	530	66

\* **Bold** represents SEM around cut score.

Table 7-21  
Scoring Table for Social Studies Grade 10

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	240	125	26	423	11
1	240	125	27	427	11
2	240	125	28	431	11
3	240	125	29	435	11
4	240	125	30	438	11
5	240	125	31	442	11
6	240	125	32	446	11
7	240	125	33	450	11
8	240	125	34	453	11
9	240	125	<b>35</b>	<b>457</b>	<b>11</b>
10	240	125	36	461	11
11	240	125	37	466	11
12	307	58	38	470	11
13	335	35	39	474	11
14	351	27	40	479	11
15	363	23	41	484	11
16	372	21	42	489	11
17	380	18	43	494	12
18	386	17	44	500	12
19	392	15	45	506	13
20	398	14	46	514	14
21	403	13	47	523	16
22	407	13	48	537	20
<b>23</b>	<b>412</b>	<b>12</b>	49	563	34
24	416	12	50	620	85
<b>25</b>	<b>420</b>	<b>11</b>			

\* **Bold** represents SEM around cut score.

Table 7-22  
Scoring Table for Science Grade 4

Raw Score	Scale Score	SEM
0	170	69
1	170	69
2	170	69
3	170	69
4	170	69
5	170	69
6	170	69
7	170	69
8	170	69
9	170	69
10	199	40
11	216	26
12	227	20
13	235	17
14	242	15
15	247	14
<b>16</b>	<b>252</b>	<b>12</b>
17	257	11
18	261	11
19	265	10
20	268	10
21	272	9
22	275	9
23	278	9
<b>24</b>	<b>281</b>	<b>8</b>
25	284	8
26	287	8
27	290	8
28	293	8
29	297	8
30	300	9
31	304	9
32	308	9
33	312	10
34	317	10
<b>35</b>	<b>323</b>	<b>11</b>
36	330	13
37	338	14
38	350	18
39	372	28
40	440	88

\* **Bold** represents SEM around cut score.

Table 7-23  
Scoring Table for Science Grade 8

Raw Score	Scale Score	SEM
0	230	89
1	230	89
2	230	89
3	230	89
4	230	89
5	230	89
6	230	89
7	230	89
8	230	89
9	230	89
10	268	51
11	290	33
12	304	25
13	314	21
14	323	18
15	330	17
16	336	15
17	342	14
18	347	13
<b>19</b>	<b>352</b>	<b>12</b>
20	356	12
21	361	11
22	365	11
23	369	11
24	373	10
<b>25</b>	<b>376</b>	<b>10</b>
26	380	10
27	384	10
28	388	10
29	392	10
30	396	10
31	401	10
32	405	11
33	410	11
34	416	12
<b>35</b>	<b>422</b>	<b>12</b>
36	429	13
37	438	15
38	450	19
39	470	27
40	560	108

\* **Bold** represents SEM around cut score.

Table 7-24  
Scoring Table for Science Grade 10

Raw Score	Scale Score	SEM	Raw Score	Scale Score	SEM
0	240	155	26	435	11
1	240	155	27	438	11
2	240	155	28	441	10
3	240	155	29	445	10
4	240	155	30	448	10
5	240	155	31	451	10
6	240	155	32	454	10
7	240	155	33	457	10
8	240	155	34	461	10
9	240	155	35	464	10
10	240	155	<b>36</b>	<b>468</b>	<b>10</b>
11	305	90	37	471	10
12	344	51	38	475	11
13	362	35	39	479	11
14	374	27	40	483	11
15	383	22	41	488	12
16	391	19	42	493	12
17	397	17	43	498	13
18	402	16	44	504	14
19	407	15	45	511	15
<b>20</b>	<b>412</b>	<b>14</b>	46	520	17
21	416	13	47	530	19
22	420	12	48	545	23
23	424	12	49	569	33
24	428	11	50	610	62
<b>25</b>	<b>431</b>	<b>11</b>			

\* **Bold** represents SEM around cut score.

Table 7-25  
The Number of Students and Percents at LOSS and HOSS

Content	Grade	LOSS	N	Percent	HOSS	N	Percent
RD	3	270	694	1.16	640	39	0.07
	4	280	919	1.52	650	22	0.04
	5	290	480	0.80	690	8	0.01
	6	300	367	0.62	730	31	0.05
	7	310	251	0.41	780	4	0.01
	8	330	465	0.76	790	17	0.03
	10	350	870	1.38	820	87	0.14
MA	3	220	156	0.26	630	375	0.63
	4	240	97	0.16	650	205	0.34
	5	270	148	0.25	680	171	0.29
	6	310	106	0.18	700	49	0.08
	7	330	143	0.24	710	33	0.05
	8	350	475	0.77	730	234	0.38
	10	410	1428	2.26	750	282	0.45
LA	4	140	812	1.35	420	211	0.35
	8	250	581	0.95	520	2336	3.80
	10	290	312	0.50	630	35	0.06
SS	4	170	263	0.44	400	922	1.53
	8	230	456	0.74	530	672	1.09
	10	240	304	0.48	620	165	0.26
SC	4	170	290	0.48	440	382	0.63
	8	230	266	0.43	560	1359	2.21
	10	240	751	1.19	610	196	0.31

Table 8-1  
Item Analysis Grade 3 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.88	0.41	0.05%				
2	MC	0.92	0.49	0.12%				
3	MC	0.91	0.45	0.10%				
4	MC	0.73	0.35	0.26%				
5	MC	0.88	0.52	0.14%				
6	MC	0.92	0.41	0.21%				
7	MC	0.79	0.54	0.28%				
8	MC	0.87	0.54	0.57%				
9	MC	0.79	0.51	0.75%				
10	MC	0.71	0.48	1.58%				
11	MC	0.64	0.49	0.31%				
12	MC	0.78	0.48	0.51%				
13	MC	0.62	0.44	0.82%				
14	MC	0.83	0.54	0.71%				
15	MC	0.84	0.52	0.84%				
16	MC	0.83	0.46	1.00%				
17	MC	0.72	0.46	1.17%				
18	MC	0.67	0.28	1.34%				
19	MC	0.82	0.48	0.24%				
20	MC	0.82	0.51	0.33%				
21	MC	0.79	0.55	0.56%				
22	MC	0.76	0.54	1.01%				
23	MC	0.74	0.41	0.32%				
24	MC	0.77	0.53	0.75%				
25	MC	0.64	0.51	0.41%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-1 Cont'd  
Item Analysis Grade 3 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
26	MC	0.78	0.46	1.01%				
27	MC	0.57	0.3	1.50%				
28	MC	0.61	0.47	0.26%				
29	MC	0.76	0.57	0.38%				
30	MC	0.57	0.36	0.90%				
31	CR	0.4	0.41	2.81%				
32	MC	0.47	0.42	2.06%		+		
33	MC	0.63	0.43	2.26%				
34	MC	0.73	0.51	2.90%				
35	MC	0.75	0.53	2.90%				
36	MC	0.57	0.49	3.41%				
37	MC	0.63	0.56	3.36%				
38	MC	0.77	0.54	3.68%				
39	MC	0.45	0.32	4.01%				
40	MC	0.87	0.51	0.15%				
41	MC	0.48	0.42	0.30%				
42	MC	0.72	0.52	0.40%				
43	MC	0.68	0.38	0.27%				
44	MC	0.69	0.47	0.41%				
45	MC	0.68	0.4	1.12%				
46	MC	0.78	0.5	3.97%				
47	MC	0.65	0.42	0.27%				
48	MC	0.54	0.37	0.39%				
49	MC	0.69	0.54	0.51%				
50	MC	0.66	0.54	0.33%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-1 Cont'd  
Item Analysis Grade 3 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
51	MC	0.74	0.51	0.68%				
52	MC	0.65	0.47	0.75%				
53	MC	0.66	0.43	1.79%				
54	MC	0.77	0.49	0.37%				
55	MC	0.71	0.57	0.66%				
56	CR	0.35	0.44	1.90%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-2  
Item Analysis Grade 4 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.6	0.25	0.03%				
2	MC	0.77	0.36	0.06%				
3	MC	0.75	0.42	0.33%				
4	MC	0.69	0.35	0.12%				
5	MC	0.76	0.47	0.24%				
6	MC	0.38	0.36	0.43%				
7	MC	0.72	0.49	0.15%				
8	MC	0.53	0.32	0.30%				
9	MC	0.82	0.41	0.92%				
10	MC	0.54	0.24	0.18%		+		
11	MC	0.6	0.37	0.25%				
12	MC	0.75	0.33	0.58%				
13	CR	0.37	0.53	1.57%				
14	MC	0.73	0.35	1.12%				
15	MC	0.77	0.29	1.28%				
16	MC	0.75	0.5	1.39%				
17	MC	0.82	0.52	1.49%				
18	MC	0.9	0.42	1.58%				
19	MC	0.55	0.45	0.27%				
20	MC	0.67	0.35	0.20%				
21	MC	0.46	0.41	0.27%				
22	MC	0.49	0.42	0.21%				
23	MC	0.58	0.35	0.43%				
24	MC	0.75	0.56	0.35%				
25	MC	0.73	0.56	0.71%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-2 Cont'd  
Item Analysis Grade 4 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
26	MC	0.69	0.42	0.32%				
27	MC	0.57	0.41	0.56%				
28	MC	0.63	0.34	1.37%				
29	MC	0.78	0.47	0.38%				
30	MC	0.52	0.41	0.54%				
31	MC	0.38	0.19	0.88%				
32 **	MC							
33	MC	0.69	0.5	0.79%				
34	MC	0.66	0.43	0.80%				
35	MC	0.74	0.46	1.13%				
36	MC	0.76	0.53	0.86%				
37	MC	0.81	0.46	0.96%				
38	MC	0.83	0.52	0.96%				
39	MC	0.83	0.36	0.17%				
40	MC	0.78	0.55	0.20%				
41	MC	0.79	0.59	0.25%				
42	MC	0.74	0.51	0.59%				
43	MC	0.89	0.51	0.93%				
44	MC	0.74	0.57	1.99%				
45	MC	0.65	0.41	0.21%				
46	MC	0.66	0.41	0.59%				
47	MC	0.79	0.54	0.38%				
48	MC	0.71	0.27	0.36%				
49	MC	0.61	0.35	0.40%				
50	MC	0.74	0.49	0.75%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

\*\* Item dropped from scoring.

Table 8-2 Cont'd  
Item Analysis Grade 4 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
51	MC	0.67	0.52	0.61%				
52	MC	0.70	0.42	1.44%				
53	MC	0.48	0.30	0.41%				
54	MC	0.60	0.35	0.66%				
55	MC	0.62	0.40	1.47%				
56	CR	0.35	0.48	2.43%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-3  
Item Analysis Grade 5 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.90	0.30	0.06%				
2	MC	0.75	0.46	0.04%				
3	MC	0.48	0.26	0.19%				
4	MC	0.91	0.42	0.56%				
5	MC	0.73	0.49	0.70%				
6	MC	0.87	0.49	0.12%				
7	MC	0.67	0.43	0.66%				
8	MC	0.59	0.35	0.22%				
9	MC	0.91	0.49	0.21%				
10	MC	0.81	0.45	0.56%				
11	MC	0.61	0.34	0.89%		+		
12	MC	0.75	0.51	1.37%				
13	MC	0.80	0.54	0.41%				
14	MC	0.77	0.50	0.58%				
15	MC	0.85	0.40	1.70%				
16	MC	0.84	0.46	1.90%				
17	MC	0.88	0.47	2.17%				
18	MC	0.83	0.35	2.46%				
19	MC	0.71	0.43	2.41%				
20	MC	0.79	0.48	3.09%				
21	MC	0.59	0.48	2.68%				
22	MC	0.78	0.38	0.12%				
23	MC	0.78	0.39	0.14%				
24	MC	0.76	0.51	0.19%				
25	MC	0.56	0.36	0.14%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-3 Cont'd  
Item Analysis Grade 5 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
26	MC	0.66	0.41	0.44%				
27	MC	0.77	0.49	0.13%				
28	MC	0.75	0.53	0.30%				
29	MC	0.44	0.36	0.90%				
30	MC	0.57	0.31	1.54%				
31	MC	0.54	0.37	0.18%				
32	MC	0.83	0.32	1.10%				
33	CR	0.26	0.38	1.48%				+
34	MC	0.61	0.40	0.62%				
35	MC	0.78	0.29	0.75%				
36	MC	0.80	0.35	0.85%				
37	MC	0.60	0.33	0.77%				
38	MC	0.61	0.35	0.84%				
39	MC	0.59	0.38	0.19%				
40	MC	0.74	0.33	0.20%				
41	MC	0.56	0.27	0.28%				
42	MC	0.40	0.32	0.24%		+		
43	MC	0.82	0.40	0.21%				
44	MC	0.49	0.33	0.35%				
45	MC	0.82	0.43	0.23%				
46	MC	0.71	0.51	0.61%				
47	MC	0.83	0.48	0.64%				
48	MC	0.73	0.40	0.32%				
49	MC	0.70	0.46	0.38%				
50	CR	0.40	0.48	1.15%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-3 Cont'd  
Item Analysis Grade 5 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
51	MC	0.60	0.35	0.80%				
52	MC	0.73	0.31	0.70%				
53	MC	0.81	0.41	1.29%				
54	MC	0.49	0.29	1.60%				
55	MC	0.64	0.42	0.89%				
56	MC	0.59	0.44	1.01%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-4  
Item Analysis Grade 6 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.75	0.32	0.05%				
2	MC	0.83	0.48	0.36%				
3	MC	0.62	0.34	0.08%				
4	MC	0.56	0.44	0.17%				
5	MC	0.92	0.44	0.20%				
6	MC	0.70	0.40	0.39%				
7	MC	0.76	0.40	0.88%				
8	MC	0.37	0.20	1.34%				
9	MC	0.57	0.19	0.20%				
10	MC	0.79	0.51	0.36%				
11	MC	0.57	0.39	0.41%				
12	MC	0.83	0.37	0.46%				
13	MC	0.76	0.34	0.59%				
14	MC	0.59	0.22	1.36%		+		
15	MC	0.50	0.38	1.63%				
16	MC	0.61	0.38	2.29%				
17	MC	0.80	0.50	0.79%				
18	MC	0.73	0.47	0.89%				
19	MC	0.74	0.25	0.11%				
20	MC	0.82	0.49	0.20%				
21	MC	0.85	0.41	0.31%				
22	MC	0.60	0.28	0.25%				
23	MC	0.85	0.37	0.16%				
24	MC	0.85	0.42	0.19%				
25	MC	0.66	0.37	0.26%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-4 Cont'd  
Item Analysis Grade 6 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
26	MC	0.89	0.46	0.20%				
27	MC	0.79	0.46	0.32%				
28	MC	0.61	0.35	0.53%				
29	MC	0.82	0.55	0.37%				
30	MC	0.94	0.48	0.34%				
31	MC	0.79	0.43	0.38%				
32	MC	0.87	0.56	0.42%				
33	MC	0.89	0.50	0.52%				
34	MC	0.77	0.30	0.65%				
35	MC	0.85	0.51	0.41%				
36	MC	0.88	0.46	0.44%				
37	MC	0.80	0.31	0.45%				
38	CR	0.51	0.55	1.80%				
39	MC	0.61	0.18	0.20%		+		
40	MC	0.93	0.33	0.27%				
41	MC	0.86	0.45	0.56%				
42	MC	0.75	0.33	0.31%				
43	MC	0.88	0.33	0.38%				
44	MC	0.73	0.35	0.43%				
45	MC	0.51	0.33	2.83%				
46	MC	0.55	0.42	3.79%				
47	MC	0.75	0.45	0.31%				
48	MC	0.63	0.43	0.27%				
49	MC	0.55	0.41	0.29%				
50	MC	0.72	0.40	0.29%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-4 Cont'd  
Item Analysis Grade 6 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
51	MC	0.64	0.44	0.48%				
52	MC	0.48	0.40	0.39%				
53	MC	0.76	0.51	1.09%				
54	MC	0.94	0.39	0.29%				
55	MC	0.43	0.32	0.61%				
56	CR	0.50	0.43	0.99%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-5  
Item Analysis Grade 7 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.64	0.57	0.07%				
2	MC	0.70	0.49	0.07%				
3	MC	0.81	0.45	0.06%				
4	MC	0.93	0.31	0.15%				
5	MC	0.75	0.49	0.19%				
6	MC	0.89	0.44	0.15%				
7	MC	0.36	0.22	0.20%		+		
8	MC	0.62	0.11	0.25%	+	+		
9	MC	0.41	0.39	0.10%				
10	MC	0.64	0.26	0.32%				
11	MC	0.95	0.36	0.15%				
12	MC	0.84	0.31	0.24%				
13	MC	0.72	0.42	0.55%				
14	MC	0.52	0.40	0.46%				
15	MC	0.71	0.44	0.60%				
16	MC	0.59	0.33	0.63%				
17	MC	0.64	0.43	0.68%				
18	MC	0.43	0.21	0.72%				
19	MC	0.77	0.31	0.71%				
20	MC	0.64	0.42	0.51%				
21	MC	0.38	0.31	2.03%		+		
22	MC	0.46	0.35	0.27%				
23	MC	0.82	0.29	0.55%				
24	MC	0.77	0.49	0.22%				
25	MC	0.56	0.34	0.60%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-5 Cont'd  
Item Analysis Grade 7 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
26	MC	0.65	0.39	0.32%				
27	MC	0.84	0.44	0.43%				
28	MC	0.80	0.37	0.61%				
29	MC	0.50	0.31	1.99%				
30	MC	0.86	0.47	0.29%				
31	MC	0.74	0.35	0.52%				
32	MC	0.77	0.36	0.66%				
33	MC	0.65	0.30	0.43%				
34	MC	0.80	0.43	0.65%				
35	MC	0.46	0.31	0.97%				
36	CR	0.51	0.55	1.37%				
37	MC	0.82	0.50	0.12%				
38	MC	0.73	0.18	0.24%				
39	MC	0.84	0.49	0.19%				
40	MC	0.83	0.40	0.74%				
41	MC	0.94	0.39	0.18%				
42	MC	0.85	0.34	0.32%				
43	MC	0.89	0.43	0.79%				
44	MC	0.66	0.43	1.32%				
45	MC	0.76	0.55	1.83%				
46	MC	0.78	0.41	0.28%				
47	MC	0.52	0.30	2.10%				
48	MC	0.50	0.28	0.25%				
49	MC	0.66	0.32	0.93%				
50	MC	0.70	0.48	0.39%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-5 Cont'd  
Item Analysis Grade 7 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
51	MC	0.73	0.31	0.70%				
52	MC	0.33	0.16	0.33%		+		
53	MC	0.62	0.38	0.43%				
54	MC	0.79	0.43	0.59%				
55	MC	0.64	0.36	1.29%				
56	CR	0.19	0.46	1.49%				+

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-6  
Item Analysis Grade 8 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.59	0.30	0.06%		+		
2	MC	0.80	0.36	0.10%				
3	MC	0.76	0.09	0.13%	+			
4	MC	0.75	0.40	0.16%				
5	MC	0.81	0.43	0.09%				
6	MC	0.71	0.33	0.12%				
7	MC	0.51	0.30	0.16%				
8	MC	0.59	0.37	0.40%				
9	MC	0.89	0.40	0.21%				
10	MC	0.47	0.15	0.72%	+	+		
11	MC	0.90	0.36	0.14%				
12	MC	0.86	0.43	0.20%				
13	MC	0.92	0.28	0.42%				
14	MC	0.89	0.40	0.65%				
15	MC	0.54	0.30	0.62%				
16	MC	0.83	0.39	1.20%				
17	MC	0.63	0.24	0.65%				
18	MC	0.54	0.17	0.68%				
19	CR	0.49	0.46	1.71%				
20	MC	0.88	0.38	0.16%				
21	MC	0.84	0.46	1.26%				
22	MC	0.76	0.46	0.16%				
23	MC	0.73	0.41	0.61%				
24	MC	0.51	0.26	0.30%				
25	MC	0.80	0.47	0.37%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-6 Cont'd  
Item Analysis Grade 8 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
26	MC	0.78	0.33	0.36%				
27	MC	0.82	0.44	0.40%				
28	MC	0.63	0.33	0.29%				
29	MC	0.46	0.21	0.39%				
30	MC	0.43	0.30	0.42%				
31	MC	0.54	0.30	0.60%				
32	MC	0.54	0.34	0.28%				
33	MC	0.61	0.21	0.29%				
34	MC	0.82	0.44	0.39%				
35	MC	0.86	0.46	0.47%				
36	MC	0.78	0.41	0.46%				
37	MC	0.54	0.36	0.62%				
38	MC	0.63	0.13	0.68%	+	+		
39	MC	0.57	0.28	0.85%				
40	CR	0.45	0.45	2.14%				
41	MC	0.67	0.35	0.22%				
42	MC	0.74	0.28	0.29%				
43	MC	0.64	0.38	0.45%				
44	MC	0.74	0.38	0.87%				
45	MC	0.87	0.43	0.22%				
46	MC	0.40	0.36	0.40%				
47	MC	0.82	0.52	0.33%				
48	MC	0.57	0.43	0.59%				
49	MC	0.88	0.49	0.30%				
50	MC	0.82	0.54	0.30%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-6 Cont'd  
Item Analysis Grade 8 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
51	MC	0.81	0.54	0.29%				
52	MC	0.44	0.27	0.41%				
53	MC	0.91	0.47	0.31%				
54	MC	0.59	0.26	0.46%				
55	MC	0.93	0.40	0.34%				
56	MC	0.83	0.48	0.40%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-7  
Item Analysis Grade 10 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.51	0.38	0.10%		+		
2	MC	0.95	0.25	0.03%				
3	MC	0.79	0.48	0.13%				
4	MC	0.40	0.45	0.21%				
5	MC	0.78	0.44	0.11%				
6	MC	0.94	0.45	0.09%				
7	MC	0.71	0.37	0.17%				
8	MC	0.83	0.51	2.05%				
9	MC	0.69	0.43	0.12%				
10	MC	0.69	0.25	0.26%		+		
11	MC	0.87	0.50	0.25%				
12	CR	0.38	0.49	2.11%				
13	MC	0.76	0.38	0.40%				
14	MC	0.67	0.46	0.49%				
15	MC	0.76	0.40	0.66%				
16	MC	0.84	0.47	0.48%				
17	MC	0.74	0.48	0.51%				
18	MC	0.63	0.38	0.18%				
19	MC	0.65	0.47	0.21%				
20	MC	0.83	0.46	0.15%				
21	MC	0.51	0.25	0.52%				
22	MC	0.65	0.42	0.20%				
23	MC	0.64	0.42	0.19%				
24	MC	0.80	0.46	0.29%				
25	MC	0.67	0.47	0.30%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-7 Cont'd  
Item Analysis Grade 10 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
26	MC	0.78	0.43	0.72%				
27	MC	0.57	0.48	0.32%				
28	MC	0.86	0.34	0.38%				
29	MC	0.80	0.35	0.23%				
30	MC	0.65	0.31	0.26%				
31	MC	0.76	0.39	0.31%				
32	MC	0.58	0.35	0.35%				
33	MC	0.67	0.24	0.29%				
34	MC	0.76	0.44	0.29%				
35	MC	0.73	0.39	0.49%				
36	MC	0.74	0.42	0.39%				
37	MC	0.59	0.44	0.37%				
38	MC	0.78	0.47	0.33%				
39	MC	0.85	0.51	0.32%				
40	MC	0.87	0.44	2.29%				
41	MC	0.84	0.35	0.32%				
42	MC	0.67	0.40	0.35%				
43	CR	0.49	0.53	5.82%				
44	MC	0.63	0.33	0.46%				
45	MC	0.82	0.35	0.45%				
46	MC	0.79	0.36	0.64%				
47	MC	0.47	0.28	0.61%				
48	MC	0.76	0.39	0.48%				
49	MC	0.77	0.38	0.51%				
50	MC	0.66	0.37	0.60%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-7 Cont'd  
Item Analysis Grade 10 Reading

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
51	MC	0.50	0.34	0.54%				
52	MC	0.65	0.40	0.65%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-8  
Item Analysis Grade 3 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.91	0.29	0.37%				
2	MC	0.74	0.38	0.38%				
3	MC	0.77	0.47	0.31%				
4	MC	0.94	0.28	0.36%				
5	MC	0.51	0.47	0.41%				
6	MC	0.74	0.36	1.27%				
7	MC	0.88	0.38	0.86%				
8	MC	0.44	0.31	0.52%				
9	MC	0.70	0.42	1.11%				
10	CR	0.64	0.37	0.86%				
11	MC	0.80	0.54	1.35%				
12	MC	0.97	0.29	1.31%				
13	MC	0.83	0.48	1.57%				
14	MC	0.84	0.45	2.31%				
15	MC	0.74	0.51	0.18%				
16	MC	0.66	0.33	0.26%				
17	MC	0.73	0.47	0.40%				
18	MC	0.87	0.49	1.64%				
19	MC	0.85	0.48	0.33%				
20	MC	0.82	0.42	0.47%				
21	MC	0.85	0.41	1.23%				
22	MC	0.82	0.27	0.28%				
23	MC	0.48	0.39	0.41%				
24	MC	0.89	0.36	0.39%				
25A	CR	0.47	0.53	1.47%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-8 Cont'd  
Item Analysis Grade 3 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
25B	CR	0.44	0.53	2.88%				
26	MC	0.83	0.50	0.85%				
27	MC	0.94	0.37	0.74%				
28A	CR	0.97	0.21	1.09%				
28B	CR	0.73	0.31	1.77%				
29	MC	0.52	0.46	1.28%				
30	MC	0.71	0.35	1.46%				
31	MC	0.82	0.51	0.21%				
32	MC	0.88	0.47	0.27%				
33	MC	0.62	0.48	0.43%				
34	MC	0.85	0.41	0.28%				
35	MC	0.58	0.34	0.92%		+		
36	MC	0.84	0.47	0.32%				
37	MC	0.84	0.39	0.35%				
38	MC	0.86	0.49	0.84%				
39	MC	0.63	0.44	1.70%				
40	MC	0.87	0.45	0.89%				
41	MC	0.92	0.29	0.35%				
42	MC	0.55	0.25	0.79%				
43	MC	0.91	0.44	1.21%				
44A	CR	0.69	0.55	1.26%				
44B	CR	0.30	0.44	2.53%				
45	MC	0.74	0.49	1.09%				
46	MC	0.73	0.47	1.01%				
47	MC	0.86	0.30	1.04%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-8 Cont'd  
Item Analysis Grade 3 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
48	MC	0.61	0.43	1.00%				
49	MC	0.78	0.45	1.39%				
50	MC	0.73	0.52	1.34%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-9  
Item Analysis Grade 4 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.78	0.26	0.05%				
2	MC	0.85	0.38	0.44%				
3	MC	0.84	0.40	0.40%				
4	MC	0.72	0.47	0.09%				
5	MC	0.74	0.43	0.15%				
6	MC	0.82	0.35	0.36%				
7	MC	0.77	0.40	0.32%				
8	MC	0.91	0.40	0.22%				
9	MC	0.71	0.56	0.15%				
10	MC	0.76	0.53	0.84%				
11	MC	0.77	0.54	2.06%				
12	MC	0.94	0.25	0.40%				
13	CR	0.43	0.47	0.51%				
14	MC	0.76	0.50	0.79%				
15	MC	0.85	0.55	0.13%				
16	MC	0.96	0.27	0.20%				
17	MC	0.87	0.32	0.14%				
18	MC	0.79	0.21	0.18%				
19	MC	0.85	0.35	0.23%				
20A	CR	0.48	0.56	0.49%				
20B	CR	0.35	0.44	2.65%				
21	MC	0.65	0.46	0.31%				
22	MC	0.82	0.36	0.32%				
23	MC	0.80	0.38	0.30%				
24	MC	0.72	0.30	0.42%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-9 Cont'd  
Item Analysis Grade 4 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
25	MC	0.82	0.53	0.71%				
26	MC	0.91	0.32	1.21%				
27	MC	0.80	0.41	1.15%				
28	MC	0.75	0.49	1.53%				
29A	CR	0.72	0.29	1.11%				
29B	CR	0.24	0.38	2.59%				+
30	MC	0.93	0.31	1.33%				
31	MC	0.75	0.23	0.20%				
32	MC	0.84	0.38	0.35%				
33	MC	0.72	0.31	0.93%				
34	MC	0.71	0.51	0.32%				
35	MC	0.84	0.50	0.31%				
36	MC	0.66	0.40	0.39%				
37	MC	0.66	0.43	2.96%				
38	MC	0.82	0.38	0.45%				
39	MC	0.55	0.36	0.44%				
40	MC	0.45	0.39	0.44%				
41A	CR	0.70	0.52	0.61%				
41B	CR	0.64	0.47	1.49%				
42	MC	0.75	0.37	0.33%				
43	MC	0.60	0.50	0.70%				
44	MC	0.71	0.40	0.79%				
45	MC	0.68	0.53	0.45%				
46	MC	0.90	0.45	0.55%				
47	MC	0.75	0.55	0.49%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-9 Cont'd  
Item Analysis Grade 4 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
48	MC	0.96	0.24	0.53%				
49	MC	0.89	0.36	0.92%				
50	MC	0.91	0.34	0.56%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-10  
Item Analysis Grade 5 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.89	0.40	0.02%				
2	MC	0.47	0.50	0.23%				
3	MC	0.83	0.35	0.27%				
4	MC	0.71	0.37	0.43%				
5	MC	0.90	0.35	0.13%				
6	MC	0.65	0.32	0.51%				
7	MC	0.52	0.40	0.29%				
8	MC	0.48	0.52	0.36%				
9	MC	0.57	0.43	0.24%				
10	MC	0.77	0.45	0.22%				
11	MC	0.75	0.34	0.31%				
12A	CR	0.57	0.52	0.65%				
12B	CR	0.56	0.50	0.92%				
13	MC	0.63	0.51	1.02%				
14	MC	0.45	0.40	1.30%				
15	MC	0.73	0.24	0.15%				
16	MC	0.50	0.26	0.20%				
17	MC	0.38	0.33	0.19%				
18	MC	0.91	0.38	0.18%				
19	CR	0.76	0.28	0.53%				
20	MC	0.96	0.22	0.23%				
21	MC	0.45	0.41	0.44%		+		
22	MC	0.67	0.53	0.67%				
23A	CR	0.40	0.50	0.53%				
23B	CR	0.38	0.49	0.79%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-10 Cont'd  
Item Analysis Grade 5 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
24	MC	0.38	0.39	0.32%				
25	MC	0.66	0.54	0.44%				
26	MC	0.50	0.36	0.38%				
27	MC	0.70	0.48	0.44%				
28	MC	0.95	0.25	0.57%				
29	MC	0.78	0.08	0.52%	+	+		
30	MC	0.45	0.40	0.54%				
31	MC	0.87	0.40	0.66%				
32	MC	0.73	0.37	0.70%				
33	MC	0.75	0.48	0.64%				
34	MC	0.84	0.47	0.86%				
35	MC	0.70	0.49	0.93%				
36	MC	0.83	0.40	0.24%				
37	MC	0.53	0.42	0.22%				
38	MC	0.69	0.43	0.29%				
39	MC	0.70	0.42	0.38%				
40	MC	0.69	0.33	0.91%				
41	MC	0.85	0.35	0.39%				
42	MC	0.69	0.35	0.39%				
43	MC	0.49	0.37	0.51%				
44	MC	0.65	0.42	0.47%				
45	MC	0.93	0.34	0.51%				
46A	CR	0.86	0.24	0.72%				
46B	CR	0.91	0.24	0.88%				
47	MC	0.85	0.39	0.61%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-10 Cont'd  
Item Analysis Grade 5 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
48	MC	0.59	0.31	0.61%				
49	MC	0.89	0.26	1.86%				
50	MC	0.74	0.37	1.28%				
51	MC	0.51	0.28	0.88%				
52	MC	0.68	0.43	0.97%				
53	MC	0.79	0.42	0.77%				
54	MC	0.54	0.40	0.95%				
55	MC	0.75	0.39	0.86%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-11  
Item Analysis Grade 6 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.55	0.49	0.33%				
2	MC	0.84	0.43	0.18%				
3	MC	0.80	0.48	0.25%				
4	MC	0.92	0.42	0.31%				
5	MC	0.54	0.37	0.47%				
6	MC	0.87	0.34	0.59%				
7	MC	0.91	0.44	0.12%				
8	MC	0.77	0.44	0.31%				
9	MC	0.78	0.54	0.41%				
10A	CR	0.63	0.51	0.43%				
10B	CR	0.64	0.49	0.61%				
11	MC	0.95	0.11	0.24%	+			
12	MC	0.81	0.43	0.55%				
13	MC	0.91	0.28	0.55%				
14	MC	0.88	0.46	0.56%				
15	MC	0.94	0.29	0.56%				
16	MC	0.73	0.43	0.28%				
17	MC	0.50	0.39	0.38%				
18	MC	0.91	0.22	0.23%				
19	MC	0.84	0.43	1.09%				
20	MC	0.42	0.47	0.32%		+		
21	MC	0.80	0.45	0.54%				
22A	CR	0.92	0.35	0.36%				
22B	CR	0.26	0.43	0.82%				+
23	MC	0.74	0.40	0.45%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-11 Cont'd  
Item Analysis Grade 6 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
24	MC	0.52	0.40	0.56%				
25	MC	0.82	0.43	0.45%				
26	MC	0.37	0.28	0.57%				
27	MC	0.84	0.49	0.48%				
28	MC	0.56	0.39	0.70%				
29	MC	0.76	0.46	0.94%				
30	MC	0.85	0.31	0.15%				
31	MC	0.68	0.49	0.21%				
32	MC	0.82	0.37	0.18%				
33	MC	0.57	0.32	0.22%				
34	MC	0.56	0.44	0.20%				
35A	CR	0.34	0.50	0.64%				
35B	CR	0.41	0.58	1.18%				
36	MC	0.97	0.17	0.30%				
37	MC	0.80	0.28	0.26%				
38	MC	0.97	0.29	0.28%				
39	MC	0.52	0.38	0.83%				
40	MC	0.72	0.50	0.30%				
41	MC	0.71	0.43	0.36%				
42	MC	0.62	0.44	0.52%				
43	MC	0.76	0.43	0.22%				
44	MC	0.35	0.42	0.28%				
45	MC	0.75	0.35	0.28%				
46	MC	0.80	0.27	0.47%				
47	MC	0.72	0.40	0.37%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-11 Cont'd  
Item Analysis Grade 6 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
48	MC	0.83	0.36	0.37%				
49	MC	0.57	0.27	0.44%		+		
50	MC	0.70	0.36	0.39%				
51	MC	0.79	0.43	0.48%				
52	MC	0.80	0.23	0.55%				
53	CR	0.56	0.49	0.86%				
54	MC	0.70	0.40	0.63%				
55	MC	0.63	0.45	0.67%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-12  
Item Analysis Grade 7 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.59	0.47	0.16%				
2	MC	0.71	0.38	0.08%				
3	MC	0.89	0.35	0.10%				
4A	CR	0.72	0.52	0.79%				
4B	CR	0.66	0.58	1.55%				
5	MC	0.78	0.42	0.20%				
6	MC	0.64	0.24	0.18%				
7	MC	0.82	0.46	0.24%				
8	MC	0.73	0.45	0.40%				
9	MC	0.48	0.40	0.61%				
10	MC	0.84	0.34	0.67%				
11	MC	0.83	0.31	0.43%				
12	MC	0.72	0.40	7.83%				
13	MC	0.74	0.42	0.66%				
14	MC	0.53	0.34	1.10%				
15	MC	0.61	0.43	1.09%				
16	MC	0.70	0.47	0.30%				
17	MC	0.73	0.30	0.30%				
18	MC	0.93	0.15	0.40%				
19	MC	0.43	0.27	0.90%				
20	MC	0.78	0.32	0.19%				
21	MC	0.62	0.41	0.24%				
22	MC	0.75	0.37	0.41%				
23	MC	0.88	0.38	0.34%				
24	MC	0.75	0.46	0.38%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-12 Cont'd  
Item Analysis Grade 7 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
25	MC	0.59	0.49	0.26%				
26	MC	0.89	0.38	0.51%				
27	MC	0.88	0.49	0.27%				
28	MC	0.84	0.31	0.34%				
29A	CR	0.51	0.35	1.19%				
29B	CR	0.68	0.54	1.76%				
30	MC	0.75	0.36	0.17%				
31	MC	0.72	0.52	1.40%				
32A	CR	0.47	0.46	0.85%				
32B	CR	0.33	0.49	1.93%				
33	MC	0.47	0.42	0.84%				
34	MC	0.67	0.45	0.28%				
35	MC	0.63	0.41	0.27%				
36	MC	0.83	0.39	0.38%				
37	MC	0.82	0.47	0.39%				
38	MC	0.88	0.23	0.27%				
39	MC	0.60	0.49	0.32%				
40	MC	0.45	0.31	0.25%				
41	MC	0.43	0.37	0.45%				
42	MC	0.53	0.44	0.36%				
43	MC	0.90	0.35	0.24%				
44	MC	0.41	0.41	0.28%				
45	MC	0.72	0.28	0.29%				
46	MC	0.55	0.45	0.67%				
47	MC	0.88	0.32	0.64%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-12 Cont'd  
Item Analysis Grade 7 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
48	MC	0.84	0.31	0.21%				
49	MC	0.43	0.23	0.37%				
50	MC	0.73	0.43	0.37%				
51	CR	0.41	0.58	0.81%				
52	MC	0.72	0.47	0.38%				
53	MC	0.78	0.44	0.31%				
54	MC	0.63	0.50	0.43%				
55	MC	0.54	0.45	0.31%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-13  
Item Analysis Grade 8 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.55	0.37	0.21%				
2	MC	0.72	0.40	0.04%				
3	MC	0.52	0.45	0.14%				
4	MC	0.72	0.49	0.11%				
5	MC	0.70	0.45	0.47%				
6	MC	0.57	0.29	0.17%				
7	MC	0.72	0.44	0.31%				
8	MC	0.73	0.40	0.32%				
9A	CR	0.89	0.35	0.53%				
9B	CR	0.77	0.45	0.97%				
10	MC	0.79	0.32	0.17%				
11	MC	0.82	0.44	0.34%				
12	MC	0.64	0.44	0.51%				
13	MC	0.60	0.46	0.72%				
14	MC	0.81	0.40	0.89%				
15	MC	0.44	0.37	1.17%				
16	MC	0.90	0.31	0.20%				
17	MC	0.54	0.53	0.20%				
18	MC	0.69	0.30	0.26%				
19	MC	0.40	0.30	0.28%				
20A	CR	0.47	0.59	1.50%				
20B	CR	0.58	0.66	2.13%				
21	MC	0.78	0.38	0.23%				
22	MC	0.49	0.23	0.46%				
23	MC	0.47	0.30	0.31%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-13 Cont'd  
Item Analysis Grade 8 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
24	MC	0.66	0.37	0.39%				
25	MC	0.44	0.35	1.12%				
26	MC	0.71	0.48	1.01%				
27	MC	0.53	0.46	0.43%				
28	MC	0.71	0.46	0.59%				
29	MC	0.91	0.35	0.35%				
30	MC	0.58	0.38	0.48%				
31	MC	0.62	0.34	0.29%				
32	MC	0.63	0.27	0.44%				
33	MC	0.50	0.35	0.75%				
34	MC	0.52	0.39	0.98%				
35	MC	0.44	0.26	0.54%				
36	MC	0.53	0.44	0.40%				
37	MC	0.84	0.39	0.41%				
38	MC	0.55	0.54	0.69%				
39	MC	0.69	0.37	0.98%				
40A	CR	0.50	0.63	1.08%				
40B	CR	0.50	0.62	1.87%				
41	MC	0.54	0.37	0.75%				
42	MC	0.84	0.46	0.78%				
43	MC	0.53	0.33	0.47%				
44	MC	0.69	0.58	0.35%				
45	MC	0.50	0.47	0.39%				
46	MC	0.60	0.37	0.57%				
47	MC	0.42	0.61	0.33%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-13 Cont'd  
Item Analysis Grade 8 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
48	MC	0.91	0.21	0.31%				
49	MC	0.66	0.46	0.64%				
50	MC	0.69	0.34	0.49%				
51	MC	0.45	0.31	1.05%				
52	MC	0.83	0.45	1.83%				
53	CR	0.32	0.60	2.92%				
54	MC	0.68	0.35	0.81%				
55	MC	0.61	0.27	0.84%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-14  
Item Analysis Grade 10 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.47	0.43	0.10%				
2	MC	0.64	0.33	0.18%				
3	MC	0.55	0.44	0.10%				
4	MC	0.52	0.39	0.13%				
5	MC	0.54	0.42	0.16%				
6 **	MC							
7	MC	0.70	0.47	0.18%				
8	MC	0.63	0.41	0.19%				
9	MC	0.54	0.53	0.12%				
10	MC	0.54	0.38	0.19%				
11	MC	0.49	0.45	0.16%				
12	MC	0.54	0.41	0.28%				
13	MC	0.49	0.51	0.52%				
14	MC	0.72	0.42	0.21%				
15	MC	0.85	0.42	0.14%				
16	MC	0.46	0.40	0.23%				
17	MC	0.54	0.53	0.51%				
18	MC	0.80	0.31	0.34%				
19	MC	0.71	0.33	0.20%				
20	MC	0.50	0.42	0.31%				
21	MC	0.74	0.53	0.29%				
22	MC	0.61	0.43	0.95%				
23	MC	0.73	0.47	0.45%				
24	MC	0.72	0.43	0.53%				
25	MC	0.61	0.36	0.67%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

\*\* Item dropped from scoring.

Table 8-14 Cont'd  
Item Analysis Grade 10 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
26 **	MC							
27	CR	0.47	0.62	5.20%			+	
28	MC	0.65	0.33	0.30%				
29	MC	0.82	0.35	0.23%				
30	MC	0.75	0.30	0.28%				
31	MC	0.78	0.44	0.51%				
32	MC	0.76	0.39	0.34%				
33	CR	0.68	0.43	2.08%				
34	MC	0.53	0.33	0.40%				
35	MC	0.69	0.28	0.32%				
36	MC	0.60	0.21	0.35%				
37	MC	0.50	0.47	0.36%				
38	CR	0.29	0.60	8.34%			+	+
39	MC	0.81	0.46	0.70%				
40	MC	0.36	0.42	0.32%				
41	MC	0.52	0.41	0.47%				
42	MC	0.33	0.31	0.89%				
43	MC	0.57	0.42	0.42%				
44	MC	0.54	0.53	0.35%				
45	MC	0.56	0.45	0.60%				
46	MC	0.61	0.42	0.65%				
47	MC	0.73	0.49	0.70%				
48	MC	0.59	0.44	0.41%				
49	MC	0.66	0.42	0.71%				
50	MC	0.72	0.48	0.42%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

\*\* Item dropped from scoring.

Table 8-14 Cont'd  
Item Analysis Grade 10 Mathematics

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
51	MC	0.64	0.58	0.73%				
52	CR	0.49	0.54	3.80%				
53	MC	0.67	0.41	0.65%				
54	MC	0.77	0.53	0.68%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-15  
Item Analysis Grade 4 Language Arts

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.48	0.35	0.10%				
2	MC	0.91	0.39	0.06%				
3	MC	0.78	0.32	0.18%				
4	MC	0.41	0.33	0.31%				
5	MC	0.66	0.29	0.04%				
6	MC	0.57	0.25	0.31%				
7	MC	0.81	0.34	0.27%				
8	MC	0.72	0.27	0.72%				
9	MC	0.89	0.35	0.35%				
10	MC	0.41	0.28	0.40%				
11	MC	0.84	0.34	0.31%				
12	MC	0.78	0.37	0.35%				
13	MC	0.37	0.29	0.47%				
14	MC	0.74	0.37	0.84%				
15	MC	0.65	0.40	0.49%				
16	MC	0.69	0.47	0.46%				
17	MC	0.49	0.33	1.09%				
18	MC	0.46	0.29	1.77%				
19	MC	0.64	0.36	0.73%				
20	MC	0.71	0.42	0.93%				
21	MC	0.48	0.27	1.34%				
22	MC	0.56	0.32	1.01%				
23	MC	0.43	0.22	1.28%				
24	MC	0.81	0.40	1.16%				
25	MC	0.85	0.40	1.35%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-15 Cont'd  
Item Analysis Grade 4 Language Arts

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
26	MC	0.58	0.34	1.41%		+		
27	MC	0.55	0.31	4.13%				
28	MC	0.50	0.32	1.99%				
29	MC	0.71	0.50	2.56%				
30	MC	0.34	0.26	2.59%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-16  
Item Analysis Grade 8 Language Arts

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.76	0.39	0.19%				
2	MC	0.34	0.30	0.26%				
3	MC	0.83	0.36	0.15%				
4	MC	0.78	0.43	0.31%				
5	MC	0.78	0.41	0.16%				
6	MC	0.80	0.50	0.19%				
7	MC	0.91	0.43	0.47%				
8	MC	0.68	0.36	0.26%				
9	MC	0.65	0.44	0.29%				
10	MC	0.92	0.36	0.76%				
11	MC	0.83	0.42	0.29%				
12	MC	0.55	0.40	0.34%				
13	MC	0.87	0.35	0.27%				
14	MC	0.79	0.50	0.32%				
15	MC	0.63	0.41	0.28%				
16	MC	0.88	0.46	0.41%				
17	MC	0.83	0.44	0.34%				
18	MC	0.57	0.50	0.80%				
19	MC	0.91	0.45	0.46%				
20	MC	0.81	0.50	0.52%				
21	MC	0.76	0.52	0.65%				
22	MC	0.85	0.41	0.79%				
23	MC	0.77	0.50	0.74%				
24	MC	0.60	0.47	1.84%				
25	MC	0.71	0.42	1.06%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-16 Cont'd  
Item Analysis Grade 8 Language Arts

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
26	MC	0.51	0.28	1.29%				
27	MC	0.66	0.36	1.59%				
28	MC	0.70	0.34	1.86%				
29	MC	0.67	0.46	2.02%				
30 **	MC							

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

\*\* Item dropped from scoring.

Table 8-17  
Item Analysis Grade 10 Language Arts

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.44	0.31	0.16%				
1A	CR	0.57	0.53	0.86%				
1B	CR	0.71	0.38	0.86%				
2	MC	0.85	0.39	0.20%				
3	MC	0.60	0.42	0.28%				
4	MC	0.61	0.31	0.47%				
5	MC	0.58	0.29	0.16%				
6	MC	0.82	0.39	0.46%				
7	MC	0.70	0.43	0.25%				
8	MC	0.66	0.50	0.23%				
9	MC	0.57	0.28	1.07%				
10	MC	0.64	0.51	0.32%				
11	MC	0.79	0.43	0.48%				
12	MC	0.76	0.39	0.17%				
13	MC	0.56	0.40	0.26%				
14	MC	0.67	0.34	0.23%				
15	MC	0.42	0.23	0.34%				
16	MC	0.62	0.43	0.26%				
17	MC	0.58	0.21	0.40%				
18	MC	0.51	0.41	0.27%				
19	MC	0.50	0.36	0.39%				
20	MC	0.59	0.30	0.56%				
21	MC	0.63	0.39	1.81%				
22	MC	0.58	0.42	0.84%				
23	MC	0.59	0.23	1.01%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-17 Cont'd  
Item Analysis Grade 10 Language Arts

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
24	MC	0.62	0.38	1.53%				
25	MC	0.52	0.35	1.76%				
26	MC	0.54	0.35	1.91%				
27	MC	0.49	0.33	2.61%				
28	MC	0.61	0.46	2.76%				
29	MC	0.56	0.50	2.72%				
30	MC	0.79	0.47	3.05%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

\*\* Writing prompt items are included here. The Writing raw score contributes to the scale score for Language Arts in grade 10.

Table 8-18  
Item Analysis Grade 4 Social Studies

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.82	0.36	0.09%				
2	MC	0.86	0.32	2.02%				
3	MC	0.79	0.38	0.12%				
4 **	MC							
5	MC	0.81	0.48	0.29%				
6	MC	0.94	0.31	2.30%				
7	MC	0.84	0.30	0.37%				
8	MC	0.87	0.36	0.82%				
9 **	MC							
10	MC	0.95	0.40	0.46%				
11	MC	0.78	0.27	0.25%				
12	MC	0.94	0.30	0.63%				
13	MC	0.89	0.43	0.83%				
14	MC	0.66	0.28	0.60%				
15	MC	0.92	0.33	0.20%				
16	MC	0.97	0.31	0.61%				
17	MC	0.72	0.47	0.36%				
18	MC	0.68	0.44	1.59%				
19	MC	0.67	0.47	0.31%				
20	MC	0.90	0.37	0.25%				
21	MC	0.77	0.43	0.58%				
22	MC	0.83	0.39	0.34%				
23	MC	0.59	0.33	2.43%				
24	MC	0.83	0.45	0.40%				
25	MC	0.76	0.31	0.70%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

\*\* Items dropped from scoring.

Table 8-18 Cont'd  
Item Analysis Grade 4 Social Studies

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
26	MC	0.79	0.40	0.51%				
27	MC	0.78	0.46	1.76%				
28	MC	0.69	0.27	0.63%				
29	MC	0.46	0.19	0.99%				
30	MC	0.70	0.44	0.54%				
31	MC	0.91	0.47	0.67%				
32	MC	0.62	0.43	1.40%				
33	MC	0.48	0.28	2.05%		+		
34	MC	0.78	0.38	0.81%				
35	MC	0.49	0.24	1.12%				
36	MC	0.75	0.47	1.19%				
37	MC	0.78	0.29	0.78%				
38	MC	0.56	0.36	1.12%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-19  
Item Analysis Grade 8 Social Studies

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.86	0.36	0.14%				
2	MC	0.91	0.40	0.11%				
3	MC	0.89	0.45	0.25%				
4	MC	0.81	0.45	0.31%				
5	MC	0.86	0.36	0.20%				
6	MC	0.81	0.39	1.51%				
7	MC	0.34	0.24	0.17%				
8	MC	0.86	0.36	0.19%				
9	MC	0.72	0.45	0.34%				
10	MC	0.95	0.34	0.16%				
11	MC	0.80	0.43	0.30%				
12	MC	0.83	0.46	0.19%				
13	MC	0.87	0.50	2.58%				
14	MC	0.93	0.42	0.24%				
15	MC	0.74	0.43	0.96%				
16	MC	0.73	0.38	0.52%				
17	MC	0.73	0.39	0.16%				
18	MC	0.64	0.24	0.28%		+		
19	MC	0.84	0.36	0.38%				
20	MC	0.60	0.48	0.63%				
21	MC	0.50	0.29	0.88%				
22	MC	0.75	0.35	0.30%				
23	MC	0.83	0.47	0.42%				
24	MC	0.62	0.39	0.52%				
25	MC	0.84	0.45	1.05%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-19 Cont'd  
Item Analysis Grade 8 Social Studies

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
26	MC	0.61	0.52	1.21%				
27	MC	0.76	0.42	1.25%				
28	MC	0.64	0.40	0.45%				
29	MC	0.55	0.48	0.55%				
30	MC	0.74	0.46	0.90%				
31	MC	0.76	0.48	0.62%				
32	MC	0.86	0.44	0.88%				
33	MC	0.58	0.35	0.81%				
34	MC	0.55	0.22	1.59%				
35	MC	0.55	0.32	0.87%				
36	MC	0.63	0.19	1.04%				
37	MC	0.58	0.32	1.21%				
38	MC	0.44	0.29	1.26%				
39	MC	0.62	0.38	1.91%				
40	MC	0.33	0.31	1.35%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-20  
Item Analysis Grade 10 Social Studies

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.65	0.45	0.17%				
2	MC	0.66	0.42	0.09%				
3	MC	0.40	0.18	0.17%				
4	MC	0.49	0.16	0.22%				
5	MC	0.57	0.32	0.31%				
6	MC	0.80	0.45	0.26%				
7	MC	0.59	0.21	0.20%				
8	MC	0.68	0.31	0.15%				
9	MC	0.71	0.35	0.20%				
10	MC	0.75	0.44	0.16%				
11	MC	0.77	0.32	0.19%				
12	MC	0.82	0.42	0.51%				
13	MC	0.96	0.31	0.15%				
14	MC	0.72	0.36	0.21%				
15	MC	0.80	0.41	0.22%				
16	MC	0.21	0.11	0.25%	+	+		+
17	MC	0.75	0.37	0.29%				
18	MC	0.69	0.49	0.40%				
19	MC	0.39	0.22	0.39%				
20	MC	0.68	0.39	0.94%				
21	MC	0.54	0.41	0.63%				
22	MC	0.36	0.41	0.74%				
23	MC	0.68	0.44	0.81%				
24	MC	0.76	0.52	1.03%				
25	MC	0.64	0.40	1.15%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-20 Cont'd  
Item Analysis Grade 10 Social Studies

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
26	MC	0.71	0.44	0.38%				
27	MC	0.49	0.34	0.35%				
28	MC	0.52	0.39	0.30%				
29	MC	0.73	0.42	0.40%				
30	MC	0.56	0.38	0.34%				
31	MC	0.85	0.49	1.36%				
32	MC	0.52	0.23	0.30%				
33	MC	0.53	0.27	0.68%				
34	MC	0.65	0.40	0.62%				
35	MC	0.79	0.54	0.37%				
36	MC	0.61	0.36	1.54%				
37	MC	0.63	0.45	0.36%				
38	MC	0.68	0.38	0.39%				
39	MC	0.98	0.21	0.29%				
40	MC	0.44	0.29	0.41%				
41	MC	0.58	0.22	0.40%				
42	MC	0.84	0.41	0.38%		+		
43	MC	0.67	0.36	0.48%				
44	MC	0.80	0.39	0.49%				
45	MC	0.81	0.50	0.55%				
46	MC	0.66	0.37	0.57%				
47	MC	0.48	0.28	0.69%				
48	MC	0.61	0.37	0.95%				
49	MC	0.66	0.47	1.04%				
50	MC	0.74	0.49	1.02%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-21  
Item Analysis Grade 4 Science

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.72	0.40	0.08%				
2	MC	0.51	0.32	0.11%				
3	MC	0.71	0.44	0.20%				
4	MC	0.83	0.36	0.04%				
5	MC	0.94	0.32	0.17%				
6	MC	0.83	0.34	0.25%				
7	MC	0.94	0.33	0.39%				
8	MC	0.75	0.42	2.15%				
9	MC	0.74	0.23	0.27%				
10	MC	0.92	0.22	0.23%				
11	MC	0.77	0.42	0.27%				
12	MC	0.84	0.33	0.25%				
13	MC	0.69	0.46	0.29%				
14	MC	0.94	0.20	0.34%				
15	MC	0.59	0.37	1.13%				
16	MC	0.70	0.35	1.60%				
17	MC	0.35	0.21	0.32%				
18	MC	0.72	0.44	0.58%				
19	MC	0.79	0.29	0.59%				
20	MC	0.66	0.37	0.64%				
21	MC	0.79	0.46	0.45%				
22	MC	0.73	0.32	0.63%				
23	MC	0.60	0.35	0.49%				
24	MC	0.86	0.32	0.61%				
25	MC	0.62	0.36	0.82%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-21 Cont'd  
Item Analysis Grade 4 Science

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
26	MC	0.78	0.42	0.45%				
27	MC	0.54	0.36	0.47%				
28	MC	0.76	0.48	0.61%				
29	MC	0.79	0.46	0.89%				
30	MC	0.85	0.29	1.84%				
31	MC	0.58	0.32	0.77%				
32	MC	0.68	0.36	0.95%				
33	MC	0.39	0.31	1.73%				
34	MC	0.80	0.44	0.78%				
35	MC	0.65	0.46	1.20%				
36	MC	0.74	0.47	1.10%				
37	MC	0.81	0.47	1.91%				
38	MC	0.64	0.43	1.29%				
39	MC	0.74	0.48	1.52%				
40	MC	0.46	0.14	2.54%	+	+		

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-22  
Item Analysis Grade 8 Science

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.87	0.38	0.03%				
2	MC	0.92	0.40	0.08%				
3	MC	0.82	0.35	0.06%				
4	MC	0.91	0.30	0.04%				
5	MC	0.77	0.41	0.14%				
6	MC	0.77	0.31	0.20%				
7	MC	0.93	0.34	0.20%				
8	MC	0.86	0.43	0.24%				
9	MC	0.86	0.40	0.73%				
10	MC	0.96	0.33	0.80%				
11	MC	0.86	0.48	1.04%				
12	MC	0.84	0.49	0.23%				
13	MC	0.79	0.49	0.25%				
14	MC	0.89	0.48	0.38%				
15	MC	0.88	0.35	0.23%				
16	MC	0.93	0.24	0.29%				
17	MC	0.53	0.27	0.41%				
18	MC	0.71	0.45	0.24%				
19	MC	0.73	0.39	0.29%				
20	MC	0.58	0.35	2.07%		+		
21	MC	0.72	0.29	0.45%				
22	MC	0.74	0.36	0.29%				
23	MC	0.73	0.40	0.20%				
24	MC	0.90	0.24	0.17%				
25	MC	0.77	0.51	0.26%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-22 Cont'd  
Item Analysis Grade 8 Science

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
26	MC	0.66	0.48	0.43%				
27	MC	0.64	0.43	0.52%				
28	MC	0.46	0.36	0.45%				
29	MC	0.83	0.46	0.51%				
30	MC	0.62	0.32	0.40%				
31	MC	0.63	0.49	0.29%				
32	MC	0.73	0.26	0.36%				
33	MC	0.76	0.39	0.47%				
34	MC	0.47	0.28	0.65%				
35	MC	0.60	0.36	0.51%				
36	MC	0.63	0.36	0.75%				
37	MC	0.77	0.43	0.52%				
38	MC	0.68	0.36	0.88%				
39	MC	0.85	0.49	0.52%				
40	MC	0.82	0.25	0.87%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-23  
Item Analysis Grade 10 Science

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
1	MC	0.69	0.48	0.09%				
2	MC	0.74	0.43	0.06%				
3	MC	0.66	0.36	0.10%				
4	MC	0.59	0.40	0.07%				
5	MC	0.80	0.43	0.09%				
6	MC	0.73	0.35	0.13%				
7	MC	0.83	0.30	0.16%				
8	MC	0.82	0.38	0.23%				
9	MC	0.63	0.36	0.28%				
10	MC	0.79	0.43	0.15%				
11	MC	0.70	0.33	0.20%				
12	MC	0.50	0.27	0.27%				
13	MC	0.73	0.46	0.55%				
14	MC	0.60	0.46	0.64%				
15	MC	0.72	0.42	0.56%				
16	MC	0.60	0.37	0.14%				
17	MC	0.53	0.46	0.26%				
18	MC	0.78	0.49	0.27%				
19	MC	0.52	0.33	0.20%				
20	MC	0.54	0.34	0.26%				
21	MC	0.66	0.49	2.46%				
22	MC	0.56	0.36	0.23%				
23	MC	0.70	0.48	0.31%				
24	MC	0.55	0.45	0.48%				
25	MC	0.58	0.36	0.33%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-23 Cont'd  
Item Analysis Grade 10 Science

Test Book Item	Item Statistic Fields				Flag			
	Item Type	<i>p</i> -value	Corr	Omit Rate	Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
26	MC	0.51	0.41	0.20%				
27	MC	0.76	0.53	0.21%				
28	MC	0.71	0.45	0.23%				
29	MC	0.67	0.46	0.40%				
30	MC	0.75	0.31	0.26%				
31	MC	0.40	0.25	0.31%				
32	MC	0.46	0.21	0.37%				
33	MC	0.48	0.38	0.88%				
34	MC	0.58	0.44	0.85%				
35	MC	0.63	0.30	0.35%				
36	MC	0.66	0.44	0.41%				
37	MC	0.62	0.41	0.65%				
38	MC	0.70	0.44	0.43%				
39	MC	0.73	0.42	0.52%				
40	MC	0.77	0.44	0.27%				
41	MC	0.57	0.37	0.32%				
42	MC	0.59	0.35	0.43%				
43	MC	0.43	0.41	0.54%				
44	MC	0.40	0.33	0.43%				
45	MC	0.41	0.27	0.57%				
46	MC	0.79	0.34	0.42%				
47	MC	0.62	0.36	0.49%				
48	MC	0.46	0.40	0.54%				
49	MC	0.72	0.44	0.56%				
50	MC	0.70	0.43	0.56%				

\* Note: The correlation is flagged when it falls below 0.15, the distractor is flagged when it has a positive correlation with the correct answer, the omit rate is flagged when it is above 5%, the *p*-value is flagged when it is below 0.30.

Table 8-24  
The Number of Items Flagged

Content	Grade	OP Items			
		Flag Corr	Flag Distractor	Flag Omit	Flag <i>p</i> -value
RD	3		1		
	4		1		
	5		2		1
	6		2		
	7	1	4		1
	8	3	3		
	10		2	1	
MA	3		1		
	4				1
	5	1	2		
	6	1	2		1
	7			1	
	8				
	10			2	1
LA	4		1		
	8				
	10		1		
SS	4		1		
	8		2		
	10	1	2		1
SC	4	1	1		
	8		1		
	10				

Table 8-25  
Raw Score Descriptive Statistics based on Census Data

Content	Grade	N Count	Mean	Test Difficulty	SD	Skewness	Kurtosis	Min Obtained	Max Obtained	Max Possible	Alpha	SEM
Reading	3	59637	40.76	0.68	12.46	-0.76	-0.43	1	60	60	0.94	3.02
	4	60321	38.04	0.64	11.73	-0.55	-0.61	0	59	59	0.93	3.18
	5	59732	39.80	0.66	10.99	-0.69	-0.30	2	60	60	0.92	3.10
	6	59394	42.04	0.70	10.58	-0.87	0.13	0	60	60	0.92	3.08
	7	60731	39.05	0.65	10.44	-0.64	-0.27	2	60	60	0.91	3.18
	8	61506	40.81	0.68	9.93	-0.80	0.19	0	60	60	0.90	3.18
	10	63143	38.17	0.68	10.55	-0.70	-0.20	0	56	56	0.92	3.07
Mathematics	3	59798	41.30	0.72	10.50	-0.80	-0.05	0	57	57	0.92	2.98
	4	60405	40.93	0.72	10.36	-0.79	-0.11	1	57	57	0.92	2.98
	5	59776	41.70	0.67	11.24	-0.44	-0.56	2	62	62	0.92	3.25
	6	59444	42.87	0.69	11.17	-0.62	-0.29	1	62	62	0.92	3.13
	7	60813	41.13	0.66	11.87	-0.49	-0.57	0	62	62	0.92	3.26
	8	61540	38.31	0.62	12.87	-0.14	-0.97	0	62	62	0.93	3.46
	10	63130	33.37	0.60	12.23	-0.08	-1.02	0	56	56	0.93	3.28
Language Arts	4	60265	18.64	0.62	5.59	-0.29	-0.62	0	30	30	0.83	2.32
	8	61463	21.24	0.73	5.83	-0.84	-0.03	0	29	29	0.88	2.04
	10	62880	23.75	0.61	7.03	-0.27	-0.71	0	39	39	0.86	2.59
Social Studies	4	60361	27.38	0.76	6.05	-1.02	0.68	1	36	36	0.86	2.24
	8	61463	28.27	0.71	7.32	-0.65	-0.21	0	40	40	0.89	2.48
	10	62855	32.51	0.65	9.23	-0.40	-0.57	0	50	50	0.90	2.95
Science	4	60327	28.55	0.71	7.15	-0.67	-0.30	2	40	40	0.88	2.51
	8	61484	30.31	0.76	6.97	-0.93	0.31	1	40	40	0.88	2.37
	10	62940	31.53	0.63	10.08	-0.29	-0.86	1	50	50	0.91	3.02

Table 8-26  
Raw Score Descriptive Statistics by Gender

Content	Grade	Male					Female				
		N Count	Mean	Test Difficulty	SD	Alpha	N Count	Mean	Test Difficulty	SD	Alpha
Reading	3	30483	39.78	0.66	12.75	0.94	29150	41.78	0.70	12.07	0.94
	4	30942	37.26	0.63	11.97	0.93	29374	38.87	0.66	11.41	0.92
	5	30654	38.59	0.64	11.28	0.92	29055	41.08	0.68	10.53	0.92
	6	30266	40.75	0.68	10.95	0.92	29127	43.38	0.72	10.01	0.91
	7	31160	38.16	0.64	10.76	0.91	29571	39.99	0.67	10.02	0.90
	8	31470	39.23	0.65	10.19	0.90	30034	42.47	0.71	9.36	0.89
	10	32120	37.33	0.67	10.84	0.92	31019	39.04	0.70	10.16	0.91
Mathematics	3	30572	41.47	0.73	10.49	0.92	29222	41.12	0.72	10.51	0.92
	4	30990	41.15	0.72	10.36	0.92	29410	40.69	0.71	10.35	0.92
	5	30663	41.44	0.67	11.31	0.92	29090	41.97	0.68	11.14	0.92
	6	30294	42.75	0.69	11.42	0.92	29149	42.99	0.69	10.91	0.92
	7	31216	40.71	0.66	12.06	0.93	29597	41.57	0.67	11.64	0.92
	8	31500	38.31	0.62	13.00	0.93	30038	38.30	0.62	12.74	0.93
	10	32110	33.54	0.60	12.61	0.93	31016	33.18	0.59	11.83	0.92
Language Arts	4	30903	17.96	0.60	5.58	0.82	29357	19.36	0.65	5.51	0.83
	8	31449	20.39	0.70	6.09	0.88	30012	22.12	0.76	5.40	0.87
	10	31968	22.54	0.58	7.10	0.86	30908	25.00	0.64	6.73	0.86
Social Studies	4	30962	27.15	0.75	6.23	0.87	29394	27.62	0.77	5.84	0.85
	8	31438	28.35	0.71	7.68	0.90	30023	28.19	0.70	6.93	0.87
	10	31955	32.65	0.65	9.73	0.91	30896	32.36	0.65	8.69	0.88
Science	4	30958	28.57	0.71	7.21	0.88	29364	28.52	0.71	7.09	0.87
	8	31469	30.52	0.76	7.27	0.89	30013	30.09	0.75	6.62	0.87
	10	32015	32.16	0.64	10.41	0.92	30921	30.89	0.62	9.69	0.90

Table 8-27  
Raw Score Descriptive Statistics for Reading by Race/Ethnicity

Content	Race/Ethnicity	Grade	N Count	Mean	Test Difficulty	SD	Alpha
Reading	W	3	42513	43.23	0.72	11.20	0.93
		4	43376	40.38	0.68	10.74	0.92
		5	43282	41.85	0.70	9.98	0.91
		6	43367	44.12	0.74	9.43	0.90
		7	44666	40.98	0.68	9.58	0.89
		8	45648	42.50	0.71	9.00	0.88
		10	48007	39.91	0.71	9.68	0.90
	AA	3	6627	31.89	0.53	13.17	0.94
		4	6581	29.54	0.50	11.76	0.92
		5	6443	31.68	0.53	11.69	0.92
		6	6333	33.40	0.56	11.68	0.92
		7	6275	30.98	0.52	10.74	0.90
		8	6523	33.11	0.55	11.03	0.90
		10	6236	29.65	0.53	11.17	0.91
	H	3	6782	34.62	0.58	12.89	0.94
		4	6705	31.96	0.54	11.63	0.92
		5	6480	34.92	0.58	11.18	0.91
		6	6227	37.13	0.62	10.79	0.91
		7	6282	34.00	0.57	10.30	0.90
		8	5878	36.66	0.61	10.08	0.89
		10	5486	33.55	0.60	10.74	0.91
	A	3	2686	40.51	0.68	12.54	0.94
		4	2627	37.96	0.64	11.88	0.93
		5	2512	39.49	0.66	11.31	0.92
		6	2438	41.44	0.69	10.74	0.92
		7	2520	38.58	0.64	10.66	0.91
		8	2473	40.95	0.68	9.98	0.90
		10	2375	37.50	0.67	10.85	0.92
	AI	3	1001	36.89	0.61	12.78	0.94
		4	1005	34.25	0.58	11.33	0.91
5		992	36.20	0.60	10.93	0.91	
6		1028	38.66	0.64	9.99	0.90	
7		986	36.28	0.60	10.31	0.90	
8		982	37.81	0.63	9.91	0.89	
10		1038	34.87	0.62	10.48	0.91	

Table 8-28  
Raw Score Descriptive Statistics for Mathematics by Race/Ethnicity

Content	Race/Ethnicity	Grade	N Count	Mean	Test Difficulty	SD	Alpha
Mathematics	W	3	42571	43.48	0.76	9.27	0.90
		4	43385	43.07	0.76	9.14	0.90
		5	43277	43.89	0.71	10.29	0.90
		6	43363	45.04	0.73	10.10	0.91
		7	44690	43.39	0.70	10.88	0.91
		8	45654	40.69	0.66	12.08	0.92
		10	47986	35.64	0.64	11.56	0.92
	AA	3	6635	32.27	0.57	11.45	0.92
		4	6583	31.65	0.56	11.31	0.92
		5	6443	32.38	0.52	11.23	0.91
		6	6322	33.13	0.53	11.53	0.91
		7	6284	30.65	0.49	11.58	0.91
		8	6508	27.28	0.44	11.32	0.90
		10	6228	22.07	0.39	9.89	0.88
	H	3	6845	36.75	0.64	10.54	0.91
		4	6756	36.51	0.64	10.31	0.91
		5	6515	36.62	0.59	10.73	0.90
		6	6261	37.93	0.61	10.92	0.91
		7	6318	35.64	0.57	11.32	0.91
		8	5906	32.03	0.52	11.66	0.90
		10	5497	27.01	0.48	10.72	0.90
	A	3	2717	42.07	0.74	10.33	0.92
		4	2649	41.64	0.73	10.14	0.91
		5	2528	42.81	0.69	11.26	0.92
		6	2469	44.07	0.71	11.30	0.93
		7	2534	42.78	0.69	11.82	0.93
		8	2486	40.61	0.66	13.11	0.93
		10	2381	34.07	0.61	12.38	0.93
	AI	3	1002	37.89	0.66	10.36	0.91
		4	1005	37.19	0.65	10.28	0.91
5		990	37.44	0.60	10.87	0.90	
6		1028	38.50	0.62	10.66	0.90	
7		985	36.74	0.59	11.58	0.91	
8		984	32.24	0.52	11.71	0.91	
10		1037	28.23	0.50	11.43	0.91	

Table 8-29  
Raw Score Descriptive Statistics for Language Arts by Race/Ethnicity

Content	Race/Ethnicity	Grade	N Count	Mean	Test Difficulty	SD	Alpha
Language Arts	W	4	43317	19.68	0.66	5.22	0.81
		8	45637	22.24	0.77	5.30	0.86
		10	47881	24.89	0.64	6.65	0.85
	AA	4	6557	14.76	0.49	5.46	0.80
		8	6480	16.70	0.58	6.46	0.88
		10	6114	18.08	0.46	6.59	0.83
	H	4	6724	16.09	0.54	5.38	0.80
		8	5881	18.83	0.65	5.87	0.86
		10	5473	20.59	0.53	6.55	0.83
	A	4	2638	18.58	0.62	5.74	0.84
		8	2483	21.27	0.73	5.69	0.87
		10	2377	23.82	0.61	7.16	0.87
	AI	4	1003	16.63	0.55	5.30	0.79
		8	980	18.92	0.65	6.06	0.87
		10	1034	20.91	0.54	6.91	0.85

Table 8-30  
Raw Score Descriptive Statistics for Social Studies by Race/Ethnicity

Content	Race/Ethnicity	Grade	N Count	Mean	Test Difficulty	SD	Alpha
Social Studies	W	4	43375	28.57	0.79	5.31	0.84
		8	45627	29.64	0.74	6.65	0.87
		10	47869	34.04	0.68	8.65	0.89
	AA	4	6573	22.47	0.62	7.09	0.87
		8	6477	21.93	0.55	7.69	0.87
		10	6111	24.84	0.50	8.96	0.87
	H	4	6740	24.84	0.69	6.20	0.84
		8	5894	25.03	0.63	7.13	0.86
		10	5470	28.41	0.57	8.93	0.88
	A	4	2644	27.30	0.76	5.95	0.86
		8	2485	28.27	0.71	7.14	0.88
		10	2373	32.13	0.64	9.03	0.89
	AI	4	1002	25.57	0.71	5.99	0.84
		8	978	25.64	0.64	7.16	0.86
		10	1031	29.54	0.59	9.11	0.89

Table 8-31  
 Raw Score Descriptive Statistics for Science by Race/Ethnicity

Content	Race/Ethnicity	Grade	N Count	Mean	Test Difficulty	SD	Alpha
Science	W	4	43339	30.04	0.75	6.40	0.86
		8	45623	31.79	0.79	6.04	0.86
		10	47923	33.44	0.67	9.34	0.90
	AA	4	6574	22.48	0.56	7.60	0.87
		8	6492	23.62	0.59	7.74	0.88
		10	6136	22.13	0.44	9.08	0.87
	H	4	6741	25.29	0.63	7.04	0.85
		8	5899	26.79	0.67	7.05	0.86
		10	5474	26.31	0.53	9.42	0.88
	A	4	2643	28.58	0.71	6.98	0.87
		8	2487	29.80	0.74	6.81	0.87
		10	2377	30.98	0.62	10.24	0.91
	AI	4	1003	26.21	0.66	7.03	0.86
		8	981	28.02	0.70	7.18	0.87
		10	1029	27.97	0.56	9.84	0.90

Table 8-32  
Raw Score Descriptive Statistics by Socioeconomic Status

Content	Grade	Economically Disadvantaged					Not Economically Disadvantaged				
		N Count	Mean	Test Difficulty	SD	Alpha	N Count	Mean	Test Difficulty	SD	Alpha
Reading	3	26888	35.83	0.60	13.04	0.94	32749	44.80	0.75	10.33	0.92
	4	26644	33.20	0.56	11.84	0.92	33677	41.88	0.71	10.11	0.91
	5	25957	35.21	0.59	11.26	0.92	33775	43.33	0.72	9.36	0.90
	6	25505	37.53	0.63	11.09	0.91	33889	45.43	0.76	8.77	0.89
	7	25465	34.56	0.58	10.68	0.90	35265	42.30	0.70	8.96	0.88
	8	24974	36.59	0.61	10.37	0.90	36532	43.70	0.73	8.47	0.87
	10	22982	33.47	0.60	10.95	0.91	40160	40.86	0.73	9.30	0.90
Mathematics	3	26995	37.05	0.65	10.94	0.92	32803	44.80	0.79	8.68	0.89
	4	26707	36.67	0.64	10.80	0.92	33698	44.30	0.78	8.61	0.89
	5	25994	36.93	0.60	11.10	0.91	33782	45.36	0.73	9.88	0.90
	6	25541	37.95	0.61	11.35	0.92	33903	46.58	0.75	9.48	0.90
	7	25518	35.77	0.58	11.74	0.91	35294	45.01	0.73	10.35	0.91
	8	25003	32.30	0.52	12.07	0.91	36537	42.42	0.68	11.74	0.92
	10	22984	27.26	0.49	11.23	0.91	40145	36.86	0.66	11.38	0.92
Language Arts	4	26625	16.46	0.55	5.45	0.80	33640	20.37	0.68	5.07	0.80
	8	24929	18.78	0.65	6.14	0.87	36534	22.91	0.79	4.95	0.85
	10	22789	20.47	0.52	6.72	0.84	40090	25.61	0.66	6.50	0.85
Social Studies	4	26674	25.06	0.70	6.48	0.86	33687	29.21	0.81	4.98	0.82
	8	24933	24.91	0.62	7.50	0.87	36530	30.56	0.76	6.23	0.86
	10	22776	28.31	0.57	9.14	0.88	40078	34.89	0.70	8.40	0.88
Science	4	26672	25.68	0.64	7.37	0.87	33655	30.82	0.77	6.08	0.85
	8	24955	27.15	0.68	7.49	0.88	36529	32.47	0.81	5.65	0.85
	10	22832	26.77	0.54	9.87	0.90	40107	34.25	0.68	9.15	0.90

Table 8-33  
Raw Score Descriptive Statistics by Disability

Content	Grade	Disabled					Not Disabled				
		N Count	Mean	Test Difficulty	SD	Alpha	N Count	Mean	Test Difficulty	SD	Alpha
Reading	3	7311	29.85	0.50	13.70	0.94	52326	42.28	0.70	11.48	0.93
	4	7636	26.84	0.45	12.37	0.92	52685	39.67	0.67	10.70	0.91
	5	7687	28.26	0.47	11.72	0.92	52045	41.51	0.69	9.79	0.90
	6	7580	29.59	0.49	11.48	0.91	51814	43.86	0.73	9.12	0.89
	7	7844	27.34	0.46	10.78	0.90	52887	40.79	0.68	9.20	0.88
	8	7799	29.19	0.49	10.52	0.89	53707	42.50	0.71	8.62	0.87
	10	7512	25.65	0.46	10.45	0.90	55631	39.86	0.71	9.36	0.90
Mathematics	3	7319	34.57	0.61	11.53	0.92	52479	42.24	0.74	10.00	0.91
	4	7641	32.73	0.57	11.80	0.93	52764	42.11	0.74	9.57	0.91
	5	7688	32.20	0.52	11.59	0.91	52088	43.10	0.70	10.48	0.91
	6	7582	31.27	0.50	11.96	0.92	51862	44.57	0.72	9.98	0.90
	7	7851	28.39	0.46	11.70	0.91	52962	43.02	0.69	10.67	0.91
	8	7805	25.14	0.41	10.55	0.89	53735	40.22	0.65	12.03	0.92
	10	7494	20.25	0.36	9.22	0.87	55636	35.13	0.63	11.49	0.92
Language Arts	4	7612	14.64	0.49	5.41	0.79	52653	19.22	0.64	5.37	0.82
	8	7765	14.98	0.52	6.06	0.85	53698	22.14	0.76	5.21	0.86
	10	7401	16.12	0.41	5.73	0.78	55479	24.76	0.63	6.55	0.85
Social Studies	4	7635	23.52	0.65	6.95	0.87	52726	27.94	0.78	5.69	0.85
	8	7751	21.07	0.53	7.73	0.87	53712	29.31	0.73	6.64	0.87
	10	7407	23.15	0.46	8.74	0.87	55448	33.76	0.68	8.56	0.88
Science	4	7632	24.03	0.60	7.64	0.87	52695	29.20	0.73	6.83	0.87
	8	7785	23.38	0.58	7.98	0.88	53699	31.31	0.78	6.19	0.86
	10	7433	21.81	0.44	9.15	0.88	55507	32.84	0.66	9.47	0.90

Table 8-34  
Raw Score Descriptive Statistics by English Language Proficiency

Content	Grade	Limited English Proficient					Fully English Proficient				
		N Count	Mean	Test Difficulty	SD	Alpha	N Count	Mean	Test Difficulty	SD	Alpha
Reading	3	4966	32.16	0.54	12.38	0.93	54671	41.54	0.69	12.17	0.94
	4	4333	28.02	0.47	10.31	0.89	55988	38.82	0.66	11.47	0.92
	5	3107	28.87	0.48	9.97	0.88	56625	40.40	0.67	10.73	0.92
	6	2603	29.81	0.50	9.67	0.87	56791	42.60	0.71	10.28	0.91
	7	2986	27.70	0.46	8.70	0.84	57745	39.64	0.66	10.19	0.90
	8	2912	31.00	0.52	9.05	0.85	58594	41.30	0.69	9.71	0.89
	10	1647	24.05	0.43	8.89	0.85	61496	38.55	0.69	10.33	0.91
Mathematics	3	5085	36.11	0.63	10.41	0.91	54713	41.78	0.73	10.38	0.92
	4	4422	34.51	0.61	9.95	0.90	55983	41.43	0.73	10.22	0.92
	5	3171	32.55	0.53	9.85	0.88	56605	42.21	0.68	11.09	0.92
	6	2677	32.41	0.52	10.16	0.89	56767	43.37	0.70	10.98	0.92
	7	3046	30.39	0.49	9.88	0.87	57767	41.70	0.67	11.69	0.92
	8	2976	27.06	0.44	9.57	0.85	58564	38.88	0.63	12.76	0.93
	10	1678	20.06	0.36	8.17	0.83	61452	33.73	0.60	12.12	0.93
Language Arts	4	4385	14.80	0.49	4.87	0.74	55880	18.94	0.63	5.53	0.83
	8	2940	15.78	0.54	5.19	0.79	58523	21.51	0.74	5.72	0.88
	10	1664	15.48	0.40	4.97	0.70	61216	23.97	0.61	6.94	0.86
Social Studies	4	4399	23.51	0.65	6.04	0.82	55962	27.68	0.77	5.94	0.86
	8	2957	21.52	0.54	6.23	0.79	58506	28.61	0.72	7.20	0.88
	10	1665	21.63	0.43	7.15	0.79	61190	32.80	0.66	9.11	0.90
Science	4	4408	23.67	0.59	6.53	0.82	55919	28.93	0.72	7.06	0.88
	8	2966	23.10	0.58	6.38	0.81	58518	30.67	0.77	6.79	0.88
	10	1665	19.40	0.39	6.90	0.78	61275	31.86	0.64	9.95	0.91

Table 8-35  
2013 and 2011 Scale Score Mean and Standard Deviation

Content	Grade	2013 Mean	2011 Mean	Diff = 2013 - 2011 Mean	2013 Standard Deviation	2011 Standard Deviation	Diff = 2013 - 2011 Standard Deviation
Reading	3	457.55	457.00	0.55	40.52	39.29	1.23
	4	477.44	476.93	0.51	50.54	48.54	2.00
	5	481.56	480.98	0.58	48.55	48.17	0.38
	6	504.91	503.97	0.94	50.42	49.89	0.53
	7	517.02	517.78	-0.76	47.93	48.18	-0.25
	8	526.05	525.16	0.89	50.10	49.46	0.64
	10	549.90	548.91	0.99	64.80	64.92	-0.12
Mathematics	3	435.32	436.91	-1.59	48.64	46.39	2.25
	4	472.59	473.29	-0.70	46.80	45.91	0.89
	5	498.17	499.52	-1.35	50.99	50.64	0.35
	6	517.54	517.27	0.27	46.65	45.40	1.25
	7	539.79	539.79	0.00	45.76	45.35	0.41
	8	549.43	548.26	1.17	52.02	49.88	2.14
	10	564.59	562.60	1.99	50.27	50.59	-0.32
Language Arts	4	293.52	294.35	-0.83	31.87	30.12	1.75
	8	396.90	397.89	-0.99	42.63	42.03	0.60
	10	449.59	449.73	-0.14	39.81	41.29	-1.48
Social Studies	4	297.07	297.94	-0.87	27.28	26.91	0.37
	8	396.39	397.08	-0.69	42.74	42.23	0.51
	10	448.51	447.77	0.74	45.58	46.48	-0.90
Science	4	298.84	299.67	-0.83	32.54	31.95	0.59
	8	404.62	405.04	-0.42	43.83	43.27	0.56
	10	452.06	451.03	1.03	49.57	49.80	-0.23

Table 8-36  
Scale Score Descriptive Statistics

<b>Content</b>	<b>Grade</b>	<b>N Count</b>	<b>Mean</b>	<b>SD</b>	<b>Skewness</b>	<b>Kurtosis</b>	<b>Min</b>	<b>Max</b>	<b>LOSS</b>	<b>HOSS</b>
<b>Reading</b>	3	59637	457.55	40.52	-1.09	4.46	270	640	270	640
	4	60321	477.44	50.54	-1.03	2.77	280	650	280	650
	5	59732	481.56	48.55	-0.57	1.76	290	690	290	690
	6	59394	504.91	50.42	-0.65	1.95	300	730	300	730
	7	60731	517.02	47.93	-0.69	1.51	310	780	310	780
	8	61506	526.05	50.10	-0.55	1.88	330	790	330	790
	10	63143	549.90	64.80	-0.40	1.09	350	820	350	820
<b>Mathematics</b>	3	59798	435.32	48.64	-0.11	2.18	220	630	220	630
	4	60405	472.59	46.80	-0.32	1.81	240	650	240	650
	5	59776	498.17	50.99	-0.41	1.60	270	680	270	680
	6	59444	517.54	46.65	-0.43	1.28	310	700	310	700
	7	60815	539.79	45.76	-0.40	1.37	330	710	330	710
	8	61540	549.43	52.02	-0.58	1.87	350	730	350	730
	10	63130	564.59	50.27	-0.52	1.54	410	750	410	750
<b>Language Arts</b>	4	60265	293.52	31.87	-1.35	6.65	140	420	140	420
	8	61463	396.90	42.63	0.22	2.16	250	520	250	520
	10	62880	449.59	39.81	-0.07	1.28	290	630	290	630
<b>Social Studies</b>	4	60361	297.07	27.28	0.17	3.97	170	400	170	400
	8	61463	396.39	42.74	-0.24	1.87	230	530	230	530
	10	62855	448.51	45.58	-0.65	2.48	240	620	240	620
<b>Science</b>	4	60327	298.84	32.54	0.06	2.73	170	440	170	440
	8	61484	404.62	43.83	0.29	3.43	230	560	230	560
	10	62940	452.06	49.57	-0.99	3.47	240	610	240	610

Table 8-37  
Scale Score Descriptive Statistics by Gender

Content	Grade	Male					Female				
		N Count	Mean	SD	Min	Max	N Count	Mean	SD	Min	Max
Reading	3	30483	454.36	41.36	270	640	29150	460.88	39.35	270	640
	4	30942	473.97	52.25	280	650	29374	481.10	48.41	280	650
	5	30654	476.51	49.44	290	690	29055	486.92	46.99	290	690
	6	30266	498.77	51.68	300	730	29127	511.29	48.25	300	730
	7	31160	512.35	49.51	310	695	29571	521.94	45.70	310	780
	8	31470	518.43	50.60	330	790	30034	534.05	48.29	330	790
	10	32120	545.11	66.09	350	820	31019	554.86	63.06	350	820
Mathematics	3	30572	436.68	48.99	220	630	29222	433.90	48.23	220	630
	4	30990	473.85	47.63	240	650	29410	471.27	45.86	240	650
	5	30663	497.16	51.69	270	680	29090	499.28	50.20	270	680
	6	30294	517.26	48.00	310	700	29149	517.83	45.20	310	700
	7	31217	538.32	46.59	330	710	29598	541.34	44.82	330	710
	8	31500	549.50	53.39	350	730	30038	549.36	50.55	350	730
	10	32110	564.91	52.95	410	750	31016	564.28	47.34	410	750
Language Arts	4	30903	289.82	32.61	140	420	29357	297.43	30.60	140	420
	8	31449	390.73	42.89	250	520	30012	403.37	41.37	250	520
	10	31968	442.78	39.94	290	630	30908	456.65	38.43	290	630
Social Studies	4	30962	296.21	28.06	170	400	29394	297.98	26.40	170	400
	8	31438	396.71	46.01	230	530	30023	396.05	39.02	230	530
	10	31955	448.70	49.48	240	620	30896	448.32	41.16	240	620
Science	4	30958	298.80	33.13	170	440	29364	298.88	31.91	170	440
	8	31469	406.41	47.82	230	560	30013	402.76	39.11	230	560
	10	32015	454.61	52.78	240	610	30921	449.44	45.85	240	610

Table 8-38  
Scale Score Descriptive Statistics for Reading by Race/Ethnicity

Content	Race/Ethnicity	Grade	N Count	Mean	SD	Min	Max
Reading	W	3	42513	465.07	36.16	270	640
		4	43376	486.89	45.69	280	650
		5	43282	490.36	44.30	290	690
		6	43367	514.37	45.92	300	730
		7	44666	525.60	44.12	310	780
		8	45648	534.25	46.04	330	790
		10	48007	560.34	59.97	350	820
	AA	3	6627	430.35	45.85	270	584
		4	6581	442.01	55.64	280	619
		5	6443	446.41	52.83	290	682
		6	6333	465.67	55.26	300	679
		7	6275	480.93	51.04	310	655
		8	6523	489.00	55.18	330	682
		10	6236	498.83	67.81	350	820
	H	3	6782	439.06	42.18	270	640
		4	6705	453.14	51.35	280	650
		5	6480	460.29	47.68	290	683
		6	6227	482.35	48.80	300	679
		7	6282	494.33	45.90	310	639
		8	5878	505.41	48.67	330	690
		10	5486	521.88	63.63	350	820
	A	3	2686	457.20	41.36	270	640
		4	2627	478.63	50.10	280	650
		5	2512	481.44	51.00	290	690
		6	2438	502.78	51.02	300	730
		7	2520	516.09	48.64	310	780
		8	2473	527.55	52.28	330	790
		10	2375	546.01	69.93	350	820
AI	3	1001	445.40	43.26	270	584	
	4	1005	462.22	48.39	280	573	
	5	992	466.48	45.38	290	602	
	6	1028	489.26	43.97	300	625	
	7	986	504.66	46.96	310	661	
	8	982	511.39	48.68	330	720	
	10	1038	530.50	60.50	350	737	

Table 8-39  
Scale Score Descriptive Statistics for Mathematics by Race/Ethnicity

Content	Race/Ethnicity	Grade	N Count	Mean	SD	Min	Max
Mathematics	W	3	42571	444.88	44.61	220	630
		4	43385	481.76	42.65	240	650
		5	43277	507.77	46.48	270	680
		6	43363	526.20	42.60	310	700
		7	44692	548.04	42.26	330	710
		8	45654	558.86	46.82	350	730
		10	47986	573.80	45.46	410	750
	AA	3	6635	395.78	51.12	220	630
		4	6583	433.03	49.64	240	650
		5	6443	456.41	54.39	270	680
		6	6322	478.42	48.48	310	700
		7	6284	500.78	46.60	330	704
		8	6508	503.90	55.92	350	730
		10	6228	516.13	52.86	410	689
	H	3	6845	414.91	43.81	220	630
		4	6756	453.22	42.58	240	650
		5	6515	476.25	47.09	270	680
		6	6261	497.39	43.57	310	700
		7	6318	519.70	41.38	330	710
		8	5906	525.89	49.87	350	730
		10	5497	540.87	46.89	410	750
	A	3	2717	439.83	50.04	220	630
		4	2649	476.74	48.20	240	650
		5	2528	504.48	53.65	270	680
		6	2469	524.07	50.18	310	700
		7	2534	547.31	47.15	330	710
		8	2486	560.14	54.86	350	730
		10	2381	569.26	51.27	410	750
AI	3	1002	419.92	42.68	220	630	
	4	1005	456.62	42.89	240	650	
	5	990	479.84	47.87	270	652	
	6	1028	499.80	41.99	310	645	
	7	985	523.68	43.94	330	710	
	8	984	527.21	48.88	350	730	
	10	1037	544.85	47.93	410	689	

Table 8-40  
Scale Score Descriptive Statistics for Language Arts by Race/Ethnicity

Content	Race/Ethnicity	Grade	N Count	Mean	SD	Min	Max
Language Arts	W	4	43317	299.14	28.25	140	420
		8	45637	403.34	40.88	250	520
		10	47881	455.82	37.79	290	630
	AA	4	6557	271.84	38.17	140	420
		8	6480	368.04	42.22	250	520
		10	6114	418.73	38.17	290	573
	H	4	6724	280.03	33.27	140	420
		8	5881	380.71	37.88	250	520
		10	5473	432.16	36.00	290	630
	A	4	2638	293.65	32.92	140	420
		8	2483	398.36	43.78	250	520
		10	2377	450.63	42.11	290	630
	AI	4	1003	284.11	30.46	140	420
		8	980	381.57	40.28	250	520
		10	1034	433.86	38.08	290	598

Table 8-41  
Scale Score Descriptive Statistics for Social Studies by Race/Ethnicity

Content	Race/Ethnicity	Grade	N Count	Mean	SD	Min	Max
Social Studies	W	4	43375	301.96	25.71	170	400
		8	45627	403.82	40.04	230	530
		10	47869	455.80	42.03	240	620
	AA	4	6573	277.37	28.66	170	400
		8	6477	362.52	43.29	230	530
		10	6111	411.02	49.94	240	566
	H	4	6740	286.11	23.94	170	400
		8	5894	378.39	38.60	230	530
		10	5470	429.65	44.15	240	620
	A	4	2644	296.90	27.21	170	400
		8	2485	396.79	42.56	230	530
		10	2373	447.52	44.78	240	620
	AI	4	1002	289.37	23.66	170	400
		8	978	381.22	40.43	230	530
		10	1031	434.77	45.13	240	620

Table 8-42  
Scale Score Descriptive Statistics for Science by Race/Ethnicity

Content	Race/Ethnicity	Grade	N Count	Mean	SD	Min	Max
Science	W	4	43339	305.12	30.20	170	440
		8	45623	412.77	41.02	230	560
		10	47923	461.07	43.81	240	610
	AA	4	6574	273.06	33.05	170	440
		8	6492	368.53	43.52	230	560
		10	6136	405.79	56.86	240	610
	H	4	6741	285.04	29.73	170	440
		8	5899	384.57	38.38	230	560
		10	5474	428.72	50.18	240	610
	A	4	2643	299.29	32.55	170	440
		8	2487	402.29	42.61	230	560
		10	2377	450.38	51.41	240	610
	AI	4	1003	289.01	29.94	170	440
		8	981	391.50	42.57	230	560
		10	1029	436.83	49.49	240	610

Table 8-43  
Scale Score Descriptive Statistics by Socioeconomic Status

Content	Grade	Economically Disadvantaged					Not Economically Disadvantaged				
		N Count	Mean	SD	Min	Max	N Count	Mean	SD	Min	Max
Reading	3	26888	442.44	42.70	270	640	32749	469.95	33.94	270	640
	4	26644	457.67	52.60	280	639	33677	493.07	42.81	280	650
	5	25957	461.61	48.40	290	683	33775	496.90	42.74	290	690
	6	25505	484.05	50.74	300	730	33889	520.60	44.09	300	730
	7	25465	496.87	48.47	310	682	35265	531.57	41.89	310	780
	8	24974	505.25	50.45	330	707	36532	540.27	44.59	330	790
	10	22982	521.63	65.01	350	820	40160	566.07	58.86	350	820
Mathematics	3	26995	416.02	46.74	220	630	32803	451.20	44.22	220	630
	4	26707	453.84	45.62	240	650	33698	487.44	42.16	240	650
	5	25994	476.97	49.90	270	680	33782	514.49	45.53	270	680
	6	25541	497.32	45.89	310	700	33903	532.76	41.10	310	700
	7	25519	519.63	44.08	330	710	35295	554.36	41.20	330	710
	8	25003	526.02	52.14	350	730	36537	565.45	45.46	350	730
	10	22984	540.39	50.21	410	750	40145	578.45	44.76	410	750
Language Arts	4	26625	282.01	33.53	140	420	33640	302.63	27.25	140	420
	8	24929	380.33	40.33	250	520	36534	408.20	40.40	250	520
	10	22789	431.66	37.05	290	630	40090	459.79	37.67	290	630
Social Studies	4	26674	287.19	26.10	170	400	33687	304.89	25.61	170	400
	8	24933	377.73	41.49	230	530	36530	409.12	38.71	230	530
	10	22776	428.62	45.97	240	620	40078	459.81	41.29	240	620
Science	4	26672	286.37	31.28	170	440	33655	308.72	30.03	170	440
	8	24955	386.60	42.11	230	560	36529	416.94	40.59	230	560
	10	22832	429.90	52.44	240	610	40107	464.68	43.03	240	610

Table 8-44  
Scale Score Descriptive Statistics by Disability

Content	Grade	Disabled					Not Disabled				
		N Count	Mean	SD	Min	Max	N Count	Mean	SD	Min	Max
Reading	3	7311	423.03	50.60	270	601	52326	462.37	36.39	270	640
	4	7636	427.30	64.79	280	639	52685	484.70	43.58	280	650
	5	7687	431.95	55.62	290	636	52045	488.89	42.79	290	690
	6	7580	448.49	57.76	300	730	51814	513.16	43.50	300	730
	7	7844	463.75	54.46	310	682	52887	524.92	41.41	310	780
	8	7799	469.92	55.12	330	790	53707	534.21	43.70	330	790
	10	7512	475.99	66.53	350	737	55631	559.88	57.72	350	820
Mathematics	3	7319	405.63	50.89	220	630	52479	439.46	46.84	220	630
	4	7641	436.82	53.03	240	650	52764	477.77	43.45	240	650
	5	7688	454.09	57.66	270	680	52088	504.68	46.52	270	680
	6	7582	469.97	52.30	310	700	51862	524.49	41.42	310	700
	7	7852	491.31	49.66	330	710	52963	546.98	40.49	330	710
	8	7805	493.15	56.89	350	730	53735	557.60	45.86	350	730
	10	7494	506.39	52.34	410	750	55636	572.43	44.51	410	750
Language Arts	4	7612	270.94	38.51	140	420	52653	296.79	29.40	140	420
	8	7765	357.37	40.63	250	520	53698	402.61	39.78	250	520
	10	7401	408.12	34.41	290	598	55479	455.13	37.13	290	630
Social Studies	4	7635	281.33	28.91	170	400	52726	299.34	26.27	170	400
	8	7751	355.78	46.14	230	530	53712	402.25	38.87	230	530
	10	7407	402.48	49.51	240	620	55448	454.66	41.31	240	620
Science	4	7632	279.69	33.22	170	440	52695	301.61	31.49	170	440
	8	7785	366.28	47.00	230	560	53699	410.18	40.44	230	560
	10	7433	404.25	57.91	240	610	55507	458.47	44.61	240	610

Table 8-45  
Scale Score Descriptive Statistics by English Language Proficiency

Content	Grade	Limited English Proficient					Fully English Proficient				
		N Count	Mean	SD	Min	Max	N Count	Mean	SD	Min	Max
Reading	3	4966	431.55	41.90	270	640	54671	459.91	39.56	270	640
	4	4333	438.18	48.65	280	639	55988	480.48	49.40	280	650
	5	3107	436.20	44.52	290	584	56625	484.05	47.52	290	690
	6	2603	451.19	46.73	300	623	56791	507.37	49.20	300	730
	7	2986	467.45	41.57	310	610	57745	519.58	46.83	310	780
	8	2912	478.77	44.08	330	612	58594	528.40	49.21	330	790
	10	1647	465.49	57.77	350	639	61496	552.16	63.46	350	820
Mathematics	3	5085	411.99	42.81	220	630	54713	437.49	48.58	220	630
	4	4422	444.84	40.08	240	650	55983	474.78	46.59	240	650
	5	3171	458.74	45.45	270	680	56605	500.38	50.38	270	680
	6	2677	476.02	42.13	310	605	56767	519.49	45.93	310	700
	7	3046	501.20	37.61	330	638	57769	541.82	45.25	330	710
	8	2976	506.20	48.17	350	661	58564	551.63	51.25	350	730
	10	1678	508.69	47.49	410	652	61452	566.12	49.47	410	750
Language Arts	4	4385	273.02	33.26	140	371	55880	295.13	31.20	140	420
	8	2940	362.70	32.32	250	520	58523	398.62	42.36	250	520
	10	1664	404.50	32.11	290	526	61216	450.82	39.29	290	630
Social Studies	4	4399	280.94	21.89	170	400	55962	298.33	27.26	170	400
	8	2957	360.48	33.39	230	530	58506	398.20	42.36	230	530
	10	1665	396.72	41.74	240	546	61190	449.92	44.85	240	620
Science	4	4408	278.32	26.57	170	440	55919	300.45	32.42	170	440
	8	2966	365.83	34.52	230	560	58518	406.59	43.33	230	560
	10	1665	393.23	52.64	240	583	61275	453.66	48.49	240	610

Table 8-46  
Performance Level Cut Scores for all Contents\*

Content	3			4			5			6			7			8			10		
	B	P	A	B	P	A	B	P	A	B	P	A	B	P	A	B	P	A	B	P	A
<b>Reading</b>	445	475	507	462	498	536	464	503	546	479	525	573	486	535	590	493	548	613	496	566	644
<b>Mathematics</b>	388	438	492	425	474	526	449	501	553	475	524	573	500	544	591	510	558	605	528	574	618
<b>Language Arts</b>				252	277	308										358	385	418	393	428	484
<b>Social Studies</b>				242	263	288										334	364	403	408	420	455
<b>Science</b>				249	279	320										349	375	419	411	429	466

\*The abbreviation “B” is for the Basic performance level, “P” is for the Proficient level, and “A” is for the Advanced level.

Table 8-47  
 Percentage of Students in Each Performance Level by Sub-Group (Reading)

Grade	Proficiency Level	Examinees		Gender		Race/Ethnicity					ELP		Disability		SES	
		N	%	Female	Male	White	African American	Hispanic	Asian	American Indian	Fully English Proficient	Limited English Proficient	Disabled	Not Disabled	Economically Disadvantaged	Not Economically Disadvantaged
3	M	18541	31.09	28.27	33.78	23.08	58.74	51.56	33.51	41.56	28.43	60.37	65.18	26.33	46.58	18.37
	B	20600	34.54	34.80	34.30	36.05	28.26	31.57	32.73	37.46	35.04	29.10	22.30	36.25	33.26	35.59
	P	16340	27.40	28.76	26.10	32.28	11.39	14.60	25.87	17.58	29.02	9.59	10.66	29.74	17.28	35.71
	A	4156	6.97	8.17	5.82	8.59	1.60	2.27	7.89	3.40	7.52	0.95	1.87	7.68	2.88	10.32
<b>Total</b>		59637	100.00	29150	30483	42513	6627	6782	2686	1001	54671	4966	7311	52326	26888	32749
4	M	19191	31.82	29.30	34.19	23.73	60.98	52.75	33.73	43.68	28.99	68.31	69.07	26.42	47.97	19.03
	B	19343	32.07	32.73	31.45	33.12	26.38	30.65	31.71	34.83	32.56	25.69	19.26	33.92	31.33	32.65
	P	16558	27.45	28.27	26.67	32.49	10.80	14.09	23.64	18.61	29.17	5.29	9.57	30.04	17.41	35.40
	A	5229	8.67	9.70	7.70	10.66	1.84	2.51	10.93	2.89	9.28	0.72	2.10	9.62	3.29	12.92
<b>Total</b>		60321	100.00	29374	30942	43376	6581	6705	2627	1005	55988	4333	7636	52685	26644	33677
5	M	18793	31.46	27.90	34.81	23.91	60.47	49.54	35.23	44.05	29.11	74.28	71.89	25.49	47.96	18.79
	B	20996	35.15	34.92	35.38	36.63	27.61	34.10	31.93	34.98	35.91	21.24	19.60	37.45	34.17	35.91
	P	15614	26.14	28.33	24.08	30.71	10.40	13.94	22.57	18.04	27.35	4.15	6.99	28.97	15.41	34.39
	A	4329	7.25	8.85	5.74	8.75	1.52	2.42	10.27	2.92	7.63	0.32	1.52	8.09	2.47	10.92
<b>Total</b>		59732	100.00	29055	30654	43282	6443	6480	2512	992	56625	3107	7687	52045	25957	33775

Table 8-47 Cont'd  
 Percentage of Students in Each Performance Level by Sub-Group (Reading)

Grade	Proficiency Level	Examinees		Gender		Race/Ethnicity					ELP		Disability		SES	
		N	%	Female	Male	White	African-American	Hispanic	Asian	American Indian	Fully English Proficient	Limited English Proficient	Disabled	Not Disabled	Economically Disadvantaged	Not Economically Disadvantaged
6	M	15290	25.74	21.75	29.58	18.42	57.19	41.87	28.79	35.89	23.58	72.88	69.53	19.34	40.78	14.43
	B	22556	37.98	37.62	38.32	38.71	29.88	40.45	36.83	44.55	38.62	24.05	23.05	40.16	39.15	37.09
	P	18063	30.41	33.17	27.76	35.61	11.80	16.16	27.89	18.09	31.68	2.84	6.69	33.88	18.15	39.64
	A	3485	5.87	7.46	4.33	7.25	1.14	1.53	6.48	1.46	6.13	0.23	0.74	6.62	1.92	8.84
<b>Total</b>		59394	100.00	29127	30266	43367	6333	6227	2438	1028	56791	2603	7580	51814	25505	33889
7	M	13676	22.52	19.29	25.58	15.95	50.79	38.83	24.92	30.02	20.29	65.61	64.98	16.22	36.89	12.14
	B	23947	39.43	39.63	39.24	39.18	36.30	43.25	40.60	43.20	39.83	31.68	26.25	41.39	41.54	37.91
	P	20629	33.97	35.96	32.07	39.87	12.25	17.16	28.49	25.86	35.59	2.68	8.21	37.79	20.37	43.79
	A	2479	4.08	5.11	3.11	4.99	0.65	0.76	5.99	0.91	4.29	0.03	0.56	4.60	1.19	6.17
<b>Total</b>		60731	100.00	29571	31160	44666	6275	6282	2520	986	57745	2986	7844	52887	25465	35265
8	M	13263	21.56	16.96	25.95	15.49	49.95	35.42	22.24	30.35	19.66	59.79	65.25	15.22	35.43	12.08
	B	27568	44.82	43.97	45.64	45.55	37.45	47.19	44.16	47.56	45.20	37.29	28.90	47.13	46.24	43.85
	P	18951	30.81	35.06	26.76	35.63	11.94	16.47	29.60	21.18	32.20	2.92	5.64	34.47	17.47	39.93
	A	1724	2.80	4.01	1.66	3.33	0.66	0.92	4.00	0.92	2.94	0.00	0.21	3.18	0.86	4.13
<b>Total</b>		61506	100.00	30034	31470	45648	6523	5878	2473	982	58594	2912	7799	53707	24974	36532

Table 8-47 Cont'd  
 Percentage of Students in Each Performance Level by Sub-Group (Reading)

Grade	Proficiency Level	Examinees		Gender		Race/Ethnicity					ELP		Disability		SES	
		N	%	Female	Male	White	African-American	Hispanic	Asian	American Indian	Fully English Proficient	Limited English Proficient	Disabled	Not Disabled	Economically Disadvantaged	Not Economically Disadvantaged
10	M	10982	17.39	15.03	19.67	12.09	44.15	30.62	20.21	25.43	16.02	68.49	60.58	11.56	30.53	9.87
	B	25383	40.20	40.63	39.78	39.37	40.28	45.53	41.39	46.92	40.51	28.48	31.20	41.41	44.47	37.75
	P	23494	37.21	38.21	36.25	42.38	14.79	22.27	31.33	25.24	38.12	3.04	7.75	41.19	23.19	45.23
	A	3284	5.20	6.13	4.30	6.16	0.79	1.57	7.07	2.41	5.34	0.00	0.47	5.84	1.81	7.14
<b>Total</b>		63143	100.00	31019	32120	48007	6236	5486	2375	1038	61496	1647	7512	55631	22982	40160

Table 8-48  
 Percentage of Students in Each Performance Level by Sub-Group (Mathematics)

Grade	Proficiency Level	Examinees		Gender		Race/Ethnicity					ELP		Disability		SES	
		N	%	Female	Male	White	African-American	Hispanic	Asian	American Indian	Fully English Proficient	Limited English Proficient	Disabled	Not Disabled	Economically Disadvantaged	Not Economically Disadvantaged
3	M	8623	14.42	14.84	14.01	8.69	40.54	24.41	12.55	20.76	13.32	26.29	34.12	11.67	24.35	6.25
	B	21254	35.54	36.51	34.62	32.85	40.39	45.73	36.25	46.21	34.49	46.92	40.29	34.88	43.15	29.28
	P	24481	40.94	40.16	41.69	47.29	17.35	26.85	39.38	28.84	42.48	24.33	22.34	43.53	29.09	50.69
	A	5440	9.10	8.49	9.68	11.17	1.72	3.01	11.81	4.19	9.71	2.46	3.25	9.91	3.40	13.78
<b>Total</b>		59798	100.00	29222	30572	42571	6635	6845	2717	1002	54713	5085	7319	52479	26995	32803
4	M	8389	13.89	14.34	13.45	8.30	40.95	22.63	12.12	22.19	12.78	27.97	39.37	10.20	23.78	6.05
	B	20680	34.24	35.37	33.17	31.55	38.48	45.66	34.81	44.28	33.07	48.96	36.47	33.91	41.94	28.13
	P	25181	41.69	40.97	42.37	47.66	18.91	28.39	39.56	29.15	43.28	21.53	20.80	44.71	30.22	50.77
	A	6155	10.19	9.33	11.01	12.49	1.66	3.32	13.51	4.38	10.87	1.54	3.36	11.18	4.06	15.05
<b>Total</b>		60405	100.00	29410	30990	43385	6583	6756	2649	1005	55983	4422	7641	52764	26707	33698
5	M	8779	14.69	14.05	15.25	9.20	40.49	24.97	12.62	23.13	13.44	37.02	42.75	10.54	24.98	6.77
	B	20735	34.69	34.74	34.64	32.18	39.56	45.60	33.70	43.23	33.99	47.18	37.21	34.32	42.61	28.59
	P	23182	38.78	39.08	38.52	44.25	17.66	25.28	38.01	28.99	40.15	14.38	17.17	41.97	28.06	47.03
	A	7080	11.84	12.12	11.59	14.37	2.28	4.14	15.66	4.65	12.43	1.42	2.86	13.17	4.35	17.61
<b>Total</b>		59776	100.00	29090	30663	43277	6443	6515	2528	990	56605	3171	7688	52088	25994	33782

Table 8-48 Cont'd  
 Percentage of Students in Each Performance Level by Sub-Group (Mathematics)

Grade	Proficiency Level	Examinees		Gender		Race/Ethnicity					ELP		Disability		SES	
		N	%	Female	Male	White	African-American	Hispanic	Asian	American Indian	Fully English Proficient	Limited English Proficient	Disabled	Not Disabled	Economically Disadvantaged	Not Economically Disadvantaged
6	M	9499	15.98	15.25	16.68	10.20	44.73	26.53	13.49	24.42	14.63	44.56	52.22	10.68	27.63	7.20
	B	22005	37.02	38.41	35.68	35.22	38.22	47.09	35.60	47.47	36.63	45.24	33.25	37.57	43.83	31.89
	P	22115	37.20	36.85	37.55	42.71	15.64	23.24	36.25	25.00	38.51	9.45	12.79	40.77	25.31	46.16
	A	5825	9.80	9.49	10.10	11.86	1.41	3.15	14.66	3.11	10.23	0.75	1.74	10.98	3.23	14.75
<b>Total</b>		59444	100.00	29149	30294	43363	6322	6261	2469	1028	56767	2677	7582	51862	25541	33903
7	M	10306	16.95	15.68	18.14	11.13	45.83	29.01	13.85	26.90	15.47	44.91	56.58	11.07	29.14	8.13
	B	21295	35.02	35.66	34.40	33.14	38.72	44.14	33.66	41.32	34.50	44.75	30.40	35.70	41.93	30.02
	P	21954	36.10	36.36	35.85	41.42	13.38	23.08	34.73	26.50	37.50	9.62	11.18	39.79	24.88	44.21
	A	7260	11.94	12.29	11.60	14.30	2.07	3.77	17.76	5.28	12.53	0.72	1.83	13.44	4.06	17.63
<b>Total</b>		60815	100.00	29598	31217	44692	6284	6318	2534	985	57769	3046	7852	52963	25519	35295
8	M	11466	18.63	18.26	18.98	12.35	50.54	31.73	14.72	30.18	17.18	47.11	59.33	12.72	32.35	9.25
	B	21630	35.15	36.33	34.02	34.01	34.67	43.67	33.07	45.22	34.77	42.67	30.26	35.86	40.92	31.20
	P	21351	34.70	34.30	35.07	39.86	12.75	21.22	34.59	21.24	35.97	9.51	9.20	38.40	22.75	42.87
	A	7093	11.53	11.11	11.93	13.78	2.04	3.39	17.62	3.35	12.08	0.71	1.20	13.03	3.98	16.69
<b>Total</b>		61540	100.00	30038	31500	45654	6508	5906	2486	984	58564	2976	7805	53735	25003	36537

Table 8-48 Cont'd  
 Percentage of Students in Each Performance Level by Sub-Group (Mathematics)

Grade	Proficiency Level	Examinees		Gender		Race/Ethnicity					ELP		Disability		SES	
		N	%	Female	Male	White	African-American	Hispanic	Asian	American Indian	Fully English Proficient	Limited English Proficient	Disabled	Not Disabled	Economically Disadvantaged	Not Economically Disadvantaged
10	M	11910	18.87	17.72	19.97	12.58	53.55	32.69	17.22	31.92	17.69	61.80	64.37	12.74	33.77	10.33
	B	22365	35.43	37.55	33.38	34.37	34.57	44.42	36.29	39.63	35.50	32.66	27.42	36.51	41.21	32.11
	P	21654	34.30	34.79	33.83	39.37	10.60	20.03	31.58	24.01	35.10	4.95	7.01	37.98	21.51	41.63
	A	7201	11.41	9.95	12.82	13.68	1.28	2.86	14.91	4.44	11.70	0.60	1.20	12.78	3.51	15.93
<b>Total</b>		63130	100.00	31016	32110	47986	6228	5497	2381	1037	61452	1678	7494	55636	22984	40145

Table 8-49  
 Percentage of Students in Each Performance Level by Sub-Group (Language Arts)

Grade	Proficiency Level	Examinees		Gender		Race/Ethnicity					ELP		Disability		SES	
		N	%	Female	Male	White	African-American	Hispanic	Asian	American Indian	Fully English Proficient	Limited English Proficient	Disabled	Not Disabled	Economically Disadvantaged	Not Economically Disadvantaged
4	M	3548	5.89	4.52	7.18	3.22	16.85	11.60	6.71	8.08	5.17	15.03	19.09	3.98	10.40	2.32
	B	10435	17.32	15.04	19.47	13.08	32.90	27.74	17.48	27.42	16.09	32.98	32.24	15.16	25.83	10.58
	P	26983	44.77	43.46	46.03	45.69	38.83	45.14	43.63	45.26	44.80	44.47	38.03	45.75	45.68	44.05
	A	19299	32.02	36.98	27.32	38.01	11.42	15.53	32.18	19.24	33.95	7.53	10.64	35.11	18.09	43.05
<b>Total</b>		60265	100.00	29357	30903	43317	6557	6724	2638	1003	55880	4385	7612	52653	26625	33640
8	M	8519	13.86	9.76	17.77	9.57	36.42	21.56	12.04	22.55	12.79	35.24	46.94	9.08	23.78	7.09
	B	13800	22.45	20.09	24.71	19.86	29.57	32.39	24.89	30.20	21.40	43.40	31.38	21.16	29.65	17.54
	P	23025	37.46	39.12	35.88	39.72	25.14	34.16	37.54	33.47	38.35	19.83	17.19	40.39	33.33	40.28
	A	16119	26.23	31.03	21.64	30.84	8.87	11.89	25.53	13.78	27.47	1.53	4.48	29.37	13.25	35.08
<b>Total</b>		61463	100.00	30012	31449	45637	6480	5881	2483	980	58523	2940	7765	53698	24929	36534
10	M	4229	6.73	3.87	9.48	4.34	20.58	11.11	6.06	13.44	6.13	28.55	29.56	3.68	12.50	3.44
	B	13422	21.35	17.72	24.85	17.25	40.58	33.36	22.55	30.75	20.52	51.68	45.24	18.16	32.76	14.86
	P	33700	53.59	55.85	51.42	56.86	34.59	48.58	51.28	46.32	54.53	19.29	23.47	57.61	47.49	57.06
	A	11529	18.34	22.57	14.25	21.54	4.25	6.94	20.11	9.48	18.82	0.48	1.73	20.55	7.24	24.64
<b>Total</b>		62880	100.00	30908	31968	47881	6114	5473	2377	1034	61216	1664	7401	55479	22789	40090

Table 8-50  
 Percentage of Students in Each Performance Level by Sub-Group (Social Studies)

Grade	Proficiency Level	Examinees		Gender		Race/Ethnicity					ELP		Disability		SES	
		N	%	Female	Male	White	African-American	Hispanic	Asian	American Indian	Fully English Proficient	Limited English Proficient	Disabled	Not Disabled	Economically Disadvantaged	Not Economically Disadvantaged
4	M	1154	1.91	1.53	2.27	0.85	8.17	2.88	1.40	1.50	1.80	3.39	6.27	1.28	3.58	0.59
	B	3232	5.35	4.74	5.94	3.15	15.24	9.38	5.56	7.88	4.80	12.46	12.81	4.27	9.19	2.32
	P	15581	25.81	25.28	26.31	21.09	40.74	38.96	27.61	38.72	24.26	45.62	39.79	23.79	36.10	17.67
	A	40394	66.92	68.45	65.48	74.91	35.84	48.78	65.43	51.90	69.15	38.53	41.13	70.66	51.13	79.43
<b>Total</b>		60361	100.00	29394	30962	43375	6573	6740	2644	1002	55962	4399	7635	52726	26674	33687
8	M	3566	5.80	4.62	6.93	3.35	19.90	9.40	4.67	8.08	5.30	15.76	25.22	3.00	11.05	2.22
	B	8044	13.09	12.88	13.28	9.57	28.55	21.63	13.64	21.88	12.05	33.65	31.18	10.48	21.64	7.25
	P	22714	36.96	39.82	34.22	35.74	36.54	44.59	39.92	42.94	36.59	44.27	31.03	37.81	41.99	33.52
	A	27139	44.16	42.68	45.56	51.34	15.01	24.38	41.77	27.10	46.07	6.32	12.57	48.71	25.31	57.02
<b>Total</b>		61463	100.00	30023	31438	45627	6477	5894	2485	978	58506	2957	7751	53712	24933	36530
10	M	9770	15.54	13.50	17.52	10.73	41.61	26.91	15.30	24.93	14.35	59.58	52.83	10.56	27.69	8.64
	B	4144	6.59	7.00	6.20	5.55	10.91	10.07	7.59	8.44	6.46	11.41	11.49	5.94	9.79	4.78
	P	19325	30.75	33.93	27.66	30.03	30.39	35.72	33.71	32.98	30.93	23.96	23.28	31.74	33.96	28.92
	A	29616	47.12	45.57	48.62	53.69	17.08	27.29	43.40	33.66	48.26	5.05	12.41	51.75	28.56	57.66
<b>Total</b>		62855	100.00	30896	31955	47869	6111	5470	2373	1031	61190	1665	7407	55448	22776	40078

Table 8-51  
 Percentage of Students in Each Performance Level by Sub-Group (Science)

Grade	Proficiency Level	Examinees		Gender		Race/Ethnicity					ELP		Disability		SES	
		N	%	Female	Male	White	African-American	Hispanic	Asian	American Indian	Fully English Proficient	Limited English Proficient	Disabled	Not Disabled	Economically Disadvantaged	Not Economically Disadvantaged
4	M	3126	5.18	5.02	5.34	2.59	19.14	8.29	4.58	5.78	4.78	10.32	13.44	3.99	9.19	2.01
	B	11101	18.40	18.26	18.53	13.55	35.78	31.11	17.97	29.21	16.89	37.57	34.33	16.09	28.19	10.64
	P	31921	52.91	53.32	52.54	55.17	39.35	51.00	54.63	53.34	53.27	48.34	42.77	54.38	50.84	54.56
	A	14179	23.50	23.41	23.60	28.69	5.73	9.60	22.81	11.67	25.06	3.77	9.46	25.54	11.78	32.79
<b>Total</b>		60327	100.00	29364	30958	43339	6574	6741	2643	1003	55919	4408	7632	52695	26672	33655
8	M	4580	7.45	6.40	8.45	3.98	26.05	13.38	7.08	11.01	6.62	23.74	29.71	4.22	14.21	2.83
	B	7257	11.80	12.42	11.22	8.24	26.02	21.48	14.68	18.14	10.70	33.55	25.51	9.82	19.33	6.66
	P	29000	47.17	51.00	43.51	47.60	39.42	51.45	48.41	49.54	47.54	39.82	35.02	48.93	48.48	46.27
	A	20647	33.58	30.18	36.82	40.19	8.52	13.70	29.84	21.30	35.14	2.90	9.76	37.03	17.98	44.24
<b>Total</b>		61484	100.00	30013	31469	45623	6492	5899	2487	981	58518	2966	7785	53699	24955	36529
10	M	9802	15.57	15.48	15.66	9.69	48.53	28.48	16.20	23.13	14.38	59.64	50.22	10.93	28.58	8.17
	B	6493	10.32	11.25	9.41	8.76	15.60	16.39	11.91	15.06	10.10	18.38	16.86	9.44	14.58	7.89
	P	21199	33.68	36.51	30.96	34.40	25.49	35.62	35.68	34.31	34.08	19.04	22.31	35.20	34.28	33.34
	A	25446	40.43	36.76	43.98	47.15	10.38	19.51	36.22	27.50	41.45	2.94	10.61	44.42	22.56	50.60
<b>Total</b>		62940	100.00	30921	32015	47923	6136	5474	2377	1029	61275	1665	7433	55507	22832	40107

Table 8-52  
Cut Scores and Associated Impact Data for WKCE-CRT Reading

Grade	Score Range				Impact Data				
	Minimal	Basic	Proficient	Advanced	Minimal	Basic	Proficient	Advanced	Proficient +Advanced
3	270-444	445-474	475-506	507-640	31.09	34.54	27.40	6.97	34.37
4	280-461	462-497	498-535	536-650	31.81	32.07	27.45	8.67	36.12
5	290-463	464-502	503-545	546-690	31.46	35.15	26.14	7.25	33.39
6	300-478	479-524	525-572	573-730	25.74	37.98	30.41	5.87	36.28
7	310-485	486-534	535-589	590-780	22.52	39.43	33.97	4.08	38.05
8	330-492	493-547	548-612	613-790	21.56	44.82	30.81	2.80	33.61
10	350-495	496-565	566-643	644-820	17.39	40.20	37.21	5.20	42.41

Table 8-53  
Cut Scores and Associated Impact Data for WKCE-CRT Mathematics

Grade	Score Range				Impact Data				
	Minimal	Basic	Proficient	Advanced	Minimal	Basic	Proficient	Advanced	Proficient +Advanced
3	220-387	388-437	438-491	492-630	14.42	35.54	40.94	9.10	50.04
4	240-424	425-473	474-525	526-650	13.89	34.24	41.69	10.19	51.88
5	270-448	449-500	501-552	553-680	14.69	34.69	38.78	11.84	50.63
6	310-474	475-523	524-572	573-700	15.98	37.02	37.20	9.80	47.00
7	330-499	500-543	544-590	591-710	16.95	35.02	36.10	11.94	48.04
8	350-509	510-557	558-604	605-730	18.63	35.15	34.69	11.53	46.22
10	410-527	528-573	574-617	618-750	18.87	35.43	34.30	11.41	45.71

Table 8-54  
Cut Scores and Associated Impact Data for WKCE-CRT Language Arts

Grade	Score Range				Impact Data				
	Minimal	Basic	Proficient	Advanced	Minimal	Basic	Proficient	Advanced	Proficient +Advanced
4	140-251	252-276	277-307	308-420	5.89	17.32	44.77	32.02	76.80
8	250-357	358-384	385-417	418-520	13.86	22.45	37.46	26.23	63.69
10	290-392	393-427	428-483	484-630	6.73	21.35	53.59	18.33	71.93

Table 8-55  
Cut Scores and Associated Impact Data for WKCE-CRT Social Studies

Grade	Score Range				Impact Data				
	Minimal	Basic	Proficient	Advanced	Minimal	Basic	Proficient	Advanced	Proficient +Advanced
4	170-241	242-262	263-287	288-400	1.91	5.35	25.81	66.92	92.73
8	230-333	334-363	364-402	403-530	5.80	13.09	36.96	44.16	81.11
10	240-407	408-419	420-454	455-620	15.54	6.59	30.75	47.12	77.86

Table 8-56  
 Cut Scores and Associated Impact Data for WKCE-CRT Science

Grade	Score Range				Impact Data				
	Minimal	Basic	Proficient	Advanced	Minimal	Basic	Proficient	Advanced	Proficient +Advanced
4	170-248	249-278	279-319	320-440	5.18	18.40	52.91	23.50	76.42
8	230-348	349-374	375-418	419-560	7.45	11.80	47.17	33.58	80.75
10	240-410	411-428	429-465	466-610	15.57	10.32	33.68	40.43	74.11

Table 8-57  
Summary Statistics for Reading Content Standards Raw and SPI Scores

Grade	N	Content Standard	Standard	No. of Items		Total Score Points	Mean	Mean <i>p</i> -value	SD	SPI	
				MC	CR					Mean	SD
3	59637	1	Determines Meaning	12	0	12	8.52	0.71	2.80	70.38	21.06
	59637	2	Understands Text	20	0	20	14.98	0.75	4.61	74.93	22.43
	59637	3	Analyzes Text	18	1	21	13.99	0.67	4.62	67.12	20.77
	59637	4	Evaluates/Extends Text	4	1	7	3.27	0.47	1.66	46.82	18.32
4	60321	1	Determines Meaning	11	0	11	7.27	0.66	2.49	66.24	20.45
	60321	2	Understands Text	19	0	19	12.98	0.68	4.22	68.53	20.74
	60321	3	Analyzes Text	18	1	21	13.11	0.62	4.41	62.23	19.73
	60321	4	Evaluates/Extends Text	5	1	8	4.68	0.59	1.88	59.04	19.62
5	59732	1	Determines Meaning	11	0	11	8.22	0.75	2.43	74.14	19.80
	59732	2	Understands Text	17	0	17	12.01	0.71	3.45	70.83	18.72
	59732	3	Analyzes Text	18	2	24	14.66	0.61	4.34	61.59	17.01
	59732	4	Evaluates/Extends Text	8	0	8	4.91	0.61	2.03	61.82	21.10
6	59394	1	Determines Meaning	10	0	10	6.75	0.68	2.17	67.32	18.36
	59394	2	Understands Text	14	0	14	10.51	0.75	2.81	75.66	18.18
	59394	3	Analyzes Text	19	1	22	15.53	0.71	3.91	70.43	16.79
	59394	4	Evaluates/Extends Text	11	1	14	9.25	0.66	2.98	65.59	18.62
7	60731	1	Determines Meaning	10	0	10	6.66	0.67	2.33	65.04	20.15
	60731	2	Understands Text	14	0	14	10.54	0.75	2.77	75.02	17.94
	60731	3	Analyzes Text	19	1	22	14.08	0.64	4.18	64.45	17.72
	60731	4	Evaluates/Extends Text	11	1	14	7.78	0.56	2.53	56.93	16.02
8	61506	1	Determines Meaning	10	0	10	7.55	0.76	2.03	74.66	17.65
	61506	2	Understands Text	14	0	14	10.25	0.73	2.79	73.56	17.73
	61506	3	Analyzes Text	19	1	22	13.88	0.63	3.74	64.28	15.44
	61506	4	Evaluates/Extends Text	11	1	14	9.13	0.65	2.71	64.91	16.95

Table 8-57 Cont'd  
 Summary Statistics for Reading Content Standards Raw and SPI Scores

Grade	N	Content Standard	Standard	No. of Items		Total Score Points	Mean	Mean <i>p</i> -value	SD	SPI	
				MC	CR					Mean	SD
10	63143	1	Determines Meaning	7	0	7	5.92	0.85	1.35	83.50	16.66
	63143	2	Understands Text	7	0	7	4.63	0.66	1.71	66.37	19.36
	63143	3	Analyzes Text	22	1	25	16.69	0.67	5.14	66.77	19.52
	63143	4	Evaluates/Extends Text	14	1	17	10.93	0.64	3.52	65.00	19.34

Table 8-58  
Summary Statistics for Mathematics Content Standards Raw and SPI Scores

Grade	N	Content Standard	Standard	No. of Items		Total Score Points	Mean	Mean <i>p</i> -value	SD	SPI	
				MC	CR					Mean	SD
3	59798	A	Mathematical Processes	3	3	9	5.10	0.57	2.32	57.13	21.80
	59798	B	Number Operations	11	1	12	9.40	0.78	2.58	78.04	20.08
	59798	C	Geometry	9	2	11	8.84	0.80	1.95	81.05	15.32
	59798	D	Measurement	8	0	8	6.12	0.76	1.70	74.87	18.14
	59798	E	Statistics/Probability	8	0	8	5.25	0.66	2.11	65.69	22.56
	59798	F	Algebraic Relationships	7	1	9	6.59	0.73	1.97	73.35	18.46
4	60405	A	Mathematical Processes	3	3	9	4.58	0.51	2.24	52.15	21.56
	60405	B	Number Operations	11	0	11	8.58	0.78	2.25	77.86	18.34
	60405	C	Geometry	9	1	10	7.92	0.79	1.89	79.77	15.49
	60405	D	Measurement	8	1	9	6.90	0.77	1.83	76.07	17.87
	60405	E	Statistics/Probability	7	1	8	5.77	0.72	1.90	70.85	20.23
	60405	F	Algebraic Relationships	8	1	10	7.18	0.72	2.27	72.77	19.70
5	59776	A	Mathematical Processes	3	3	9	5.80	0.64	2.06	64.34	19.14
	59776	B	Number Operations	11	0	11	8.48	0.77	2.28	74.77	19.21
	59776	C	Geometry	9	1	11	7.27	0.66	2.13	68.24	14.51
	59776	D	Measurement	9	1	10	7.21	0.72	2.10	72.64	18.11
	59776	E	Statistics/Probability	9	1	10	5.77	0.58	2.42	59.27	20.67
	59776	F	Algebraic Relationships	10	1	11	7.16	0.65	2.59	65.21	20.94

Table 8-58 Cont'd  
 Summary Statistics for Mathematics Content Standards Raw and SPI Scores

Grade	N	Content Standard	Standard	No. of Items		Total Score Points	Mean	Mean <i>p</i> -value	SD	SPI	
				MC	CR					Mean	SD
6	59444	A	Mathematical Processes	3	3	9	4.94	0.55	2.13	55.93	20.49
	59444	B	Number Operations	12	0	12	9.51	0.79	2.32	78.81	17.55
	59444	C	Geometry	9	1	10	7.97	0.80	1.75	77.39	13.63
	59444	D	Measurement	9	1	10	6.41	0.64	2.42	64.92	20.76
	59444	E	Statistics/Probability	8	1	10	6.11	0.61	2.41	63.36	19.28
	59444	F	Algebraic Relationships	10	1	11	7.92	0.72	2.41	71.89	19.72
7	60813	A	Mathematical Processes	3	3	9	5.17	0.57	2.27	58.29	22.31
	60813	B	Number Operations	12	0	12	8.74	0.73	2.70	72.99	20.46
	60813	C	Geometry	10	2	12	8.06	0.67	2.55	66.73	18.32
	60813	D	Measurement	9	0	9	5.72	0.64	2.03	64.00	19.22
	60813	E	Statistics/Probability	8	1	10	5.79	0.58	2.28	59.11	18.85
	60813	F	Algebraic Relationships	9	1	10	7.64	0.76	2.24	75.56	19.85
8	61540	A	Mathematical Processes	3	3	9	5.75	0.64	2.49	63.98	24.74
	61540	B	Number Operations	7	0	7	4.24	0.61	1.84	61.68	22.03
	61540	C	Geometry	8	1	9	5.26	0.58	2.10	57.56	19.43
	61540	D	Measurement	11	1	12	7.84	0.65	2.86	65.64	21.62
	61540	E	Statistics/Probability	8	1	10	4.92	0.49	2.65	48.99	23.24
	61540	F	Algebraic Relationships	14	1	15	10.30	0.69	3.15	68.70	19.09
10	63130	A	Mathematical Processes	6	1	8	5.13	0.64	2.00	64.59	21.81
	63130	B	Number Operations	7	0	7	4.20	0.60	1.88	60.00	22.41
	63130	C	Geometry	8	1	10	5.66	0.57	2.57	56.21	22.42
	63130	D	Measurement	9	1	11	6.50	0.59	2.82	59.39	23.49
	63130	E	Statistics/Probability	8	0	8	4.42	0.55	1.95	55.44	20.08
	63130	F	Algebraic Relationships	10	1	12	7.46	0.62	3.07	62.11	23.33

Table 8-59  
 Summary Statistics for Language Arts Content Standards Raw and SPI Scores

Grade	N	Content Standard	Standard	No. of Items		Total Score Points	Mean	Mean <i>p</i> -value	SD	SPI	
				MC	CR					Mean	SD
4	60265	B	Writing	20	0	20	12.95	0.65	3.80	64.99	18.11
	60265	D	Language	4	0	4	2.37	0.59	1.11	58.74	18.70
	60265	F	Research and Inquiry	6	0	6	3.32	0.55	1.61	56.15	20.90
8	61463	B	Writing	17	0	17	13.15	0.77	3.44	77.40	19.62
	61463	D	Language	6	0	6	4.20	0.70	1.55	69.50	22.49
	61463	F	Research and Inquiry	6	0	6	3.89	0.65	1.62	65.15	20.80
10	62880	B	Writing	15	2	24	14.75	0.61	4.00	60.96	15.91
	62880	D	Language	9	0	9	5.35	0.59	2.32	61.78	22.70
	62880	F	Research and Inquiry	6	0	6	3.65	0.61	1.60	59.55	20.62

Table 8-60  
Summary Statistics for Social Studies Content Standards Raw and SPI Scores

Grade	N	Content Standard	Standard	No. of Items		Total Score Points	Mean	Mean <i>p</i> -value	SD	SPI	
				MC	CR					Mean	SD
4	60361	A	Geography	8	0	8	5.94	0.74	1.67	74.46	17.12
	60361	B	History	8	0	8	6.21	0.78	1.56	77.95	15.92
	60361	C	Political Science	7	0	7	5.05	0.72	1.51	71.86	17.05
	60361	D	Economics	6	0	6	4.71	0.79	1.23	79.62	16.93
	60361	E	Behavioral Science	7	0	7	5.47	0.78	1.58	77.96	18.82
8	61463	A	Geography	10	0	10	7.67	0.77	1.96	76.89	16.83
	61463	B	History	13	0	13	8.79	0.68	2.72	67.49	18.68
	61463	C	Political Science	6	0	6	4.14	0.69	1.49	68.82	19.43
	61463	D	Economics	6	0	6	4.59	0.77	1.39	76.17	18.96
	61463	E	Behavioral Science	5	0	5	3.09	0.62	1.30	63.30	19.86
10	62855	A	Geography	10	0	10	6.73	0.67	2.25	66.84	18.69
	62855	B	History	12	0	12	6.83	0.57	2.57	57.31	18.33
	62855	C	Political Science	12	0	12	7.86	0.65	2.59	65.93	19.36
	62855	D	Economics	8	0	8	6.28	0.79	1.77	77.95	19.02
	62855	E	Behavioral Science	8	0	8	4.81	0.60	1.88	61.02	19.33

Table 8-61  
Summary Statistics for Science Content Standards Raw and SPI Scores

Grade	N	Content Standard	Standard	No. of Items		Total Score Points	Mean	Mean <i>p</i> -value	SD	SPI	
				MC	CR					Mean	SD
4	60327	A/B	Connections & Nature of Sci	8	0	8	5.69	0.71	1.84	70.76	19.40
	60327	C	Science Inquiry	7	0	7	4.87	0.70	1.85	70.49	22.11
	60327	D	Physical Science	6	0	6	4.11	0.69	1.17	69.91	13.99
	60327	E	Earth and Space	6	0	6	4.21	0.70	1.33	68.98	16.32
	60327	F	Life and Environment	6	0	6	4.48	0.75	1.34	72.55	17.17
	60327	G/H	Appl & Social Perspectives	7	0	7	5.18	0.74	1.68	74.76	20.27
8	61484	A/B	Connections & Nature of Sci	7	0	7	5.50	0.79	1.52	77.62	18.60
	61484	C	Science Inquiry	8	0	8	6.61	0.83	1.51	82.88	16.06
	61484	D	Physical Science	6	0	6	4.00	0.67	1.43	66.80	18.55
	61484	E	Earth and Space	6	0	6	3.89	0.65	1.49	65.76	18.64
	61484	F	Life and Environment	6	0	6	4.58	0.76	1.38	77.59	18.26
	61484	G/H	Appl & Social Perspectives	7	0	7	5.73	0.82	1.49	81.29	18.57
10	62940	A/B	Connections & Nature of Sci	10	0	10	6.75	0.68	2.37	67.43	21.28
	62940	C	Science Inquiry	10	0	10	6.78	0.68	2.30	66.96	20.10
	62940	D	Physical Science	7	0	7	3.89	0.56	1.76	55.72	19.31
	62940	E	Earth and Space	6	0	6	3.89	0.65	1.48	64.46	19.66
	62940	F	Life and Environment	7	0	7	3.81	0.54	1.83	55.89	20.75
	62940	G/H	Appl & Social Perspectives	10	0	10	6.41	0.64	2.54	64.44	22.81

Table 8-62  
SPI Cut Scores

Content	Content Standard	Performance Level	SPI Cut Score Ranges						
			Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 10
RD	<b>Standard 1 Determines Meaning</b>	1	0-61	0-58	0-68	0-55	0-46	0-61	0-71
		2	62-82	59-77	69-86	56-75	47-73	62-84	72-91
		3	83-95	78-89	87-94	76-91	74-92	85-96	92-98
		4	96-100	90-100	95-100	92-100	93-100	97-100	99-100
	<b>Standard 2 Understands Text</b>	1	0-68	0-60	0-64	0-66	0-63	0-61	0-46
		2	69-89	61-80	65-81	67-86	64-84	62-83	47-71
		3	90-97	81-92	82-92	87-95	85-95	84-94	72-93
		4	98-100	93-100	93-100	96-100	96-100	95-100	94-100
	<b>Standard 3 Analyzes Text</b>	1	0-59	0-52	0-54	0-62	0-50	0-52	0-46
		2	60-79	53-71	55-70	63-78	51-72	53-71	47-73
		3	80-90	72-86	71-82	79-89	73-88	72-89	74-91
		4	91-100	87-100	83-100	90-100	89-100	90-100	92-100
	<b>Standard 4 Evaluates/Extends Text</b>	1	0-36	0-51	0-51	0-53	0-45	0-52	0-44
		2	37-54	52-69	52-73	54-74	46-63	53-73	45-72
		3	55-72	70-81	74-89	75-88	64-79	74-87	73-90
		4	73-100	82-100	90-100	89-100	80-100	88-100	91-100
MA	<b>Standard A Mathematical Processes</b>	1	0-31	0-25	0-43	0-33	0-33	0-38	0-43
		2	32-57	26-52	44-65	34-58	34-63	39-71	44-70
		3	58-85	53-77	66-85	59-81	64-82	72-91	71-89
		4	86-100	78-100	86-100	82-100	83-100	92-100	90-100
	<b>Standard B Number Operations</b>	1	0-54	0-55	0-50	0-60	0-51	0-38	0-36
		2	55-84	56-82	51-78	61-84	52-78	39-64	37-64
		3	85-96	83-94	79-94	85-96	79-95	65-90	65-87
		4	97-100	95-100	95-100	97-100	96-100	91-100	88-100
	<b>Standard C Geometry</b>	1	0-65	0-63	0-54	0-64	0-48	0-37	0-32
		2	66-85	64-83	55-69	65-79	49-69	38-58	33-57
		3	86-95	84-94	70-83	80-91	70-87	59-81	58-85
		4	96-100	95-100	84-100	92-100	88-100	82-100	86-100
	<b>Standard D Measurement</b>	1	0-52	0-53	0-52	0-42	0-44	0-42	0-35
		2	53-78	54-79	53-75	43-68	45-65	43-71	36-62
		3	79-93	80-94	76-92	69-90	66-87	72-90	63-90
		4	94-100	95-100	93-100	91-100	88-100	91-100	91-100
	<b>Standard E Statistics/Probability</b>	1	0-38	0-45	0-35	0-43	0-39	0-25	0-35
		2	39-66	46-72	36-59	44-67	40-60	26-46	36-56
		3	67-93	73-93	60-84	68-86	61-81	47-80	57-81
		4	94-100	94-100	85-100	87-100	82-100	81-100	82-100
	<b>Standard F Algebraic Relationships</b>	1	0-53	0-48	0-40	0-50	0-55	0-49	0-37
		2	54-78	49-77	41-66	51-77	56-81	50-72	38-66
		3	79-91	78-93	67-89	78-93	82-94	73-90	67-90
		4	92-100	94-100	90-100	94-100	95-100	91-100	91-100

Table 8-62 Cont'd  
SPI Cut Scores

Content	Content Standard	Performance Level	SPI Cut Score Ranges						
			Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 10
LA	Standard B Writing	1		0-34				0-53	0-35
		2		35-51				54-75	36-50
		3		52-74				76-91	51-75
		4		75-100				92-100	76-100
	Standard D Language	1		0-29				0-40	0-26
		2		30-45				41-61	27-48
		3		46-68				62-87	49-85
		4		69-100				88-100	86-100
	Standard F Research and Inquiry	1		0-23				0-42	0-29
		2		24-38				43-60	30-44
		3		39-67				61-79	45-79
		4		68-100				80-100	80-100
SS	Standard A Geography	1		0-31				0-44	0-45
		2		32-46				45-63	46-50
		3		47-69				64-83	51-70
		4		70-100				84-100	71-100
	Standard B History	1		0-36				0-34	0-37
		2		37-52				35-49	38-41
		3		53-74				50-71	42-57
		4		75-100				72-100	58-100
	Standard C Political Science	1		0-29				0-36	0-43
		2		30-43				37-49	44-49
		3		44-67				50-74	50-69
		4		68-100				75-100	70-100
	Standard D Economics	1		0-29				0-39	0-57
		2		30-51				40-59	58-65
		3		52-77				60-83	66-85
		4		78-100				84-100	86-100
	Standard E Behavioral Science	1		0-31				0-30	0-38
		2		32-44				31-44	39-44
		3		45-73				45-67	45-64
		4		74-100				68-100	65-100

Table 8-62 Cont'd  
SPI Cut Scores

Content	Content Standard	Performance Level	SPI Cut Score Ranges						
			Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 10
SC	<b>Standard A/B Connections &amp; Nature of Science</b>	1		0-35				0-43	0-42
		2		36-56				44-61	43-52
		3		57-86				62-88	53-76
		4		87-100				89-100	77-100
	<b>Standard C Science Inquiry</b>	1		0-30				0-56	0-43
		2		31-53				57-72	44-54
		3		54-89				73-92	55-74
		4		90-100				93-100	75-100
	<b>Standard D Physical Science</b>	1		0-46				0-38	0-34
		2		47-60				39-50	35-40
		3		61-80				51-74	41-59
		4		81-100				75-100	60-100
	<b>Standard E Earth and Space</b>	1		0-40				0-38	0-42
		2		41-57				39-48	43-51
		3		58-80				49-74	52-71
		4		81-100				75-100	72-100
	<b>Standard F Life and Environment</b>	1		0-41				0-46	0-32
		2		42-60				47-62	33-40
		3		61-85				63-88	41-61
		4		86-100				89-100	62-100
	<b>Standard G/H Science Applications &amp; Social Perspectives</b>	1		0-35				0-46	0-36
		2		36-61				47-66	37-46
		3		62-91				67-92	47-74
		4		92-100				93-100	75-100

Table 9-1  
Reliability for Total Group and Subgroups Using Cronbach's Alpha

Content	Grade	Total	Gender		Race/Ethnicity					ELP		Disability		SES	
			Female	Male	White	African American	Hispanic	Asian	American Indian	Fully English Proficient	Limited English Proficient	Disabled	Not Disabled	Economically Disadvantaged	Not Economically Disadvantaged
Reading	3	0.94	0.94	0.94	0.93	0.94	0.94	0.94	0.94	0.94	0.93	0.94	0.93	0.94	0.92
	4	0.93	0.92	0.93	0.92	0.92	0.92	0.93	0.91	0.92	0.89	0.92	0.91	0.92	0.91
	5	0.92	0.92	0.92	0.91	0.92	0.91	0.92	0.91	0.92	0.88	0.92	0.90	0.92	0.90
	6	0.92	0.91	0.92	0.90	0.92	0.91	0.92	0.90	0.91	0.87	0.91	0.89	0.91	0.89
	7	0.91	0.90	0.91	0.89	0.90	0.90	0.91	0.90	0.90	0.84	0.90	0.88	0.90	0.88
	8	0.90	0.89	0.90	0.88	0.90	0.89	0.90	0.89	0.89	0.85	0.89	0.87	0.90	0.87
	10	0.92	0.91	0.92	0.90	0.91	0.91	0.92	0.91	0.91	0.85	0.90	0.90	0.91	0.90
Mathematics	3	0.92	0.92	0.92	0.90	0.92	0.91	0.92	0.91	0.92	0.91	0.92	0.91	0.92	0.89
	4	0.92	0.92	0.92	0.90	0.92	0.91	0.91	0.91	0.92	0.90	0.93	0.91	0.92	0.89
	5	0.92	0.92	0.92	0.90	0.91	0.90	0.92	0.90	0.92	0.88	0.91	0.91	0.91	0.90
	6	0.92	0.92	0.92	0.91	0.91	0.91	0.93	0.90	0.92	0.89	0.92	0.90	0.92	0.90
	7	0.92	0.92	0.93	0.91	0.91	0.91	0.93	0.91	0.92	0.87	0.91	0.91	0.91	0.91
	8	0.93	0.93	0.93	0.92	0.90	0.90	0.93	0.91	0.93	0.85	0.89	0.92	0.91	0.92
	10	0.93	0.92	0.93	0.92	0.88	0.90	0.93	0.91	0.93	0.83	0.87	0.92	0.91	0.92
Language Arts	4	0.83	0.83	0.82	0.81	0.80	0.80	0.84	0.79	0.83	0.74	0.79	0.82	0.80	0.80
	8	0.88	0.87	0.88	0.86	0.88	0.86	0.87	0.87	0.88	0.79	0.85	0.86	0.87	0.85
	10	0.86	0.86	0.86	0.85	0.83	0.83	0.87	0.85	0.86	0.70	0.78	0.85	0.84	0.85
Social Studies	4	0.86	0.85	0.87	0.84	0.87	0.84	0.86	0.84	0.86	0.82	0.87	0.85	0.86	0.82
	8	0.89	0.87	0.90	0.87	0.87	0.86	0.88	0.86	0.88	0.79	0.87	0.87	0.87	0.86
	10	0.90	0.88	0.91	0.89	0.87	0.88	0.89	0.89	0.90	0.79	0.87	0.88	0.88	0.88
Science	4	0.88	0.87	0.88	0.86	0.87	0.85	0.87	0.86	0.88	0.82	0.87	0.87	0.87	0.85
	8	0.88	0.87	0.89	0.86	0.88	0.86	0.87	0.87	0.88	0.81	0.88	0.86	0.88	0.85
	10	0.91	0.90	0.92	0.90	0.87	0.88	0.91	0.90	0.91	0.78	0.88	0.90	0.90	0.90

Table 9-2  
Standard Error of Measurement for Total Group and Subgroups

Content	Grade	Total	Gender		Race/Ethnicity					ELP		Disability		SES	
			Female	Male	White	African American	Hispanic	Asian	American Indian	Fully English Proficient	Limited English Proficient	Disabled	Not Disabled	Economically Disadvantaged	Not Economically Disadvantaged
Reading	3	3.02	3.00	3.05	2.93	3.28	3.25	3.04	3.15	2.99	3.33	3.30	2.98	3.20	2.86
	4	3.18	3.17	3.19	3.11	3.39	3.38	3.19	3.34	3.16	3.47	3.39	3.15	3.34	3.04
	5	3.10	3.06	3.12	3.01	3.35	3.31	3.12	3.25	3.07	3.46	3.39	3.05	3.28	2.94
	6	3.08	3.03	3.12	3.00	3.38	3.28	3.10	3.23	3.06	3.46	3.42	3.02	3.26	2.93
	7	3.18	3.15	3.20	3.11	3.36	3.32	3.20	3.27	3.16	3.44	3.41	3.13	3.31	3.06
	8	3.18	3.12	3.21	3.11	3.41	3.35	3.18	3.29	3.16	3.51	3.48	3.12	3.33	3.05
	10	3.07	3.05	3.07	3.00	3.31	3.25	3.14	3.20	3.06	3.41	3.32	3.02	3.23	2.96
Mathematics	3	2.98	2.97	2.98	2.89	3.26	3.17	2.94	3.15	2.96	3.19	3.23	2.94	3.15	2.81
	4	2.98	3.00	2.96	2.90	3.23	3.16	2.96	3.13	2.96	3.22	3.21	2.94	3.14	2.83
	5	3.24	3.24	3.24	3.18	3.43	3.39	3.19	3.36	3.23	3.46	3.44	3.21	3.38	3.12
	6	3.13	3.13	3.13	3.06	3.36	3.30	3.07	3.29	3.12	3.40	3.38	3.09	3.29	2.99
	7	3.26	3.26	3.26	3.19	3.49	3.45	3.17	3.42	3.25	3.53	3.49	3.21	3.43	3.11
	8	3.46	3.47	3.44	3.40	3.58	3.60	3.38	3.58	3.44	3.65	3.57	3.42	3.58	3.34
	10	3.28	3.29	3.27	3.25	3.36	3.39	3.25	3.36	3.28	3.35	3.34	3.26	3.38	3.21
Language Arts	4	2.32	2.29	2.36	2.28	2.45	2.43	2.32	2.41	2.31	2.48	2.47	2.30	2.41	2.25
	8	2.04	1.96	2.11	1.97	2.28	2.20	2.02	2.21	2.02	2.37	2.37	1.98	2.21	1.91
	10	2.59	2.53	2.63	2.55	2.71	2.68	2.60	2.67	2.58	2.72	2.70	2.56	2.68	2.52
Social Studies	4	2.24	2.23	2.26	2.15	2.53	2.44	2.26	2.40	2.22	2.53	2.49	2.20	2.42	2.09
	8	2.48	2.48	2.47	2.40	2.76	2.67	2.48	2.66	2.46	2.83	2.82	2.42	2.67	2.34
	10	2.95	2.97	2.93	2.89	3.19	3.11	2.98	3.08	2.94	3.25	3.21	2.91	3.12	2.85
Science	4	2.51	2.51	2.50	2.42	2.77	2.70	2.51	2.65	2.48	2.78	2.73	2.47	2.67	2.36
	8	2.37	2.38	2.36	2.27	2.71	2.61	2.42	2.55	2.35	2.81	2.76	2.31	2.58	2.21
	10	3.02	3.06	2.97	2.96	3.22	3.20	3.04	3.14	3.01	3.27	3.21	2.99	3.17	2.93

Table 9-3  
Cronbach's Alpha Reliability Coefficients for Content Standards

Content Area	Grade	Alpha Per Content Standard								
		A/1	A/B	B/2	C/3	D/4	E	F	G/H	Total
Reading	3	0.77		0.88	0.84	0.52				0.94
	4	0.70		0.83	0.81	0.56				0.93
	5	0.73		0.78	0.80	0.64				0.92
	6	0.66		0.75	0.78	0.72				0.92
	7	0.70		0.75	0.76	0.63				0.91
	8	0.67		0.73	0.71	0.65				0.90
	10	0.62		0.58	0.83	0.76				0.92
Mathematics	3	0.59		0.78	0.67	0.62	0.71	0.64		0.92
	4	0.62		0.72	0.62	0.63	0.68	0.68		0.92
	5	0.56		0.72	0.55	0.68	0.69	0.73		0.92
	6	0.58		0.75	0.60	0.71	0.67	0.73		0.92
	7	0.63		0.76	0.69	0.62	0.63	0.73		0.92
	8	0.64		0.63	0.61	0.75	0.70	0.76		0.93
	10	0.62		0.63	0.68	0.74	0.60	0.77		0.93
Language Arts	4			0.76		0.36		0.56		0.83
	8			0.83		0.61		0.59		0.88
	10			0.76		0.70		0.55		0.86
Social Studies	4	0.57		0.57	0.50	0.51	0.64			0.86
	8	0.67		0.70	0.54	0.60	0.49			0.89
	10	0.66		0.63	0.69	0.67	0.59			0.90
Science	4		0.62		0.68	0.32	0.51	0.50	0.61	0.88
	8		0.60		0.61	0.52	0.49	0.56	0.63	0.88
	10		0.69		0.68	0.54	0.55	0.57	0.73	0.91

Table 9-4  
Standard Error of Measurement per Content Standard

Content Area	Grade	SEM Per Content Standard								
		A/1	A/B	B/2	C/3	D/4	E	F	G/H	Total
Reading	3	1.34		1.60	1.85	1.15				3.02
	4	1.36		1.74	1.92	1.25				3.18
	5	1.26		1.62	1.94	1.22				3.10
	6	1.27		1.41	1.83	1.58				3.08
	7	1.28		1.39	2.05	1.54				3.18
	8	1.17		1.45	2.01	1.60				3.18
	10	0.83		1.11	2.12	1.72				3.07
Mathematics	3	1.49		1.21	1.12	1.05	1.14	1.18		2.98
	4	1.38		1.19	1.17	1.11	1.07	1.28		2.98
	5	1.37		1.21	1.43	1.19	1.35	1.35		3.24
	6	1.38		1.16	1.11	1.30	1.38	1.25		3.13
	7	1.38		1.32	1.42	1.25	1.39	1.16		3.26
	8	1.49		1.12	1.31	1.43	1.45	1.54		3.46
	10	1.23		1.14	1.45	1.44	1.23	1.47		3.28
Language Arts	4			1.86		0.89		1.07		2.32
	8			1.42		0.97		1.04		2.04
	10			1.96		1.27		1.07		2.59
Social Studies	4	1.10		1.02	1.07	0.86	0.95			2.24
	8	1.13		1.49	1.01	0.88	0.93			2.48
	10	1.31		1.56	1.44	1.02	1.20			2.95
Science	4		1.13		1.05	0.96	0.93	0.95	1.05	2.51
	8		0.96		0.94	0.99	1.06	0.92	0.91	2.37
	10		1.32		1.30	1.19	0.99	1.20	1.32	3.02

Table 9-5  
 Classification Consistency and Classification Accuracy for Reading Grade 3

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.31	0.03	0.00	0.00	0.34
<b>Basic Proficient</b>	0.04	0.24	0.04	0.00	0.32
<b>Proficient</b>	0.00	0.05	0.16	0.04	0.25
<b>Advanced</b>	0.00	0.00	0.03	0.06	0.09
<b>Sum</b>	0.34	0.33	0.23	0.10	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.93	0.90	0.93	0.77
<b>Probability of Chance</b>	0.55	0.55	0.83	0.29
<b>Kappa (k)</b>	0.85	0.78	0.58	0.67
<b>Classification Accuracy</b>	0.95	0.93	0.95	0.83

Table 9-6  
 Classification Consistency and Classification Accuracy for Reading Grade 4

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.32	0.04	0.00	0.00	0.36
<b>Basic Proficient</b>	0.04	0.22	0.04	0.00	0.30
<b>Proficient</b>	0.00	0.05	0.16	0.03	0.24
<b>Advanced</b>	0.00	0.00	0.03	0.07	0.11
<b>Sum</b>	0.36	0.31	0.22	0.10	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.92	0.91	0.94	0.76
<b>Probability of Chance</b>	0.54	0.55	0.81	0.29
<b>Kappa (k)</b>	0.82	0.80	0.67	0.67
<b>Classification Accuracy</b>	0.94	0.93	0.95	0.83

Table 9-7  
 Classification Consistency and Classification Accuracy for Reading Grade 5

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.29	0.04	0.00	0.00	0.33
<b>Basic Proficient</b>	0.04	0.22	0.05	0.00	0.31
<b>Proficient</b>	0.00	0.06	0.16	0.04	0.25
<b>Advanced</b>	0.00	0.00	0.03	0.07	0.10
<b>Sum</b>	0.33	0.32	0.24	0.11	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.92	0.89	0.93	0.73
<b>Probability of Chance</b>	0.56	0.54	0.81	0.28
<b>Kappa (k)</b>	0.81	0.75	0.62	0.63
<b>Classification Accuracy</b>	0.93	0.92	0.95	0.80

Table 9-8  
 Classification Consistency and Classification Accuracy for Reading Grade 6

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.23	0.04	0.00	0.00	0.27
<b>Basic Proficient</b>	0.04	0.28	0.06	0.00	0.38
<b>Proficient</b>	0.00	0.06	0.18	0.04	0.28
<b>Advanced</b>	0.00	0.00	0.03	0.05	0.08
<b>Sum</b>	0.27	0.37	0.27	0.09	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.92	0.89	0.94	0.74
<b>Probability of Chance</b>	0.61	0.54	0.85	0.30
<b>Kappa (k)</b>	0.81	0.75	0.56	0.64
<b>Classification Accuracy</b>	0.95	0.91	0.95	0.81

Table 9-9  
 Classification Consistency and Classification Accuracy for Reading Grade 7

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.18	0.03	0.00	0.00	0.21
<b>Basic Proficient</b>	0.04	0.26	0.06	0.00	0.36
<b>Proficient</b>	0.00	0.06	0.24	0.04	0.34
<b>Advanced</b>	0.00	0.00	0.03	0.06	0.09
<b>Sum</b>	0.22	0.35	0.33	0.10	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.93	0.88	0.93	0.74
<b>Probability of Chance</b>	0.66	0.51	0.84	0.29
<b>Kappa (k)</b>	0.80	0.76	0.59	0.64
<b>Classification Accuracy</b>	0.95	0.92	0.95	0.82

Table 9-10  
 Classification Consistency and Classification Accuracy for Reading Grade 8

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.19	0.04	0.00	0.00	0.23
<b>Basic Proficient</b>	0.04	0.31	0.06	0.00	0.42
<b>Proficient</b>	0.00	0.07	0.21	0.02	0.30
<b>Advanced</b>	0.00	0.00	0.02	0.03	0.05
<b>Sum</b>	0.23	0.42	0.30	0.05	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.92	0.87	0.95	0.74
<b>Probability of Chance</b>	0.64	0.55	0.90	0.32
<b>Kappa (k)</b>	0.77	0.71	0.54	0.62
<b>Classification Accuracy</b>	0.95	0.91	0.97	0.82

Table 9-11  
 Classification Consistency and Classification Accuracy for Reading Grade 10

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.18	0.03	0.00	0.00	0.21
<b>Basic Proficient</b>	0.03	0.29	0.06	0.00	0.38
<b>Proficient</b>	0.00	0.06	0.24	0.03	0.32
<b>Advanced</b>	0.00	0.00	0.03	0.05	0.08
<b>Sum</b>	0.21	0.38	0.32	0.08	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.93	0.89	0.94	0.76
<b>Probability of Chance</b>	0.66	0.52	0.85	0.30
<b>Kappa (k)</b>	0.80	0.77	0.60	0.65
<b>Classification Accuracy</b>	0.95	0.92	0.96	0.83

Table 9-12  
 Classification Consistency and Classification Accuracy for Mathematics Grade 3

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.10	0.03	0.00	0.00	0.13
<b>Basic Proficient</b>	0.03	0.25	0.05	0.00	0.33
<b>Proficient</b>	0.00	0.06	0.31	0.04	0.40
<b>Advanced</b>	0.00	0.00	0.05	0.09	0.14
<b>Sum</b>	0.13	0.34	0.41	0.13	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.95	0.89	0.91	0.75
<b>Probability of Chance</b>	0.78	0.50	0.77	0.31
<b>Kappa (k)</b>	0.77	0.78	0.62	0.64
<b>Classification Accuracy</b>	0.96	0.92	0.93	0.82

Table 9-13  
 Classification Consistency and Classification Accuracy for Mathematics Grade 4

Contingency Table with All Cut Scores

	Minimal Performance	Basic Proficient	Proficient	Advanced	Sum
Minimal Performance	0.12	0.03	0.00	0.00	0.15
Basic Proficient	0.03	0.26	0.05	0.00	0.33
Proficient	0.00	0.05	0.28	0.04	0.38
Advanced	0.00	0.00	0.05	0.09	0.14
Sum	0.15	0.34	0.38	0.14	

Indexes for Classification Consistency and Classification Accuracy

	Cut 1	Cut 2	Cut 3	All cuts
Classification Consistency (P)	0.94	0.90	0.91	0.75
Probability of Chance	0.74	0.50	0.76	0.30
Kappa (k)	0.77	0.80	0.61	0.64
Classification Accuracy	0.96	0.92	0.93	0.82

Table 9-14  
 Classification Consistency and Classification Accuracy for Mathematics Grade 5

Contingency Table with All Cut Scores

	Minimal Performance	Basic Proficient	Proficient	Advanced	Sum
Minimal Performance	0.12	0.03	0.00	0.00	0.15
Basic Proficient	0.03	0.25	0.05	0.00	0.34
Proficient	0.00	0.05	0.28	0.04	0.37
Advanced	0.00	0.00	0.04	0.10	0.14
Sum	0.15	0.34	0.37	0.14	

Indexes for Classification Consistency and Classification Accuracy

	Cut 1	Cut 2	Cut 3	All cuts
Classification Consistency (P)	0.94	0.89	0.92	0.75
Probability of Chance	0.75	0.50	0.76	0.30
Kappa (k)	0.75	0.79	0.66	0.64
Classification Accuracy	0.96	0.93	0.94	0.83

Table 9-15  
 Classification Consistency and Classification Accuracy for Mathematics Grade 6

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.13	0.03	0.00	0.00	0.16
<b>Basic Proficient</b>	0.03	0.27	0.06	0.00	0.36
<b>Proficient</b>	0.00	0.06	0.25	0.04	0.35
<b>Advanced</b>	0.00	0.00	0.04	0.09	0.13
<b>Sum</b>	0.16	0.36	0.35	0.12	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.94	0.88	0.92	0.74
<b>Probability of Chance</b>	0.73	0.50	0.78	0.30
<b>Kappa (k)</b>	0.79	0.76	0.64	0.64
<b>Classification Accuracy</b>	0.96	0.92	0.95	0.82

Table 9-16  
 Classification Consistency and Classification Accuracy for Mathematics Grade 7

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.13	0.03	0.00	0.00	0.16
<b>Basic Proficient</b>	0.03	0.26	0.05	0.00	0.34
<b>Proficient</b>	0.00	0.05	0.27	0.03	0.35
<b>Advanced</b>	0.00	0.00	0.04	0.10	0.14
<b>Sum</b>	0.16	0.34	0.36	0.13	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.94	0.90	0.93	0.77
<b>Probability of Chance</b>	0.72	0.50	0.76	0.29
<b>Kappa (k)</b>	0.78	0.81	0.69	0.68
<b>Classification Accuracy</b>	0.96	0.93	0.94	0.83

Table 9-17  
 Classification Consistency and Classification Accuracy for Mathematics Grade 8

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.15	0.04	0.00	0.00	0.20
<b>Basic Proficient</b>	0.03	0.27	0.05	0.00	0.34
<b>Proficient</b>	0.00	0.05	0.26	0.03	0.33
<b>Advanced</b>	0.00	0.00	0.03	0.10	0.13
<b>Sum</b>	0.18	0.35	0.34	0.12	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.93	0.91	0.94	0.77
<b>Probability of Chance</b>	0.69	0.50	0.78	0.29
<b>Kappa (k)</b>	0.77	0.81	0.72	0.68
<b>Classification Accuracy</b>	0.95	0.93	0.95	0.84

Table 9-18  
 Classification Consistency and Classification Accuracy for Mathematics Grade 10

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.20	0.05	0.00	0.00	0.25
<b>Basic Proficient</b>	0.04	0.28	0.04	0.00	0.37
<b>Proficient</b>	0.00	0.04	0.22	0.02	0.29
<b>Advanced</b>	0.00	0.00	0.02	0.07	0.09
<b>Sum</b>	0.24	0.38	0.29	0.09	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.91	0.91	0.96	0.78
<b>Probability of Chance</b>	0.63	0.53	0.83	0.29
<b>Kappa (k)</b>	0.75	0.82	0.74	0.69
<b>Classification Accuracy</b>	0.93	0.94	0.97	0.84

Table 9-19  
 Classification Consistency and Classification Accuracy for Language Arts Grade 4

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.04	0.02	0.00	0.00	0.06
<b>Basic Proficient</b>	0.02	0.08	0.05	0.00	0.15
<b>Proficient</b>	0.00	0.06	0.28	0.07	0.41
<b>Advanced</b>	0.00	0.00	0.07	0.29	0.37
<b>Sum</b>	0.07	0.16	0.40	0.37	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.95	0.88	0.85	0.69
<b>Probability of Chance</b>	0.88	0.65	0.53	0.33
<b>Kappa (k)</b>	0.60	0.67	0.68	0.54
<b>Classification Accuracy</b>	0.96	0.92	0.89	0.77

Table 9-20  
 Classification Consistency and Classification Accuracy for Language Arts Grade 8

Contingency Table with All Cut Scores

	Minimal Performance	Basic Proficient	Proficient	Advanced	Sum
Minimal Performance	0.10	0.03	0.00	0.00	0.13
Basic Proficient	0.03	0.12	0.05	0.00	0.20
Proficient	0.00	0.06	0.21	0.07	0.34
Advanced	0.00	0.00	0.08	0.25	0.33
Sum	0.13	0.22	0.34	0.32	

Indexes for Classification Consistency and Classification Accuracy

	Cut 1	Cut 2	Cut 3	All cuts
Classification Consistency (P)	0.94	0.88	0.85	0.68
Probability of Chance	0.78	0.55	0.56	0.28
Kappa (k)	0.72	0.73	0.66	0.55
Classification Accuracy	0.96	0.92	0.89	0.77

Table 9-21  
 Classification Consistency and Classification Accuracy for Language Arts Grade 10

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.10	0.03	0.00	0.00	0.13
<b>Basic Proficient</b>	0.04	0.12	0.06	0.00	0.22
<b>Proficient</b>	0.00	0.06	0.38	0.05	0.48
<b>Advanced</b>	0.00	0.00	0.04	0.12	0.16
<b>Sum</b>	0.14	0.21	0.48	0.17	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.93	0.88	0.91	0.71
<b>Probability of Chance</b>	0.77	0.54	0.73	0.33
<b>Kappa (k)</b>	0.68	0.73	0.66	0.58
<b>Classification Accuracy</b>	0.95	0.91	0.93	0.79

Table 9-22  
 Classification Consistency and Classification Accuracy for Social Studies Grade 4

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.02	0.01	0.00	0.00	0.02
<b>Basic Proficient</b>	0.01	0.03	0.02	0.00	0.06
<b>Proficient</b>	0.00	0.02	0.17	0.06	0.25
<b>Advanced</b>	0.00	0.00	0.06	0.62	0.67
<b>Sum</b>	0.03	0.06	0.24	0.67	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.98	0.96	0.89	0.83
<b>Probability of Chance</b>	0.95	0.85	0.56	0.52
<b>Kappa (k)</b>	0.64	0.71	0.74	0.64
<b>Classification Accuracy</b>	0.99	0.97	0.92	0.87

Table 9-23  
 Classification Consistency and Classification Accuracy for Social Studies Grade 8

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.05	0.02	0.00	0.00	0.08
<b>Basic Proficient</b>	0.02	0.07	0.04	0.00	0.13
<b>Proficient</b>	0.00	0.03	0.24	0.07	0.34
<b>Advanced</b>	0.00	0.00	0.06	0.39	0.45
<b>Sum</b>	0.08	0.13	0.34	0.46	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.96	0.92	0.88	0.76
<b>Probability of Chance</b>	0.86	0.67	0.50	0.34
<b>Kappa (k)</b>	0.69	0.77	0.75	0.63
<b>Classification Accuracy</b>	0.97	0.95	0.91	0.83

Table 9-24  
 Classification Consistency and Classification Accuracy for Social Studies Grade 10

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.16	0.02	0.02	0.00	0.20
<b>Basic Proficient</b>	0.02	0.02	0.03	0.00	0.07
<b>Proficient</b>	0.02	0.03	0.19	0.06	0.29
<b>Advanced</b>	0.00	0.00	0.06	0.38	0.44
<b>Sum</b>	0.20	0.07	0.29	0.44	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.92	0.91	0.88	0.74
<b>Probability of Chance</b>	0.68	0.61	0.51	0.32
<b>Kappa (k)</b>	0.75	0.76	0.77	0.62
<b>Classification Accuracy</b>	0.95	0.94	0.91	0.81

Table 9-25  
 Classification Consistency and Classification Accuracy for Science Grade 4

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.05	0.02	0.00	0.00	0.07
<b>Basic Proficient</b>	0.02	0.11	0.05	0.00	0.19
<b>Proficient</b>	0.00	0.05	0.37	0.06	0.48
<b>Advanced</b>	0.00	0.00	0.07	0.20	0.27
<b>Sum</b>	0.07	0.19	0.48	0.26	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.95	0.90	0.87	0.72
<b>Probability of Chance</b>	0.87	0.62	0.61	0.34
<b>Kappa (k)</b>	0.61	0.73	0.67	0.58
<b>Classification Accuracy</b>	0.96	0.93	0.91	0.80

Table 9-26  
 Classification Consistency and Classification Accuracy for Science Grade 8

Contingency Table with All Cut Scores

	Minimal Performance	Basic Proficient	Proficient	Advanced	Sum
Minimal Performance	0.07	0.02	0.00	0.00	0.10
Basic Proficient	0.02	0.07	0.05	0.00	0.14
Proficient	0.00	0.04	0.31	0.07	0.42
Advanced	0.00	0.00	0.07	0.28	0.35
Sum	0.10	0.13	0.42	0.35	

Indexes for Classification Consistency and Classification Accuracy

	Cut 1	Cut 2	Cut 3	All cuts
Classification Consistency (P)	0.95	0.91	0.86	0.73
Probability of Chance	0.82	0.65	0.54	0.33
Kappa (k)	0.71	0.75	0.69	0.59
Classification Accuracy	0.96	0.94	0.91	0.81

Table 9-27  
 Classification Consistency and Classification Accuracy for Science Grade 10

Contingency Table with All Cut Scores

	<b>Minimal Performance</b>	<b>Basic Proficient</b>	<b>Proficient</b>	<b>Advanced</b>	<b>Sum</b>
<b>Minimal Performance</b>	0.17	0.03	0.01	0.00	0.22
<b>Basic Proficient</b>	0.04	0.05	0.04	0.00	0.12
<b>Proficient</b>	0.01	0.04	0.22	0.05	0.33
<b>Advanced</b>	0.00	0.00	0.04	0.29	0.34
<b>Sum</b>	0.22	0.12	0.31	0.34	

Indexes for Classification Consistency and Classification Accuracy

	<b>Cut 1</b>	<b>Cut 2</b>	<b>Cut 3</b>	<b>All cuts</b>
<b>Classification Consistency (P)</b>	0.91	0.90	0.91	0.74
<b>Probability of Chance</b>	0.66	0.55	0.55	0.28
<b>Kappa (k)</b>	0.74	0.77	0.80	0.64
<b>Classification Accuracy</b>	0.94	0.93	0.94	0.81

Table 9-28  
Inter-Rater Reliability, Reading\*

Grade	Item No.	Max	Percentage Absolute Difference				Codes	Intra. Corr.	Weighted Kappa	Mean	No. of Reads	Frequency			
			Perfect	Adjacent	Discrepant							0	1	2	3
3	31	3	0.70	0.25	0.02	0.03	0.91	0.82	1.17	3,137	1,582	2,548	1,630	514	
3	56	3	0.73	0.22	0.02	0.03	0.89	0.79	1.03	3,137	1,740	2,860	1,431	243	
4	13	3	0.70	0.26	0.02	0.02	0.87	0.73	1.09	3,169	1,484	3,055	1,551	248	
4	56	3	0.72	0.22	0.04	0.03	0.92	0.83	0.99	3,169	2,800	1,127	2,086	325	
5	33	3	0.68	0.28	0.01	0.02	0.82	0.64	0.76	3,147	2,287	3,320	622	65	
5	50	3	0.65	0.31	0.02	0.02	0.86	0.72	1.17	3,147	1,536	2,285	2,368	105	
6	38	3	0.65	0.31	0.02	0.02	0.90	0.79	1.48	3,092	1,179	1,647	2,554	804	
6	56	3	0.60	0.36	0.02	0.01	0.84	0.67	1.46	3,092	822	2,288	2,508	566	
7	36	3	0.75	0.21	0.02	0.02	0.93	0.86	1.49	3,164	1,519	1,096	2,790	923	
7	56	3	0.76	0.21	0.02	0.02	0.87	0.75	0.55	3,164	3,689	1,864	709	66	
8	19	3	0.62	0.34	0.02	0.02	0.87	0.74	1.41	3,196	1,044	2,388	2,278	682	
8	40	3	0.70	0.26	0.01	0.03	0.92	0.83	1.33	3,196	1,685	1,443	2,750	514	
10	12	3	0.65	0.30	0.01	0.03	0.90	0.79	1.08	3,261	2,015	2,257	1,943	307	
10	43	3	0.62	0.28	0.03	0.07	0.91	0.82	1.35	3,261	1,804	1,642	2,098	978	

\* The sum of the modes of agreement and codes may not equal exactly 100% due to rounding.

Table 9-29  
Inter-Rater Reliability, Mathematics\*

Grade	Item No.	Max	Percentage Absolute Difference				Codes	Intra. Corr.	Weighted Kappa	Mean	No. of Reads	Frequency		
			Perfect	Adjacent	Discrepant							0	1	2
3	10	2	0.79	0.19	0.01	0.01	0.89	0.78	1.27	3,137	1,046	2,462	2,766	
3	25A	1	0.96	0.02	0.00	0.02	0.98	0.96	0.47	3,137	3,327	2,947	0	
3	25B	2	0.79	0.17	0.02	0.03	0.92	0.83	0.86	3,137	2,643	1,885	1,746	
3	28A	1	0.99	0.00	0.00	0.01	0.97	0.96	0.96	3,137	247	6,027	0	
3	28B	2	0.92	0.05	0.01	0.02	0.97	0.94	1.43	3,137	1,630	327	4,317	
3	44A	1	0.97	0.02	0.00	0.01	0.98	0.96	0.68	3,137	1,991	4,283	0	
3	44B	2	0.82	0.11	0.05	0.02	0.90	0.81	0.61	3,137	4,084	566	1,624	
4	13	2	0.93	0.06	0.00	0.01	0.98	0.96	0.82	3,169	3,245	982	2,111	
4	20A	1	0.98	0.01	0.00	0.01	0.99	0.99	0.47	3,169	3,373	2,965	0	
4	20B	2	0.81	0.13	0.03	0.03	0.89	0.78	0.65	3,169	3,251	2,034	1,053	
4	29A	1	0.97	0.01	0.00	0.01	0.99	0.97	0.72	3,169	1,800	4,538	0	
4	29B	2	0.83	0.12	0.02	0.03	0.91	0.82	0.47	3,169	4,258	1,177	903	
4	41A	1	0.97	0.02	0.00	0.01	0.97	0.95	0.69	3,169	1,998	4,340	0	
4	41B	2	0.78	0.16	0.03	0.02	0.90	0.81	1.25	3,169	1,712	1,323	3,303	
5	12A	1	0.97	0.02	0.00	0.01	0.98	0.97	0.56	3,147	2,756	3,538	0	
5	12B	2	0.82	0.15	0.02	0.02	0.89	0.79	1.09	3,147	1,237	3,256	1,801	
5	19	2	0.90	0.08	0.01	0.01	0.94	0.89	1.50	3,147	598	1,942	3,754	
5	23A	1	0.98	0.01	0.00	0.01	0.98	0.97	0.38	3,147	3,897	2,397	0	
5	23B	2	0.90	0.07	0.02	0.01	0.96	0.92	0.72	3,147	3,873	311	2,110	
5	46A	1	0.98	0.01	0.00	0.01	0.98	0.96	0.85	3,147	964	5,330	0	
5	46B	2	0.92	0.05	0.01	0.01	0.92	0.84	1.81	3,147	462	298	5,534	
6	10A	1	0.98	0.01	0.00	0.01	1.00	0.99	0.63	3,092	2,318	3,866	0	
6	10B	2	0.90	0.07	0.02	0.01	0.96	0.92	1.26	3,092	2,019	520	3,645	
6	22A	1	0.99	0.00	0.00	0.01	0.99	0.97	0.91	3,092	573	5,611	0	
6	22B	2	0.89	0.09	0.00	0.01	0.92	0.83	0.49	3,092	3,345	2,659	180	

\* The sum of the modes of agreement and codes may not equal exactly 100% due to rounding.

Table 9-29 Cont'd  
Inter-Rater Reliability, Mathematics\*

Grade	Item No.	Max	Percentage Absolute Difference				Codes	Intra. Corr.	Weighted Kappa	Mean	No. of Reads	Frequency		
			Perfect	Adjacent	Discrepant							0	1	2
6	35A	1	0.98	0.01	0.00	0.01	0.99	0.99	0.33	3,092	4,133	2,051	0	
6	35B	2	0.84	0.14	0.01	0.01	0.94	0.88	0.79	3,092	2,843	1,787	1,554	
6	53	2	0.97	0.02	0.00	0.01	0.99	0.98	1.07	3,092	1,665	2,454	2,065	
7	4A	1	0.99	0.00	0.00	0.01	1.00	0.99	0.71	3,164	1,856	4,472	0	
7	4B	2	0.90	0.08	0.01	0.02	0.97	0.94	1.28	3,164	1,835	881	3,612	
7	29A	1	0.97	0.02	0.00	0.02	0.98	0.97	0.50	3,164	3,173	3,155	0	
7	29B	2	0.88	0.08	0.02	0.02	0.95	0.91	1.32	3,164	1,768	759	3,801	
7	32A	1	0.98	0.01	0.00	0.01	0.99	0.98	0.47	3,164	3,369	2,959	0	
7	32B	2	0.92	0.05	0.00	0.02	0.95	0.91	0.64	3,164	2,444	3,721	163	
7	51	2	0.98	0.01	0.00	0.01	1.00	0.99	0.82	3,164	2,596	2,262	1,470	
8	9A	1	0.98	0.00	0.00	0.01	0.99	0.98	0.87	3,196	840	5,552	0	
8	9B	2	0.91	0.06	0.02	0.01	0.96	0.91	1.49	3,196	1,459	323	4,610	
8	20A	1	0.98	0.00	0.00	0.02	1.00	0.99	0.46	3,196	3,431	2,961	0	
8	20B	2	0.89	0.08	0.00	0.03	0.97	0.94	1.12	3,196	2,021	1,595	2,776	
8	40A	1	0.98	0.00	0.00	0.02	1.00	1.00	0.48	3,196	3,334	3,058	0	
8	40B	2	0.90	0.06	0.01	0.02	0.97	0.95	0.94	3,196	3,197	368	2,827	
8	53	2	0.91	0.05	0.00	0.04	0.98	0.97	0.60	3,196	4,100	733	1,559	
10	27	2	0.86	0.07	0.00	0.07	0.97	0.94	0.88	3,261	2,625	2,088	1,809	
10	33	2	0.85	0.11	0.00	0.03	0.95	0.90	1.32	3,261	1,301	1,854	3,367	
10	38	2	0.88	0.02	0.00	0.09	0.99	0.98	0.51	3,261	4,733	254	1,535	
10	52	2	0.84	0.09	0.01	0.06	0.96	0.92	0.91	3,261	2,765	1,584	2,173	

\* The sum of the modes of agreement and codes may not equal exactly 100% due to rounding.

Table 9-30  
Inter-Rater Reliability, Writing Prompts\*

Grade	Item No.	Max Score	Percentage Absolute Difference				Frequency										
			P	A	D	Codes	Intra. Corr.	Weighted Kappa	Mean	No. of Reads	0	1	2	3	4	5	6
4	1A	6	0.66	0.32	0.01	0.01	0.90	0.79	3.33	3,169	61	133	757	2,623	2,236	502	26
4	1B	3	0.93	0.06	0.00	0.01	0.81	0.63	1.96	3,169	54	241	5,952	91	0	0	0
8	1A	6	0.64	0.32	0.01	0.02	0.91	0.81	3.16	3,196	149	107	1,075	2,767	1,888	370	36
8	1B	3	0.94	0.05	0.00	0.01	0.87	0.75	1.96	3,196	90	152	6,071	79	0	0	0
10	1A	6	0.59	0.36	0.02	0.03	0.91	0.82	3.31	3,261	190	87	950	2,376	2,235	606	78
10	1B	3	0.80	0.17	0.00	0.02	0.81	0.62	2.08	3,261	146	84	5,408	884	0	0	0

\* Note that P is percent perfect agreement, A is percent adjacent agreement, and D is percent discrepant. Also, note that the sum of the modes of agreement and codes may not equal exactly 100% due to rounding.

Table 10-1  
Items Flagged for DIF, By Gender

Content	Grade	Test Book Number	Item Type	Female			Male			SMD	Delta	LH Flag Female	LH Flag Male	Flag MH
				D+	D-	Z	D+	D-	Z					
RD	5	5	MC	0.01	-0.06	-7.95	0.05	0.00	8.00	-0.25	-1.90			-C
RD	6	56	CR	0.10	0.00	6.74	0.00	-0.11	-7.68	0.26			-CC	CC
RD	8	19	CR	0.12	0.00	8.69	0.01	-0.16	-10.06	0.30		CC	-CC	CC
RD	10	4	MC	0.02	-0.06	-6.94	0.05	-0.01	5.39	-0.22	-1.52			-C
RD	10	43	CR	0.14	0.00	9.35	0.03	-0.19	-11.23	0.30		CC	-CC	CC
LA	4	1A	CR	0.14	0.00	9.40	0.02	-0.16	-9.40	0.30		CC	-CC	CC
LA	8	1A	CR	0.07	-0.07	4.12	0.16	-0.15	-7.74	0.25			-CC	CC
SS	8	14	MC	0.02	0.00	4.32	0.00	-0.01	-2.90	0.13	1.68			C

Table 10-2  
 Items Flagged for DIF, By Race/Ethnicity, African American

Content	Grade	Test Book Number	Item Type	D+	D-	Z	SMD	Delta	LH Flag	MH Flag
RD	4	56	CR	0.10	-0.12	-4.20	-0.07		-CC	
RD	7	36	CR	0.01	-0.23	-6.84	-0.28		-CC	-CC
RD	8	40	CR	0.03	-0.13	-3.60	-0.07		-CC	
RD	10	8	MC	0.01	-0.06	-3.12	-0.39	-1.93		-C
RD	10	43	CR	0.00	-0.13	-4.48	-0.07		-CC	
SS	10	13	MC	0.01	-0.03	-2.09	-0.41	-1.88		-C

Table 10-3  
 Items Flagged for DIF, By Race/Ethnicity, Hispanic

<b>Content</b>	<b>Grade</b>	<b>Test Book Number</b>	<b>Item Type</b>	<b>D+</b>	<b>D-</b>	<b>Z</b>	<b>SMD</b>	<b>Delta</b>	<b>LH Flag</b>	<b>MH Flag</b>
RD	6	7	MC	0.00	-0.14	-8.67	-0.26	-1.26	-C	-B
RD	7	1	MC	0.00	-0.11	-6.66	-0.29	-1.79	-C	-C
RD	7	13	MC	0.11	0.00	6.17	0.17	0.92	C	
SC	10	14	MC	0.11	0.00	6.49	0.12	0.66	C	

Table 10-4  
Items Flagged for DIF, By Race/Ethnicity, Asian

Content	Grade	Test Book Number	Item Type	D+	D-	Z	SMD	Delta	LH Flag	MH Flag
RD	3	31	CR	0.25	-0.08	4.25	0.06		CC	
RD	4	10	MC	0.1	0.00	5.05	0.26	1.38	C	B
RD	4	56	CR	0.15	-0.02	3.52	0.08		CC	
RD	5	33	CR	0.13	-0.03	3.55	0.16		CC	
RD	7	5	MC	0.00	-0.08	-4.85	-0.25	-1.55		-C
RD	7	13	MC	0.04	-0.11	-4.44	-0.29	-1.63		-C
RD	7	36	CR	0.15	-0.07	3.44	0.04		CC	
RD	7	40	MC	0.07	-0.02	3.19	0.20	1.61		C
RD	8	10	MC	0.00	-0.14	-6.95	-0.29	-1.46	-C	-B
RD	8	19	CR	0.21	0.00	6.15	0.19		CC	BB
RD	8	35	MC	0.04	0.00	2.89	0.16	1.55		C
RD	8	40	CR	0.19	0.00	5.69	0.16		CC	
RD	10	3	MC	0.10	0.00	5.73	0.20	1.56	C	C
RD	10	8	MC	0.01	-0.15	-6.87	-0.35	-2.25	-C	-C
RD	10	12	CR	0.14	-0.08	3.62	0.23		CC	BB
RD	10	15	MC	0.00	-0.10	-5.8	-0.28	-1.63	-C	-C
RD	10	20	MC	0.04	-0.12	-7.08	-0.19	-1.24	-C	-B
RD	10	43	CR	0.23	0.00	6.91	0.23		CC	BB
MA	5	20	MC	0.01	-0.04	-2.38	-0.17	-1.64		-C
MA	6	47	MC	0.03	-0.11	-5.48	-0.16	-0.98	-C	
MA	6	53	CR	0.15	-0.06	3.60	0.06		CC	

Table 10-5 Cont'd  
 Items Flagged for DIF, By Race/Ethnicity, Asian

Content	Grade	Test Book Number	Item Type	D+	D-	Z	SMD	Delta	LH Flag	MH Flag
LA	4	1A	CR	0.18	0.00	4.85	0.17		CC	
LA	4	1B	CR	0.11	0.00	5.99	0.09		CC	
LA	10	1	MC	0.06	-0.12	-5.10	-0.19	-1.08	-C	-B
LA	10	22	MC	0.03	-0.15	-6.41	-0.16	-0.97	-C	
LA	10	1A	CR	0.15	-0.06	3.37	0.20		CC	BB
SC	10	1	MC	0.04	-0.13	-6.22	-0.16	-0.98	-C	
SS	8	2	MC	0.02	-0.03	-2.99	-0.22	-1.81		-C
SS	10	9	MC	0.00	-0.10	-5.65	-0.15	-0.85	-C	
SS	10	34	MC	0.14	-0.04	5.09	0.11	0.62	C	

Table 10-6  
 Items Flagged for DIF, By Race/Ethnicity, American Indian\*

Content	Grade	Test Book Number	Item Type	D+	D-	Z	SMD	Delta	LH Flag	MH Flag
RD	3	7	MC	0.09	-0.24	-2.83	0.01	0.08	-C	
RD	5	19	MC	0.08	-0.26	-2.88	0.07	0.36	-C	
RD	10	19	MC	0.09	-0.17	-3.39	0.09	0.50	-C	
MA	5	35	MC	0.00	-0.15	-2.99	-0.08	-0.43	-C	

\* Note: DIF statistics can only be calculated for items with sufficient student N counts. In some cases here, the size of the tested population was too small to include valid DIF statistics.

Table 10-7  
Items Flagged for DIF, By English Language Proficiency

Content	Grade	Test Book Number	Item Type	Limited English Proficient			Fully English Proficient			SMD	Delta	LH Flag Limited English Proficient	LH Flag Fully English Proficient	MH Flag
				D+	D-	Z	D+	D-	Z					
RD	3	31	CR	0.19	-0.11	2.85	0.03	-0.05	-2.30	0.09		CC		
RD	4	10	MC	0.13	-0.02	5.96	0.03	-0.03	-2.06	0.27	1.38	C		B
RD	4	56	CR	0.16	-0.04	3.15	0.02	-0.05	-2.10	0.11		CC		
RD	5	2	MC	0.00	-0.10	-5.52	0.02	-0.01	2.33	-0.24	-1.17	-C		-B
RD	5	33	CR	0.10	0.00	3.86	0.01	-0.03	-2.31	0.09		CC		
RD	6	7	MC	0.00	-0.12	-6.14	0.02	-0.01	2.13	-0.30	-1.36	-C		-B
RD	7	1	MC	0.03	-0.10	-3.37	0.01	-0.03	1.50	-0.25	-1.73			-C
RD	8	10	MC	0.00	-0.11	-4.51	0.04	-0.03	0.34	-0.17	-0.94	-C		
RD	8	19	CR	0.21	-0.02	4.91	0.00	-0.02	-2.17	0.16		CC		
RD	8	40	CR	0.24	-0.08	5.48	0.02	-0.05	-2.66	0.13		CC		
RD	8	56	MC	0.07	-0.15	-5.18	0.02	-0.01	1.62	-0.26	-1.23	-C		-B
RD	10	6	MC	0.04	-0.05	-1.81	0.01	0.00	2.26	-0.39	-1.52			-C
RD	10	12	CR	0.13	-0.06	3.52	0.02	-0.03	-2.28	0.11		CC		
RD	10	20	MC	0.04	-0.13	-5.83	0.02	-0.01	2.32	-0.19	-0.82	-C		
RD	10	43	CR	0.16	-0.01	3.75	0.00	-0.03	-2.16	0.12		CC		
MA	3	28B	CR	0.16	0.00	4.44	0.02	-0.03	-1.90	0.14		CC		
MA	3	35	MC	0.10	0.00	5.50	0.00	-0.02	-2.85	0.15	0.82	C		
MA	5	26	MC	0.15	-0.05	5.13	0.01	-0.03	-2.81	0.11	0.64	C		
MA	6	24	MC	0.12	0.00	5.67	0.01	-0.04	-2.10	0.06	0.34	C		
MA	6	34	MC	0.12	0.00	5.75	0.01	-0.04	-1.86	0.11	0.64	C		
MA	6	47	MC	0.00	-0.10	-5.48	0.01	0.00	1.75	-0.13	-0.65	-C		
MA	6	53	CR	0.19	0.00	6.29	0.02	-0.04	-1.88	0.07		CC		
MA	8	20B	CR	0.14	-0.03	3.00	0.03	-0.03	-2.41	0.06		CC		
MA	8	26	MC	0.07	-0.14	-4.40	0.02	-0.01	1.45	-0.19	-1.00	-C		-B
MA	8	43	MC	0.00	-0.15	-6.49	0.02	-0.01	1.50	0.01	0.04	-C		
MA	10	54	MC	0.14	-0.02	5.16	0.01	-0.02	-0.78	0.11	0.53	C		

Table 10-6 Cont'd  
 Items Flagged for DIF, By English Language Proficiency

Content	Grade	Test Book Number	Item Type	Limited English Proficient			Fully English Proficient			SMD	Delta	LH Flag Limited English Proficient	LH Flag Fully English Proficient	MH Flag
				D+	D-	Z	D+	D-	Z					
LA	4	2	MC	0.02	-0.04	-0.64	0.02	0.00	4.13	-0.33	-1.79			-C
LA	4	1A	CR	0.22	-0.13	5.31	0.01	-0.03	-1.90	0.13		CC		
LA	8	8	MC	0.02	-0.14	-5.33	0.02	-0.01	0.63	-0.20	-0.97	-C		
LA	8	12	MC	0.00	-0.11	-5.03	0.02	-0.02	0.31	-0.09	-0.57	-C		
LA	8	15	MC	0.00	-0.12	-5.09	0.03	-0.01	1.47	-0.13	-0.68	-C		
LA	8	1A	CR	0.18	-0.10	3.66	0.03	-0.06	-3.75	0.13		CC		
LA	10	22	MC	0.00	-0.12	-5.14	0.01	-0.01	1.17	-0.03	-0.19	-C		
LA	10	1A	CR	0.19	-0.05	4.10	0.04	-0.04	-0.56	0.07		CC		
SC	10	27	MC	0.12	-0.02	5.10	0.01	-0.02	-0.64	0.05	0.25	C		
SS	8	2	MC	0.01	-0.07	-1.88	0.01	0.00	0.75	-0.41	-1.93			-C

Table 10-8  
Items Flagged for DIF, By Disability Status

Content	Grade	Test Book Number	Item Type	Not Disabled			Disabled			SMD	Delta	LH Flag Not Disabled	LH Flag Disabled	MH Flag
				D+	D-	Z	D+	D-	Z					
RD	8	19	CR	0.02	-0.02	0.54	0.16	-0.13	-3.90	-0.08			-CC	
RD	10	43	CR	0.02	-0.02	-0.19	0.07	-0.14	-3.11	-0.11			-CC	
LA	4	2	MC	0.02	0.00	5.08	0.00	-0.06	-3.13	-0.37	-2.12			-C
LA	4	25	MC	0.03	-0.01	3.57	0.04	-0.11	-5.55	-0.31	-1.69			-C
LA	4	1A	CR	0.05	-0.05	2.51	0.05	-0.28	-7.62	-0.36			-CC	-CC
LA	4	1B	CR	0.02	-0.02	1.87	0.01	-0.11	-6.34	-0.26			-CC	-CC
LA	8	1A	CR	0.04	-0.06	-0.72	0.06	-0.20	-4.99	-0.22			-CC	-BB
LA	8	1B	CR	0.04	-0.01	-2.09	0.11	-0.06	-3.47	-0.25				-CC
LA	10	1A	CR	0.05	-0.05	2.08	0.10	-0.20	-4.08	-0.28				-CC

Table 10-9  
Correlations among Reading Objectives

<b>Grade</b>	<b>CS</b>	<b>1</b>	<b>2</b>	<b>3</b>
<b>3</b>	2	0.79		
	3	0.79	0.85	
	4	0.60	0.63	0.66
<b>4</b>	2	0.74		
	3	0.75	0.80	
	4	0.65	0.68	0.71
<b>5</b>	2	0.74		
	3	0.75	0.79	
	4	0.64	0.69	0.71
<b>6</b>	2	0.66		
	3	0.68	0.77	
	4	0.68	0.74	0.76
<b>7</b>	2	0.67		
	3	0.72	0.74	
	4	0.64	0.67	0.71
<b>8</b>	2	0.69		
	3	0.68	0.72	
	4	0.66	0.70	0.70
<b>10</b>	2	0.55		
	3	0.69	0.69	
	4	0.65	0.67	0.81

Table 10-10  
Correlations among Mathematics Objectives

Grade	CS	A	B	C	D	E
3	B	0.65				
	C	0.61	0.66			
	D	0.58	0.65	0.63		
	E	0.62	0.66	0.62	0.62	
	F	0.57	0.70	0.60	0.59	0.61
4	B	0.62				
	C	0.60	0.62			
	D	0.62	0.68	0.60		
	E	0.63	0.66	0.60	0.65	
	F	0.63	0.71	0.62	0.67	0.67
5	B	0.62				
	C	0.53	0.54			
	D	0.62	0.68	0.55		
	E	0.67	0.64	0.58	0.64	
	F	0.63	0.69	0.57	0.67	0.67
6	B	0.65				
	C	0.55	0.57			
	D	0.68	0.70	0.55		
	E	0.59	0.61	0.52	0.62	
	F	0.70	0.74	0.57	0.70	0.61
7	B	0.69				
	C	0.66	0.65			
	D	0.63	0.69	0.61		
	E	0.64	0.68	0.62	0.62	
	F	0.70	0.72	0.61	0.63	0.63
8	B	0.63				
	C	0.65	0.60			
	D	0.74	0.69	0.65		
	E	0.64	0.66	0.62	0.69	
	F	0.70	0.67	0.64	0.72	0.68
10	B	0.65				
	C	0.65	0.63			
	D	0.69	0.68	0.72		
	E	0.61	0.62	0.62	0.66	
	F	0.69	0.67	0.72	0.75	0.65

Table 10-11  
Correlations among Language Arts Objectives

Grade	CS	B	D
4	D	0.51	
	F	0.59	0.41
8	D	0.71	
	F	0.61	0.53
10	D	0.72	
	F	0.61	0.58

Table 10-12  
Correlations among Social Studies Objectives

Grade	CS	A	B	C	D
4	B	0.57			
	C	0.53	0.55		
	D	0.54	0.54	0.51	
	E	0.57	0.60	0.56	0.55
8	B	0.66			
	C	0.58	0.62		
	D	0.63	0.63	0.55	
	E	0.52	0.59	0.51	0.50
10	B	0.61			
	C	0.66	0.64		
	D	0.62	0.57	0.65	
	E	0.59	0.59	0.65	0.60

Table 10-13  
Correlations among Science Objectives

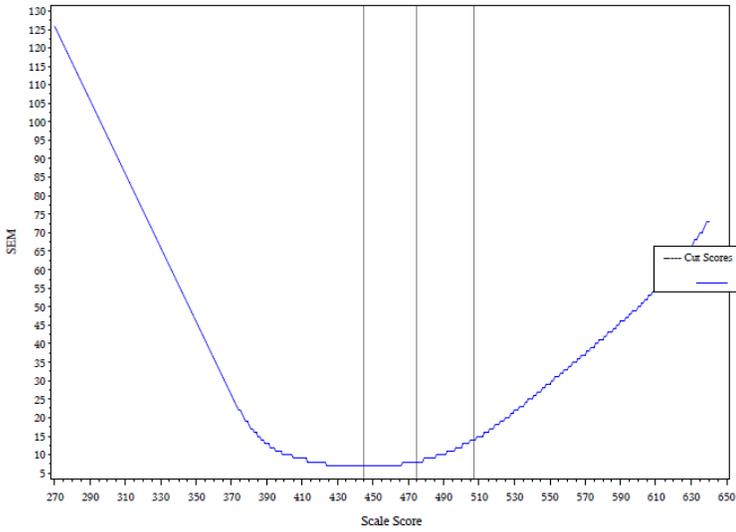
Grade	CS	A/B	C	D	E	F
<b>4</b>	C	0.64				
	D	0.43	0.43			
	E	0.51	0.50	0.40		
	F	0.53	0.52	0.42	0.48	
	G/H	0.61	0.60	0.45	0.52	0.55
<b>8</b>	C	0.60				
	D	0.54	0.52			
	E	0.51	0.48	0.50		
	F	0.58	0.57	0.54	0.51	
	G/H	0.62	0.63	0.54	0.50	0.59
<b>10</b>	C	0.69				
	D	0.56	0.57			
	E	0.59	0.58	0.50		
	F	0.62	0.59	0.52	0.51	
	G/H	0.70	0.70	0.57	0.58	0.62

Table 10-14  
Principal Components Analysis

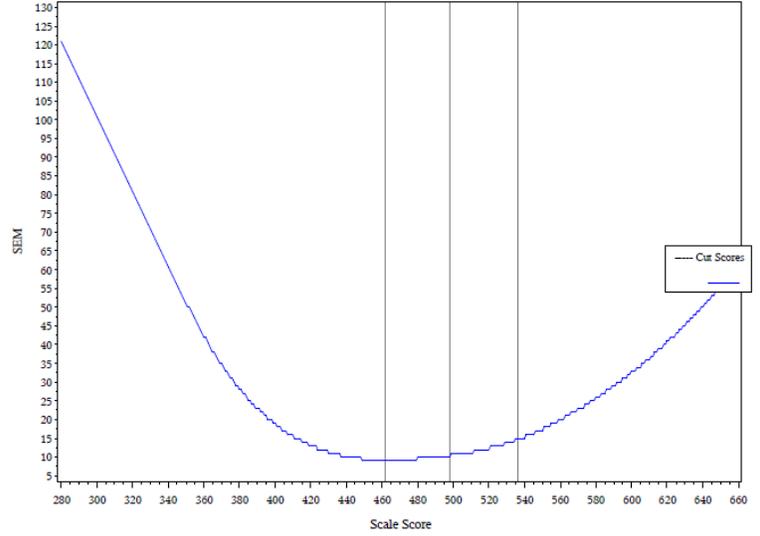
<b>Content Area</b>	<b>Grade</b>	<b>First Eigenvalue</b>	<b>Second Eigenvalue</b>	<b>Ratio of First Two Eigenvalues</b>
<b>Reading</b>	3	14.23	1.77	8.02
	4	11.99	1.54	7.78
	5	11.19	1.57	7.14
	6	11.08	1.87	5.92
	7	10.16	1.64	6.18
	8	9.79	1.61	6.07
	10	10.50	1.48	7.12
<b>Mathematics</b>	3	11.32	1.70	6.67
	4	10.85	1.58	6.89
	5	10.74	1.74	6.18
	6	11.22	1.89	5.93
	7	11.40	1.54	7.39
	8	11.99	1.65	7.26
	10	11.57	1.55	7.46
<b>Language Arts</b>	4	5.26	1.36	3.86
	8	6.86	1.24	5.52
	10	6.49	1.18	5.50
<b>Social Studies</b>	4	6.66	1.38	4.83
	8	7.90	1.60	4.93
	10	9.04	1.68	5.39
<b>Science</b>	4	7.27	1.24	5.86
	8	7.71	1.53	5.03
	10	9.60	1.19	8.04

Figure 7-1  
SEM Curves, Reading Grades 3–8, 10

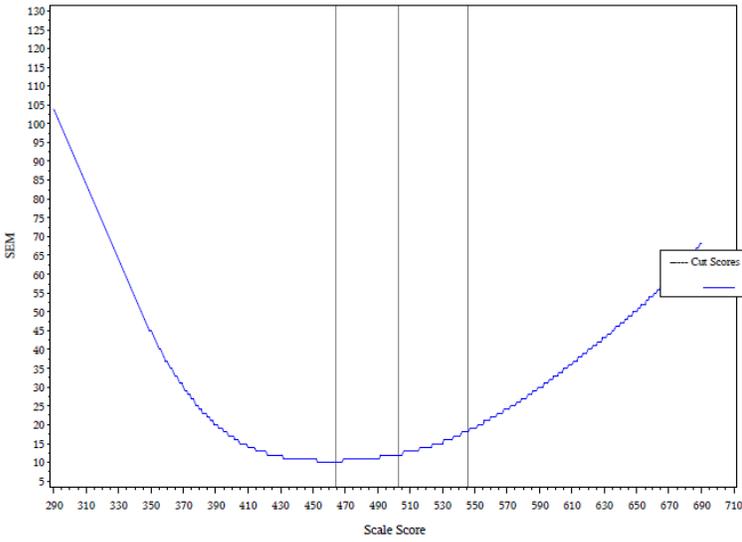
**RD03**



**RD04**



**RD05**



**RD06**

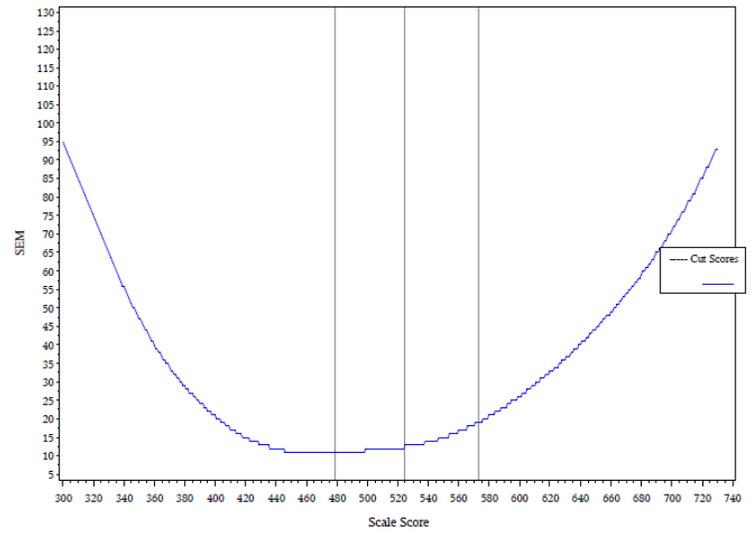
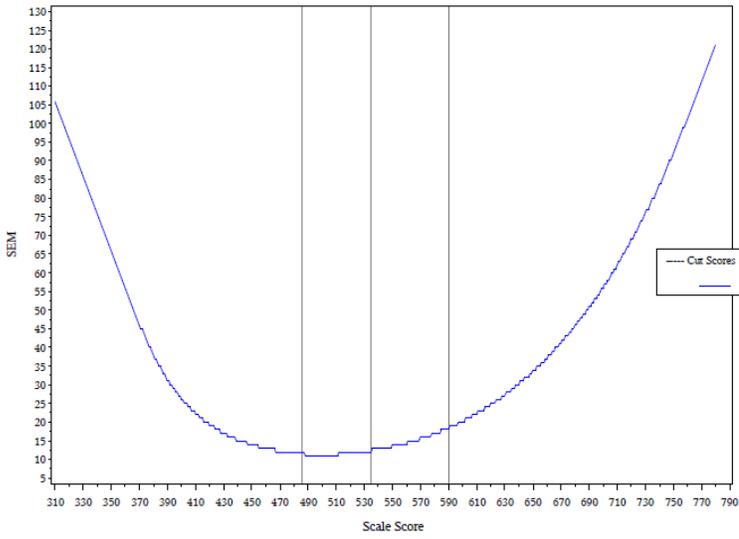
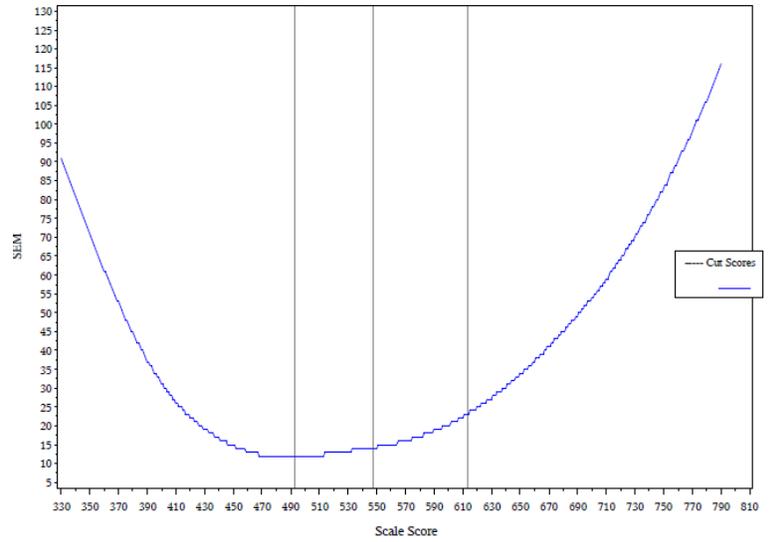


Figure 7-1 Cont'd  
SEM Curves, Reading Grades 3–8, 10

RD07



RD08



RD10

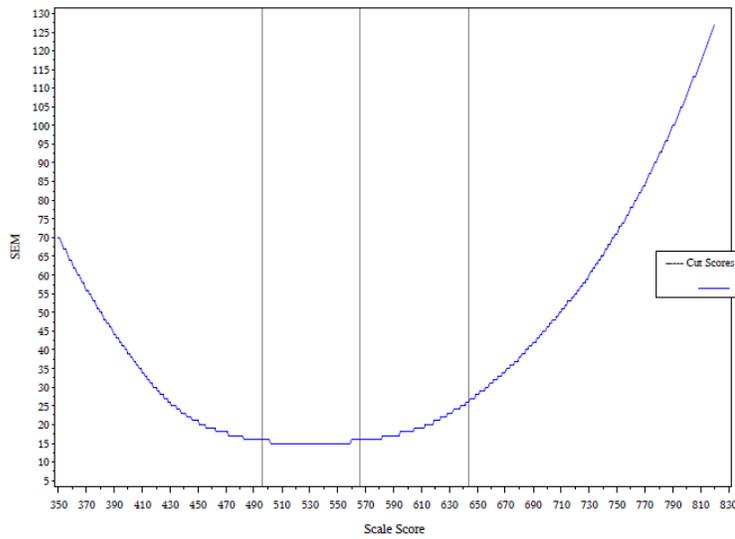
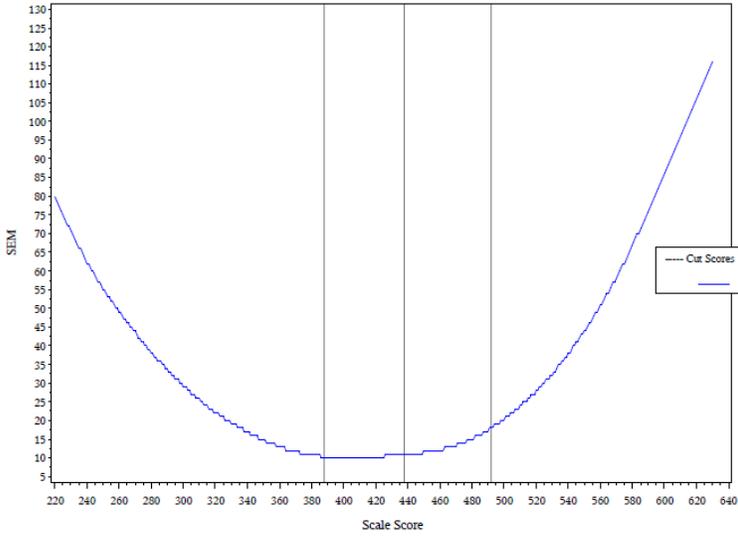
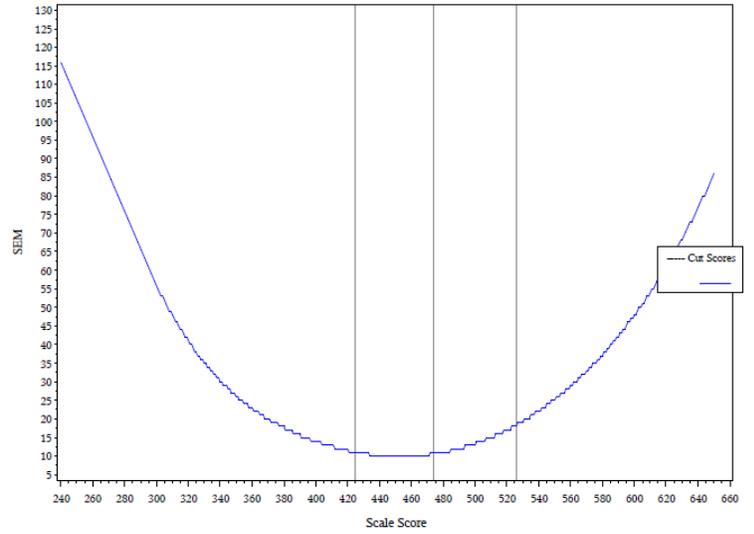


Figure 7-2  
SEM Curves, Mathematics Grades 3–8, 10

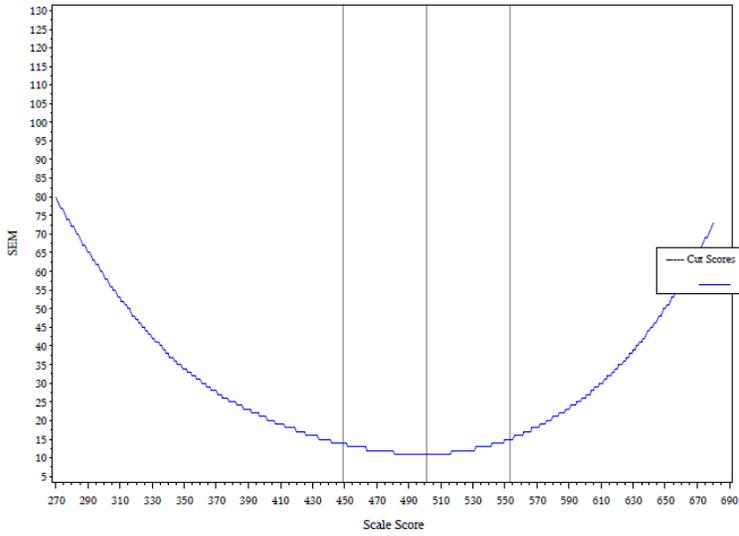
MA03



MA04



MA05



MA06

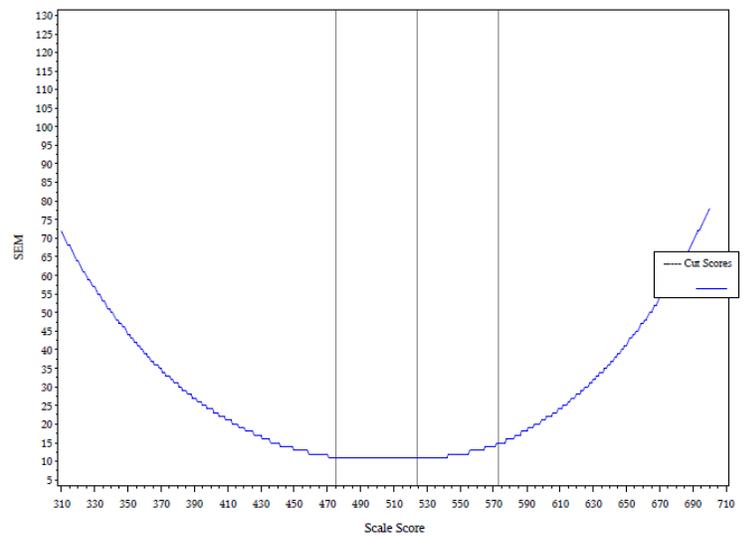


Figure 7-2 Cont'd  
SEM Curves, Mathematics Grades 3–8, 10

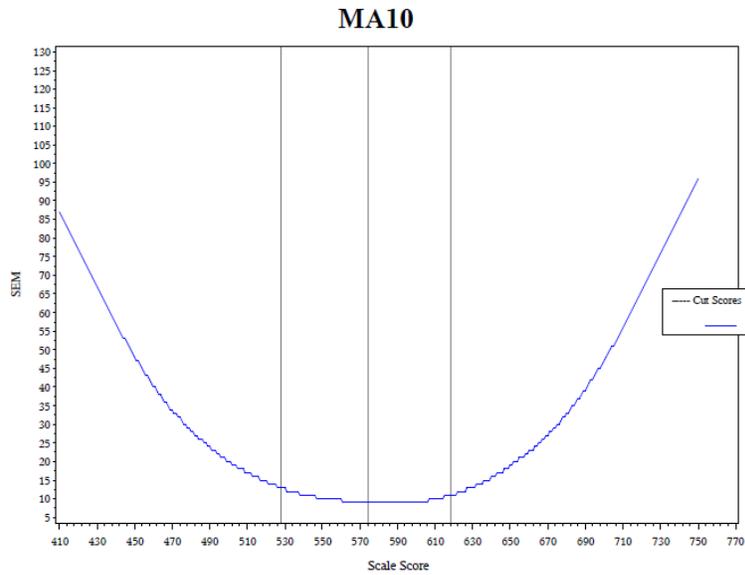
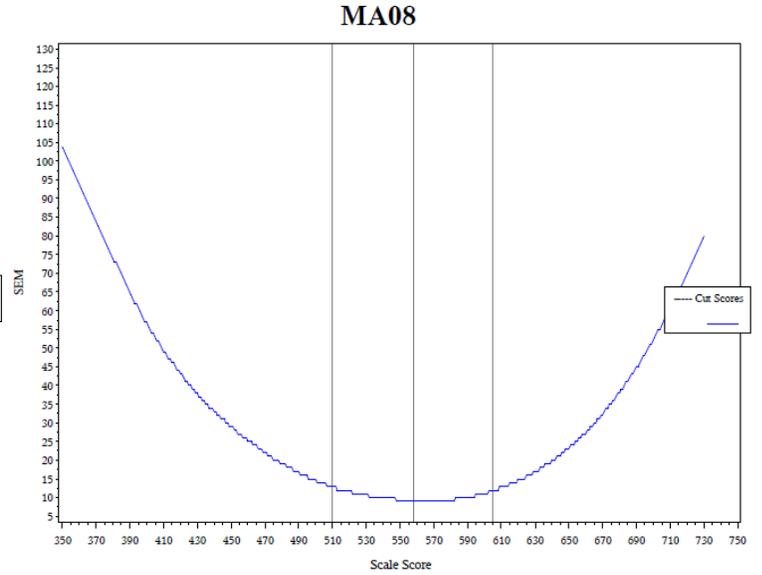
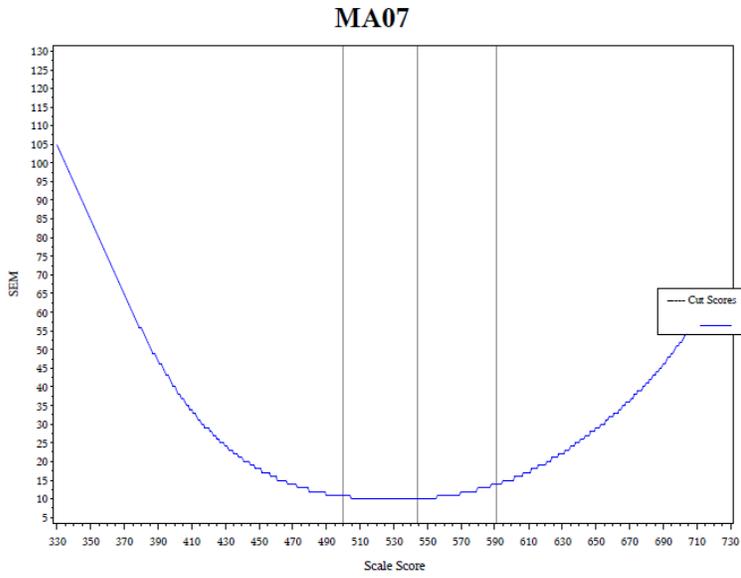


Figure 7-3  
SEM Curves, Language Arts Grades 4, 8, 10

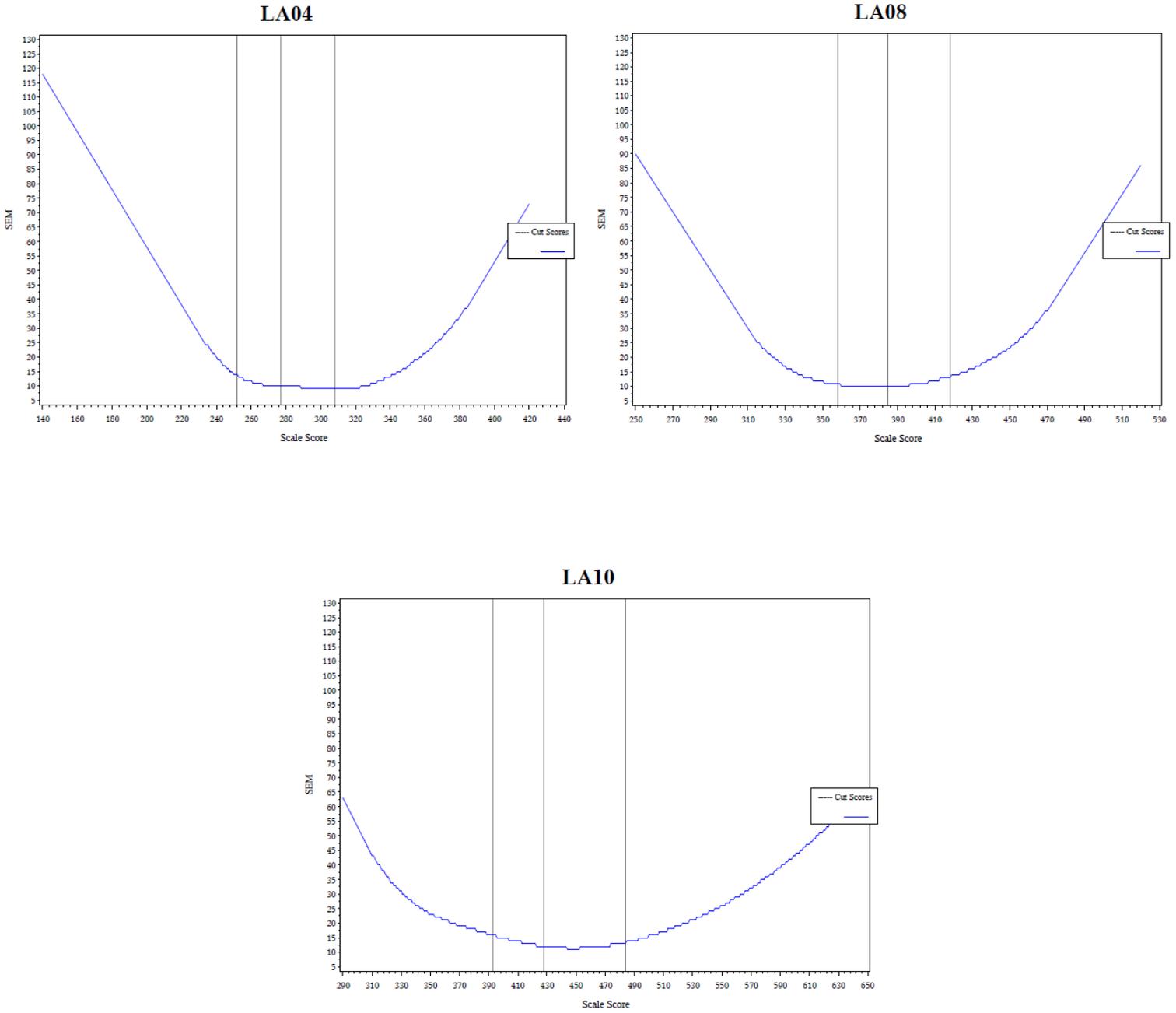
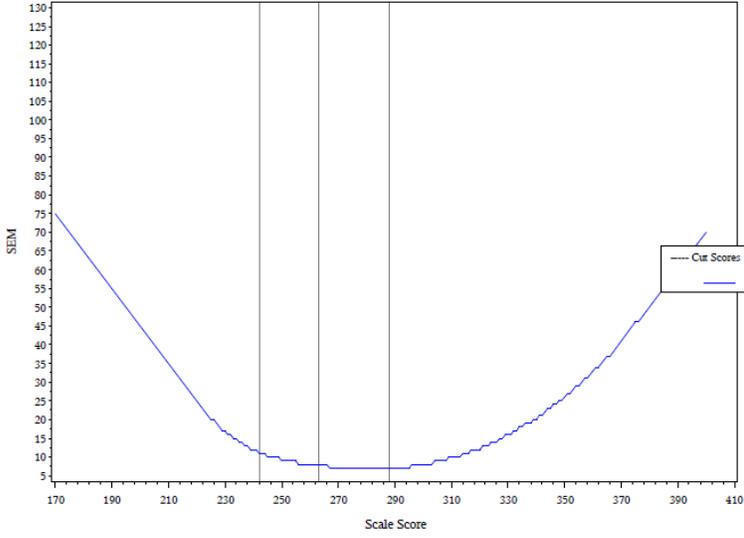
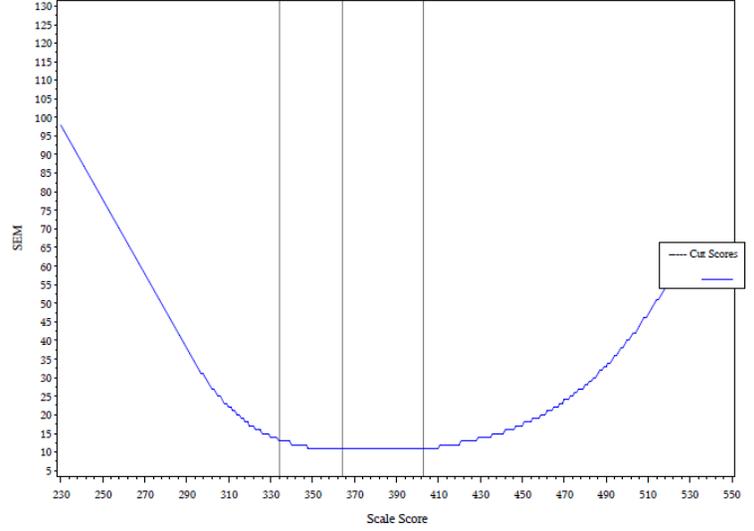


Figure 7-4  
SEM Curves, Social Studies Grades 4, 8, 10

**SS04**



**SS08**



**SS10**

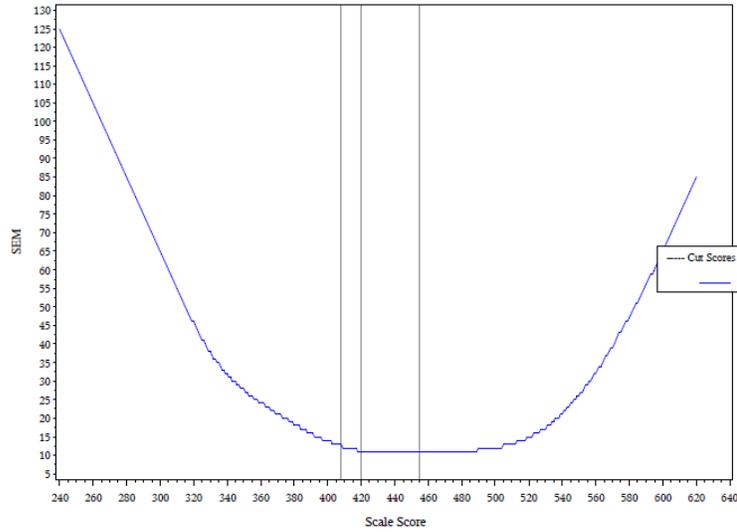


Figure 7-5  
SEM Curves, Science Grades 4, 8, 10

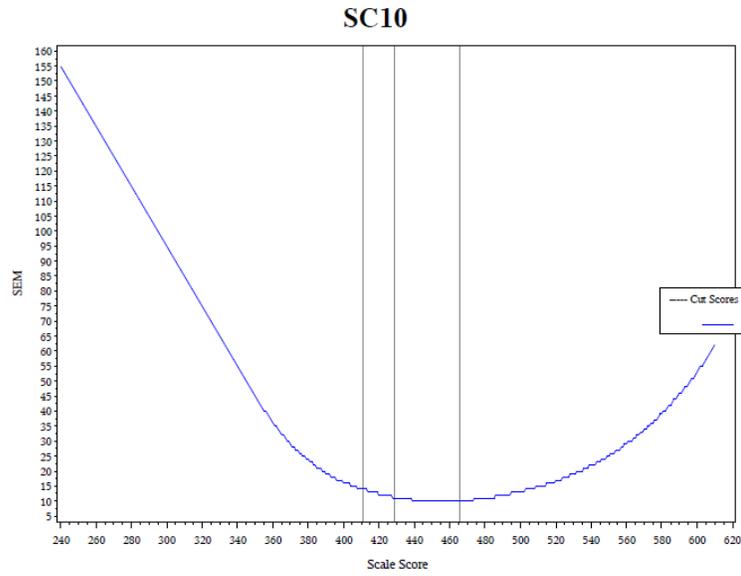
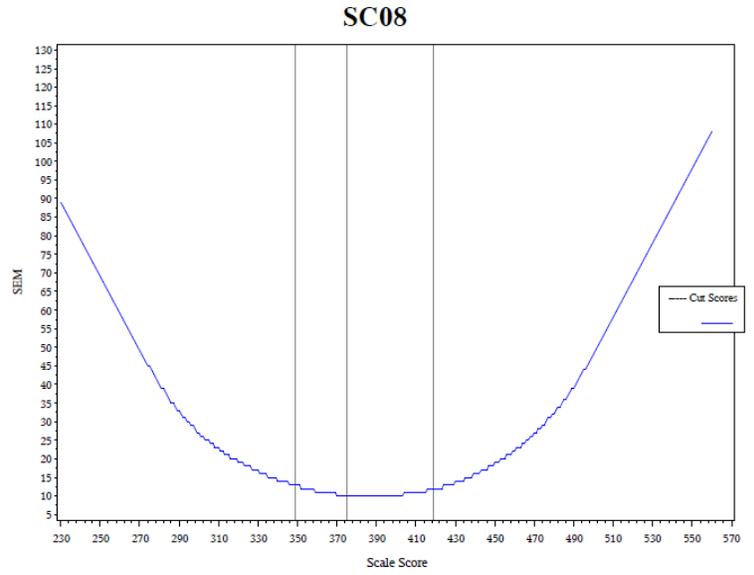
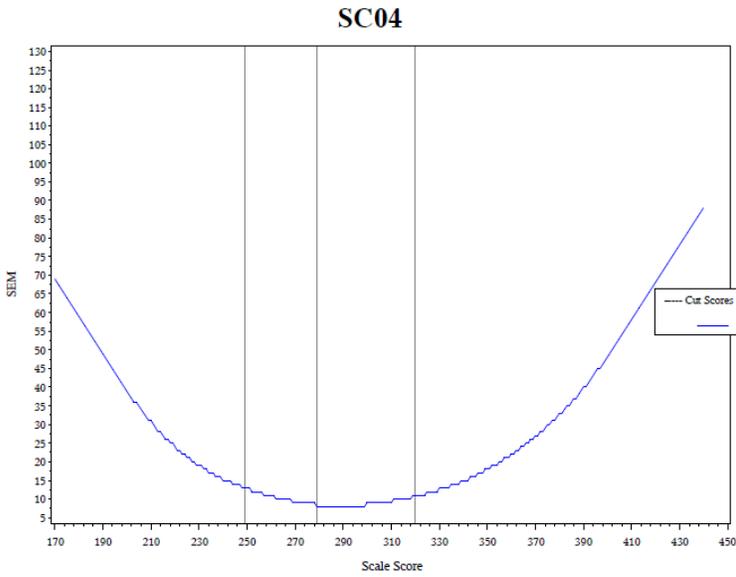


Figure 7-6  
TCC Curve, Reading Grades 3–8, 10

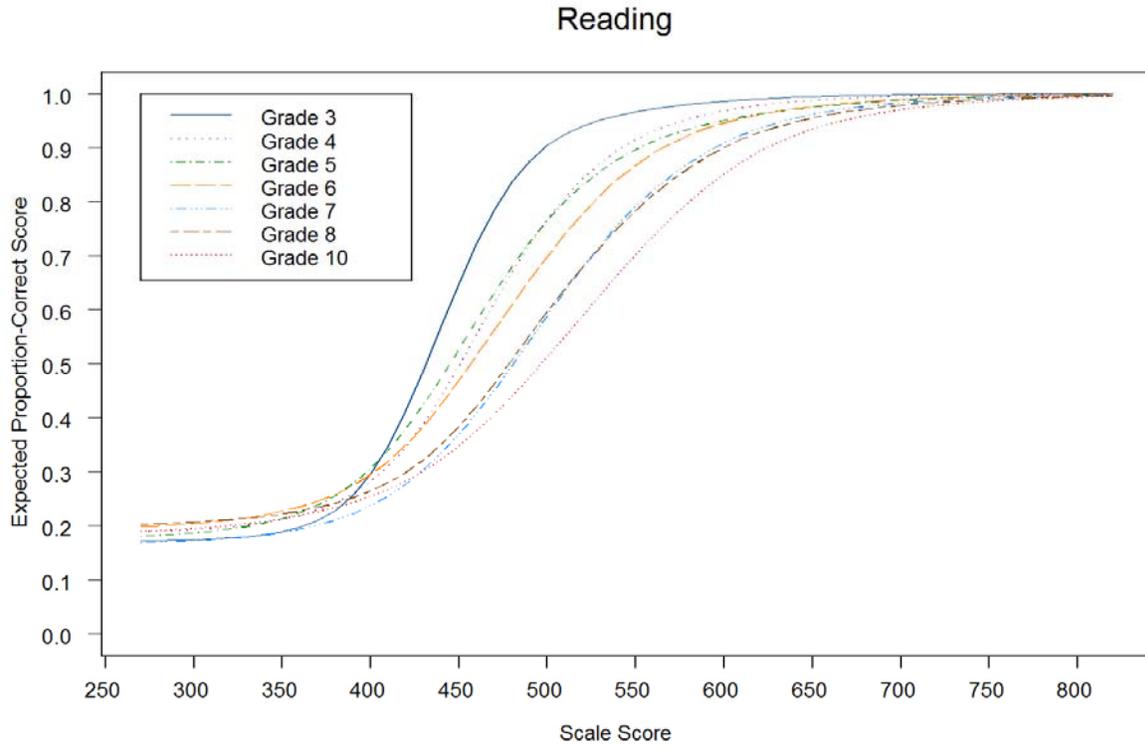


Figure 7-7  
TCC Curve, Mathematics Grades 3–8, 10

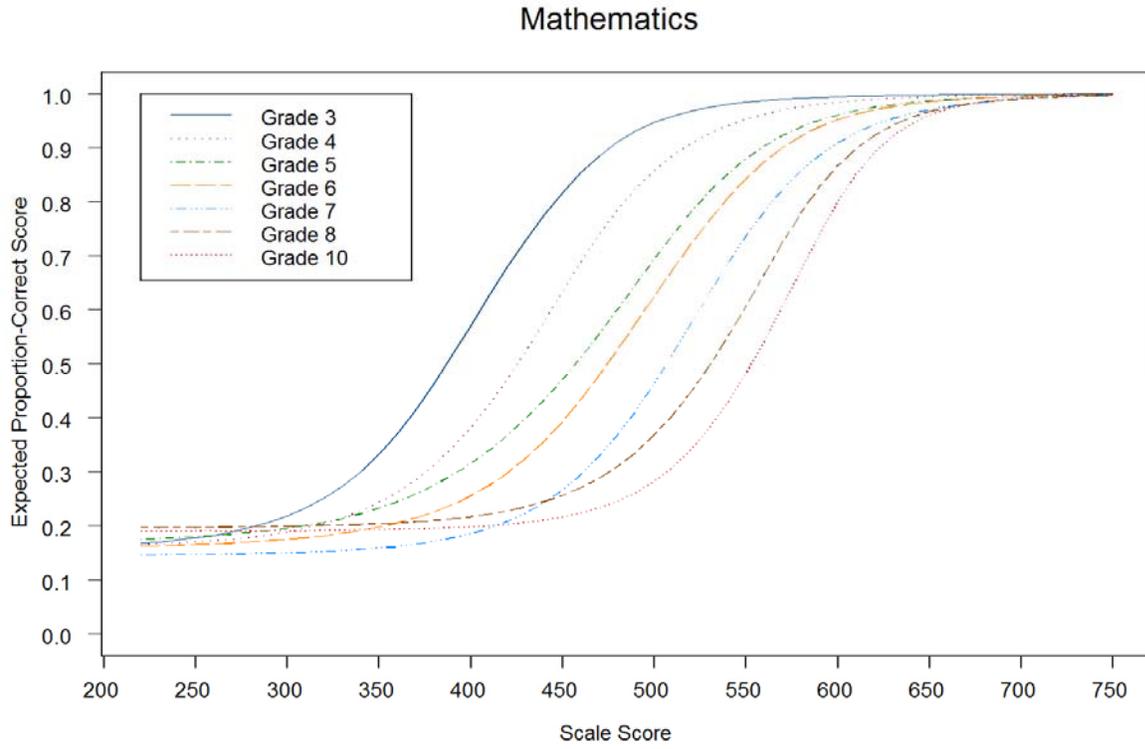


Figure 7-8  
TCC Curve, Language Arts Grades 4, 8, 10

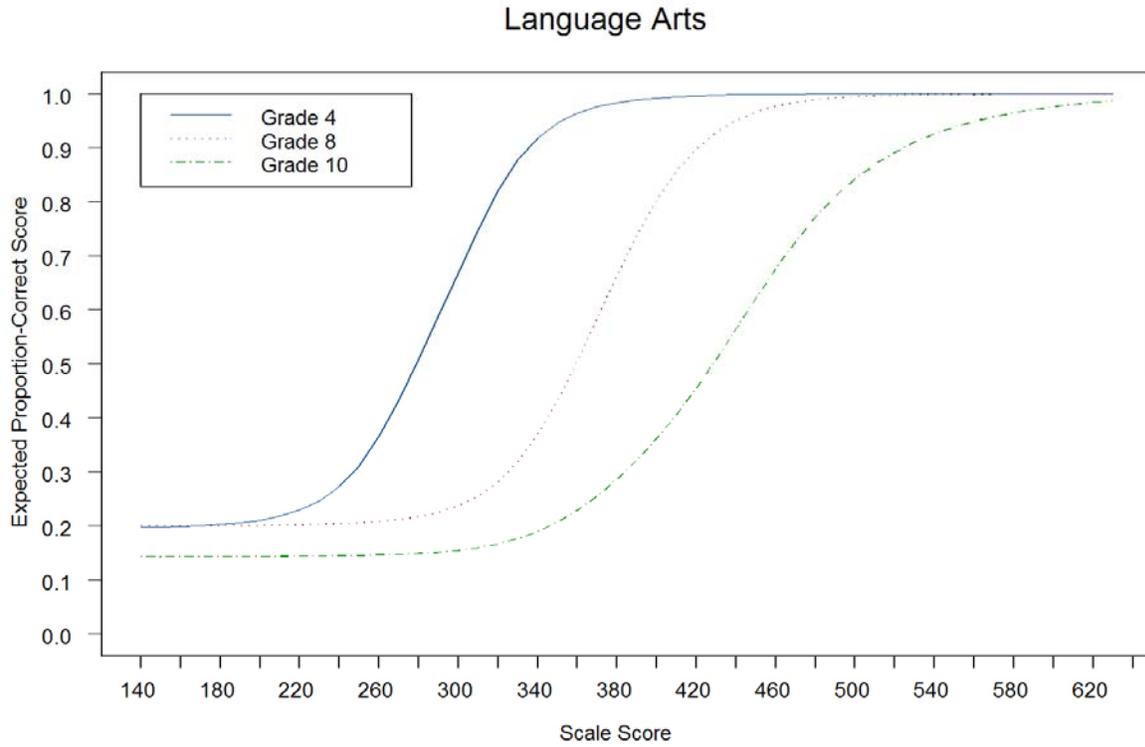


Figure 7-9  
TCC Curve, Social Studies Grades 4, 8, 10

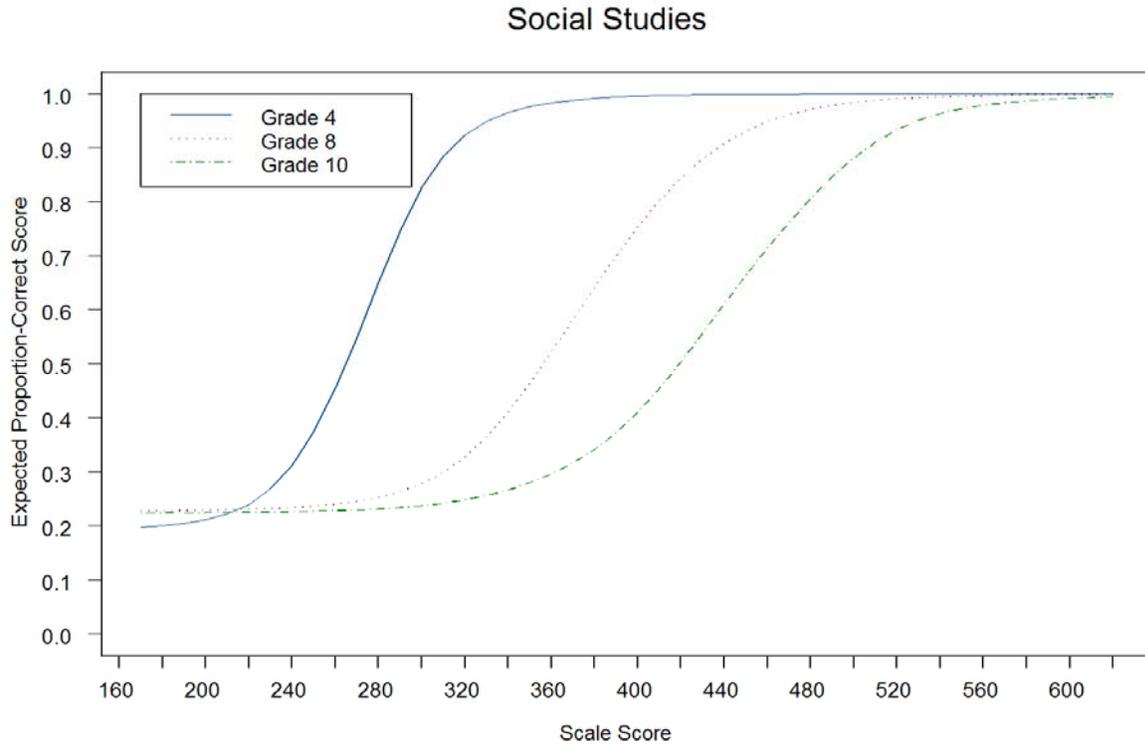


Figure 7-10  
TCC Curve, Science Grades 4, 8, 10

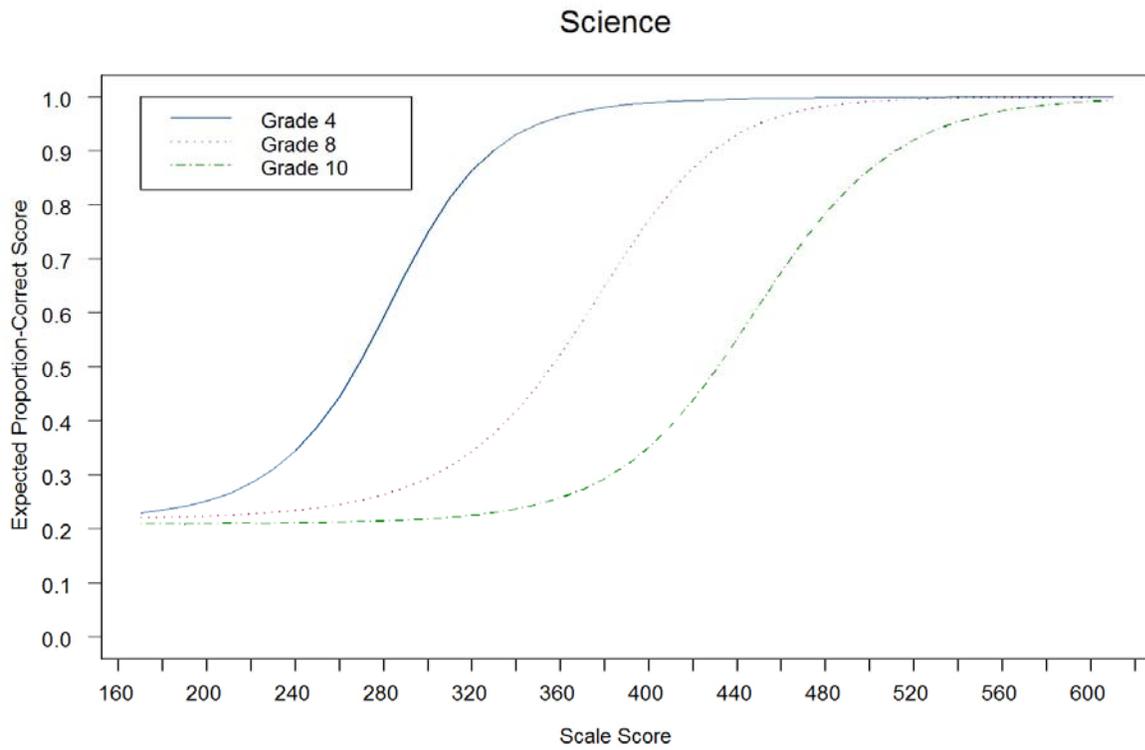


Figure 9-1  
 Reading Indices for Classification Consistency and Classification Accuracy

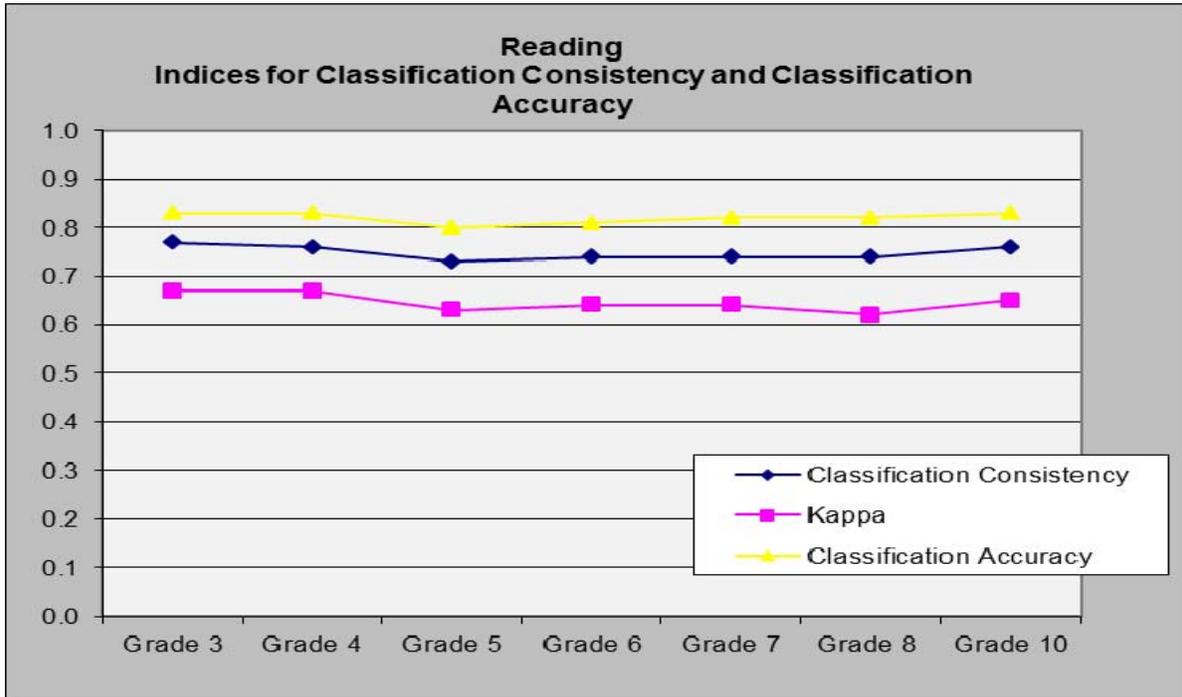


Figure 9-2  
 Mathematics Indices for Classification Consistency and Classification Accuracy

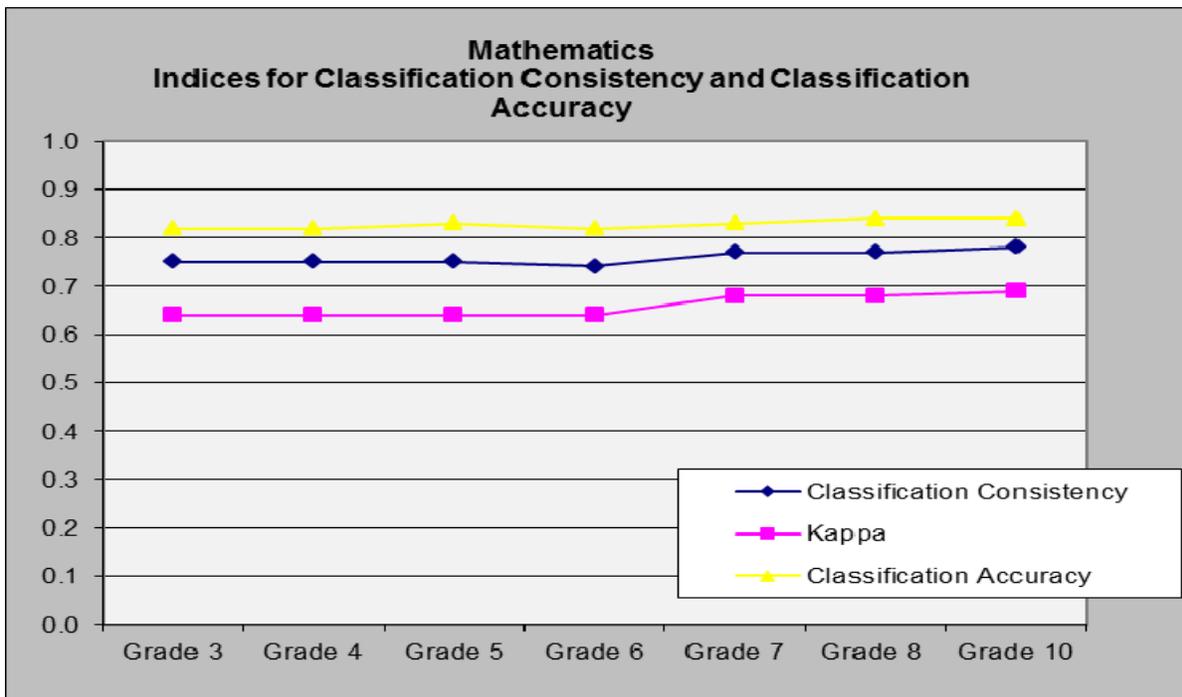


Figure 9-3  
 Language Arts Indices for Classification Consistency and Classification Accuracy

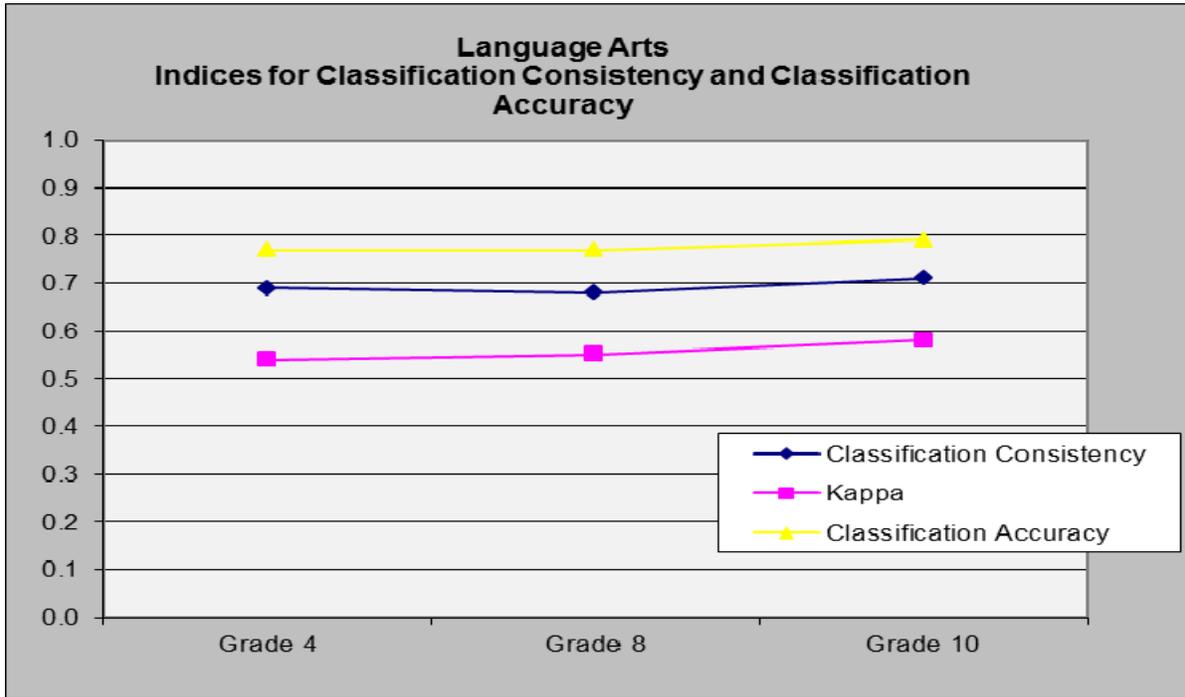


Figure 9-4  
 Social Studies Indices for Classification Consistency and Classification Accuracy

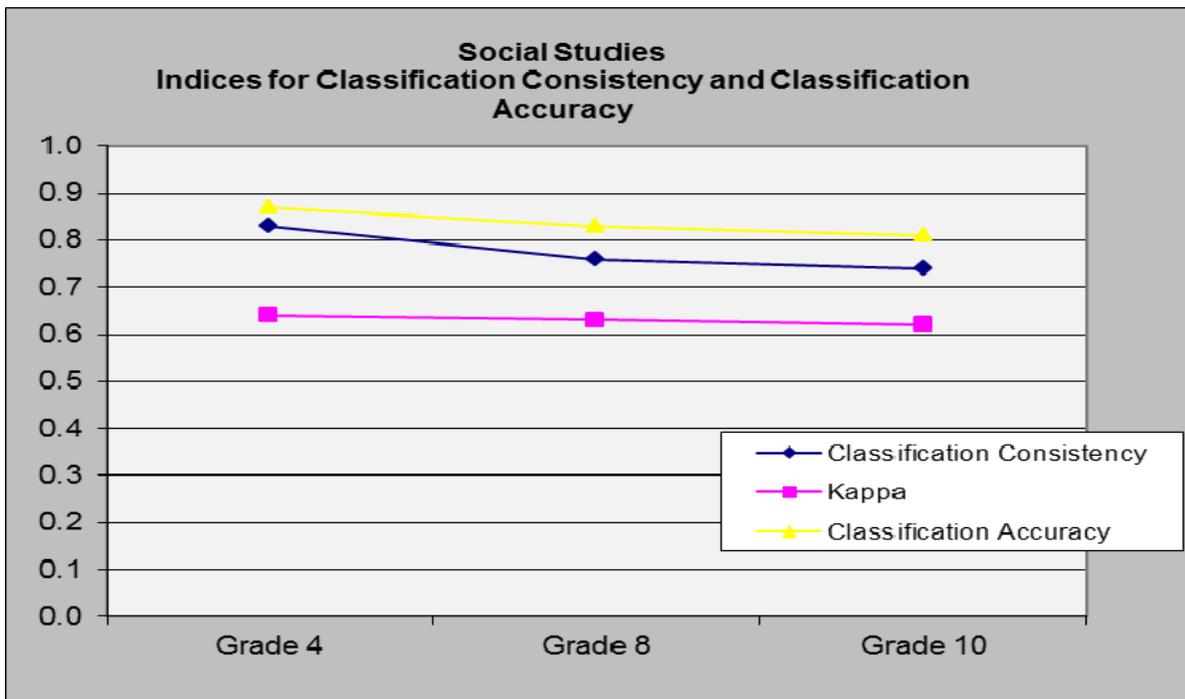
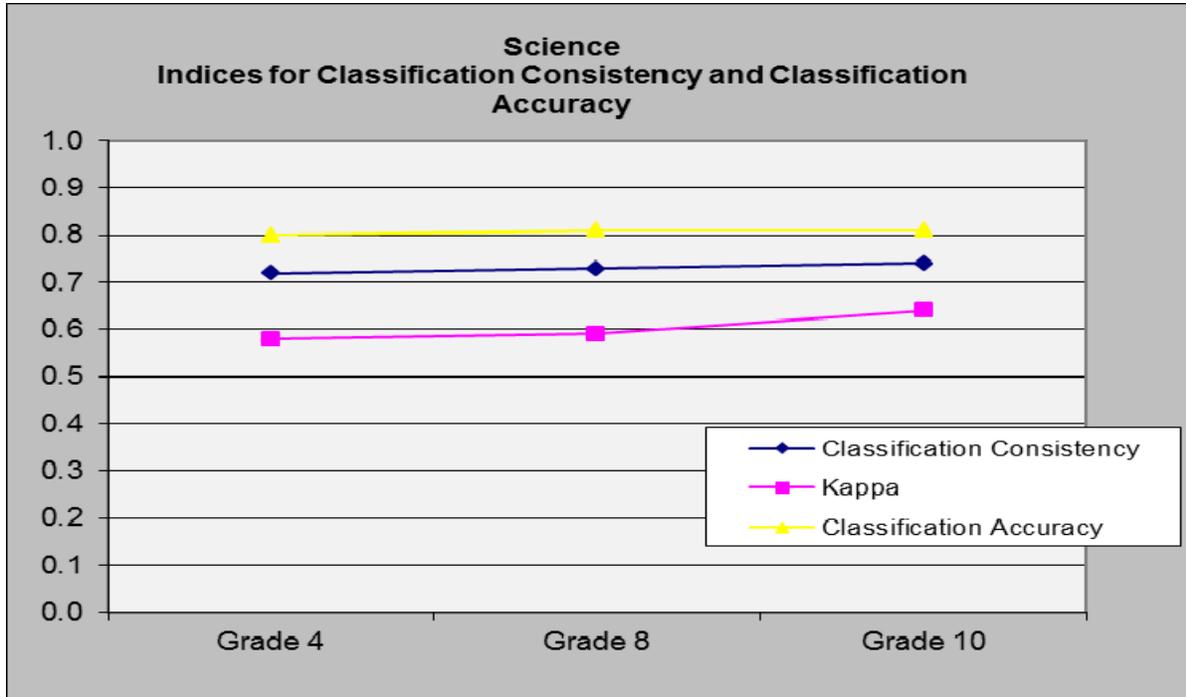


Figure 9-5  
Science Indices for Classification Consistency and Classification Accuracy



## **Appendix 1: Fall 2009 Item Selection Check-Off Form**

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## Fall 2009 Item Selection Check-Off Form

<b>Program Name:</b>	Wisconsin Knowledge and Concepts Examinations (WKCE)
<b>Administration Year:</b>	Fall 2009
<b>Content Area:</b>	
<b>Grade Level:</b>	

	Fall 2008				Anchor Items: Fall 2009				Total Form: Fall 2009			
	No. Items	% No. Items	No. Points	% No. Points	No. Items	% No. Items	No. Points	% No. Points	No. Items	% No. Items	No. Points	% No. Points
SR												
CR												
Prompt												
Total												

**Blueprint Comparison (Number of items)**

Reporting Category	Fall 2008 Blueprint Requirement			Fall 2009 Blueprint Requirement			Fall 2008 Actual Content Distribution			Fall 2009 Anchors			Fall 2009 Anchors			Fall 2009 Complete Form		
	SR	CR	Prompt	SR	CR	Prompt	SR	CR	Prompt	SR	CR	Prompt	SR	CR	Prompt	SR	CR	Prompt
A																		
B																		
C																		
D																		
E																		
F																		
G																		
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

**Blueprint Comparison (% of items)**

Reporting Category	Fall 2008 Blueprint Requirement			Fall 2009 Blueprint Requirement			Fall 2008 Actual Content Distribution			Fall 2008 Anchors			Fall 2009 Anchors			Fall 2009 Complete Form		
	SR	CR	Prompt	SR	CR	Prompt	SR	CR	Prompt	SR	CR	Prompt	SR	CR	Prompt	SR	CR	Prompt
A																		
B																		
C																		
D																		
E																		
F																		
Total																		

**Fall 2008 Form Distribution of Items by DOK & Objective (number of items)**

Objective	Obj DOK	DOK Level 1	DOK Level 2	DOK Level 3	DOK Level 4	50% ≥ Obj DOK?	Comments
A							
B							
C							
D							
E							
F							
G							

\*Combine SR & CR items

**Answer Key Distribution**

	A	B	C	D
<b>Selected Items</b>				
<b>Session 1</b>				
<b>Session 2</b>				
<b>Session 3</b>				
<b>Session 4</b>				
<b>Session 5</b>				
<b>Total Test</b>				

- The "Selected Items" entry should be the same as the sum of the 5 sessions on the total test.

**Number of Items on DPI Watch List**

	<b>Anchor Items</b>	<b>Full Form</b>	<b>Item PEID IDs</b>	<b>Reasons for Use of Watch Items</b>
<b>Number of items</b>				

**Number of easy and difficult items for preventing ceiling and floor effect**

	<b>Previous Year's Form</b>			<b>Current Year's Anchors</b>			<b>Current Year's Full Form</b>		
	<b>SR</b>	<b>CR</b>	<b>ER</b>	<b>SR</b>	<b>CR</b>	<b>ER</b>	<b>SR</b>	<b>CR</b>	<b>ER</b>
<b>Mean P-value</b>									
<b>No. of items: P &lt; .30</b>									
<b>No. of items: .30 &lt; P &lt; .40</b>									
<b>No. of items: .80 &lt; P &lt; .90</b>									
<b>No. of items: P &gt; .90</b>									

**Number of items flagged for point biserials (Pbis) indicating poor discrimination**

	Fall 2008 Form			Fall 2009 Anchors			Fall 2009 Full Form		
	SR	CR	ER	SR	CR	ER	SR	CR	ER
No. of items: Pbis < .15									
No. of items: Pbis for distracter > 0									
No. of items: Pbis for correct choice is negative									
PEID ID of Flagged Items in Current Form:									
Reasons for Using Flagged Items in Current Form:									

**Number of items near the Proficient Cut Score**

	Fall 2008 Form		Anchors 2009 (SR only)		Fall 2009 Form	
	SR	CR	SR	CR	SR	CR
Proficient cut score = _____						
No. of items +/- 8 points around cut score						

**TCCs overlay each other closely?**

	<b>Fall 2008 Form and Fall 2009 Anchors</b>	<b>Fall 2008 Form and Fall 2009 Form</b>	<b>Fall 2008 Anchor and Fall 2009 Form</b>
<b>TCCs of Selected Form</b>			

**SE curves are smoothly bow-shaped without dips, bumps, and twists?**

	<b>Fall 2008 Form and Fall 2009 Anchors</b>	<b>Fall 2008 Form and Fall 2009 Form</b>	<b>Fall 2008 Anchor and Fall 2009 Form</b>
<b>SE curves of Selected Form</b>			

**Expected % Max. RS Difference between any two Selected Forms  $\leq 0.05$ :**

	<b>Fall 2008 Form and Fall 2009 Anchors</b>	<b>Fall 2008 Form and Fall 2009 Form</b>	<b>Fall 2008 Anchor and Fall 2009 Form</b>
<b>Max Raw Score Difference</b>			

**Number of Items with DIF**

Group	Statistic	Fall 2008 Form		Fall 2009 Anchors		Fall 2009 Full Form		PEID ID of Items Flagged using one or more DIF method
		Against	Favor	Against	Favor	Against	Favor	
Gender	Female (Linn-Harnisch)							
	Male (Linn-Harnisch)							
	Mantel-Haenszel							
Ethnicity	White (Linn-Harnisch)							
	African American (Linn-Harnisch)							
	African American (Mantel-Haenszel)							
	Hispanic (Linn-Harnisch)							
	Hispanic (Mantel-Haenszel)							
	Asian (Linn-Harnisch)							
	Asian (Mantel-Haenszel)							
	American Indian (Linn-Harnisch)							
	American Indian (Mantel-Haenszel)							

**Number of Items with DIF cont'd**

<b>ELL</b>	Proficient (Linn-Harnisch)							
	Not Proficient (Linn-Harnisch)							
	Mantel-Haenszel							
<b>SES</b>	Disadvantaged (Linn-Harnisch)							
	Not Disadvantaged (Linn-Harnisch)							
	Mantel-Haenszel							
<b>Disability</b>	Disabled (Linn-Harnisch)							
	Not Disabled (Linn-Harnisch)							
	Mantel-Haenszel							

**Number of Items with Less Than Optimal Fit**

	Fall 2008 Form	Fall 2009 Anchor	Fall 2009 Full Form	PEID ID of Items Flagged using one or more DIF method	Reasons for Using Flagged Items
Fit					

**Items Dropped in Fall 2008 Test to Not Use in Future Tests**

Grade	Subject	Item#	PEID-Item	Form





***Approvals: Two independent reviews and approvals within Development are required prior to submitting to Research***

	<b>Name</b>	<b>Digital Signature</b>	<b>Date</b>
<b>Assessment Editor I</b>			
<b>Assessment Editor II</b>			
<b>Project Mgr/Development Lead</b>			
<b>Research Scientist</b>			
<b>WDPI</b>			

## **Appendix 2: 2013 WKCE Assessment Accommodations Matrix**

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## THE ASSESSMENT ACCOMMODATIONS MATRIX FOR STUDENTS WITH DISABILITIES - UPDATED 2014



### Accommodations for Students with Disabilities

#### on the *Wisconsin Knowledge and Concepts Examination (WKCE)* and *Wisconsin Alternate Assessment for Students with Disabilities (WAA-SwD)* for Science and Social Studies

- All accommodations for a student with a disability must be documented on an IEP or Section 504 plan in the section for statewide assessment.\* Refer to page 2
- All *Allowable Test Practices for All Students* may be documented in an IEP or Section 504 plan in the section for statewide assessment.
- Accommodations should be consistent with day-to-day instructional methods and should not be first introduced during testing.
- Accommodations should enhance access without changing the skill or construct measured.
- Districts should monitor the use of accommodations by comparing assessment accommodations received with those stated in IEP or Section 504 plans.

Accommodation Description For Students with Disabilities (D)		WKCE	WAA-SwD
<b>Test Directions</b>			
D 1	Sign language for directions. <sup>1,10</sup>	✓	✓
D 2	Mark or highlight directions. <sup>1,2,3</sup>	✓	<i>N/A: Test administrator reads WAA-SwD aloud.</i>
D 3	Provide printed copy of teacher directions (i.e. bold text following the SAY icon) from the WKCE Test Administration Manual. <sup>1</sup>	✓	<i>N/A: Test administrator reads WAA-SwD aloud.</i>
D 4	Explain or clarify directions. <sup>1</sup>	✓	✓
D 5	Student rereads and/or restates directions. <sup>1</sup>	✓	✓
<b>Content Presentation</b>			
D 6	Turn pages for student.	✓	✓
D 7	Braille; student responses must be transcribed into scorable test book by a licensed teacher of the visually impaired or a certified transcriber. <sup>6,13</sup>	✓	✓
D 8	DPI-provided WAA-SwD Picture Descriptions; appropriate only for a student who cannot access the printed WAA-SwD, even with magnification, or the Braille WAA-SwD. <sup>12</sup>	N/A	✓
D 9	Large-print; student responses must be transcribed into scorable test book. <sup>6,13</sup>	✓	<i>N/A: WAA-SwD is 18 pt. font, no separate large print edition.</i>
D 10	Extra test book; answers must be recorded in one scorable test book. <sup>13</sup>	✓	<i>N/A: All items are presented to the student so that they view one entire item at a time.</i>
D 11	Sign language for test passages and questions. <sup>10</sup>	✓	✓
D 12	Text talker for test passages and questions. <sup>4</sup>	✓	<i>N/A: Test administrator reads WAA-SwD aloud.</i>
D 13	Student reads aloud to self.	✓	✓
D 14	Test administrator reads test passages and questions aloud. <sup>8</sup>	✓	<i>N/A: Test administrator reads WAA-SwD aloud.</i>
D 15	Student records him/herself reading aloud and plays back recording. <sup>4</sup>	✓	✓
D 16	Audio recording of test passages and questions in English. <sup>4,8</sup>	✓	<i>N/A: Test administrator reads WAA-SwD aloud.</i>

## THE ASSESSMENT ACCOMMODATIONS MATRIX FOR STUDENTS WITH DISABILITIES - UPDATED 2014



Accommodation Description For <i>Students with Disabilities</i> (D)		WKCE	WAA-SwD
<b>Response</b>			
D 17	Manipulatives or 3-D objects.	✓	✓ Follow guidelines in WAA-SwD Manipulatives Guide. <a href="http://oea.dpi.wi.gov/files/oea/pdf/maniguide.pdf">http://oea.dpi.wi.gov/files/oea/pdf/maniguide.pdf</a>
D 18	Braille output device; transcribe student responses into scorable test book. <sup>4, 6, 13</sup>	✓	✓
D 19	Student indicates responses orally to scribe. <sup>5</sup>	✓	<i>N/A: Test administrator records all student responses.</i>
D 20	Student signs responses to interpreter/scribe. <sup>5, 10</sup>	✓	✓
D 21	Student records responses using an audio or video device: a) Test administrator transcribes student's responses into scorable test book. <sup>6, 13</sup> b) Student watches or listens to his/her recorded responses and transcribes into scorable test book. <sup>4, 6, 13</sup>	✓	<i>N/A: Student is allowed to communicate responses in whichever mode is best for the student. Test administrator records student responses.</i>
D 22	Speech-to-text devices; responses must be transcribed into the scorable test book. <sup>4, 6, 13</sup>	✓	N/A
<b>Setting</b>			
D 23	Student moves, stands, or paces during individual administration.	✓	✓
<b>Timing/Scheduling</b>			
D 24	Extra time; test session must be completed within the same day the student started the session. <sup>7</sup>	✓	<i>N/A: WAA-SwD is an untimed test.</i>
<b>Other Accommodations for Students with Disabilities</b>			
D 25	Any accommodation not on this list must be submitted to DPI for approval, as it may represent a modification which changes the skill being measured. <ul style="list-style-type: none"> <li>○ All requests for additional accommodations must be made to DPI <b>at least two weeks before the test administration window</b> begins, by completing and submitting the Request for Accommodation Form located at <a href="http://oea.dpi.wi.gov/oea_accommtrx">http://oea.dpi.wi.gov/oea_accommtrx</a>.</li> <li>○ Requests will be reviewed by a committee to determine whether the request can be approved; approval or non-approval will be returned via fax or email.</li> </ul>		

### \*Allowable Accommodations for Students in Unique Circumstances

Some students who do *not* have an IEP or 504 plan, due to unique circumstances at the time of testing, may be able to demonstrate their learning more accurately through the use of accommodations on an **as needed basis only**. In these unique cases, please follow the guidelines outlined in the matrix for Students with Disabilities; call DPI's Office of Student Assessment with any questions at (608) 267-1072. Examples of unique circumstances:

- A student with a broken arm may need a scribe or be able to use a word processor to record responses.<sup>4</sup>
- A student who forgot to wear eyeglasses may need a visual magnification device.

# THE ASSESSMENT ACCOMMODATIONS MATRIX FOR STUDENTS WITH DISABILITIES - UPDATED 2014

**Explanation of Footnotes** - Only footnotes 1-8, 10, 12 and 13 apply to students with disabilities.

## <sup>1</sup> **Test directions:**

- Any portion of the WKCE test book where the word “Directions” appears in a shaded/colored box, typically at the top of a page preceding a particular section of test content. In addition, test directions refer to anything that the test administrator reads aloud to the class from the WKCE Test Administration Manual (i.e. bold text following the SAY icon).
- WKCE item stems and test questions should not be considered directions.
- Test Directions for the WAA-SwD are incorporated into the teacher test book and are read aloud to the student. These directions must be read verbatim but may be reread if a student needs further clarification.
- Directions may not be expanded.

<sup>2</sup> **Marking test book with #2 pencil:** Student should not make pencil marks near answer bubbles, other than to mark one correct answer. Student should not mark in any of the following areas in the test book:

- the student Pre-ID Barcode on barcode label,
- the timing tracks (the parallel lines along the side of the test book),
- the skunk lines (the little squares and rectangles across the bottom of each page of the test book), or
- the Litho codes (the squares and numbers across the bottom of the first and last page of the test book).

## <sup>3</sup> **Highlighters:**

- Carefully supervise the use of highlighters as they may cause smudging of pencil marks and bubbles and, therefore, could affect scoring.
- Do not allow the highlighting of track marks, litho codes, skunk lines, barcodes, pre-slugged bubbles or any carbon black printing. The highlighters cause these black inks to blur and bleed, which could affect scoring.
- Use only a highlighter from the following list, which were tested and found to have minimal problems:
  - Avery Hi-liter (regular or thin-tipped), Bic Brite-Liner, Sanford Major Accent, or Sanford Pocket Accent (thin-tipped)

<sup>4</sup> **Using audio/video or electronic (e.g., word processor or text talker) recordings:** when using audio, video, electronic recordings or saved files, the test administrator must ensure that the recording or file is deleted upon completion of testing for security purposes.

<sup>5</sup> **Use of a scribe** (student dictates orally to scribe):

- A scribe may be provided when a student’s documented disability, ELL status, or injury prevents them from writing their answer.
- When a student dictates responses orally to a scribe, the test must be administered in a separate, individual setting so as not to disturb other students.
- A scribe must be impartial and should allow the student adequate time to review and approve the response, if desired.
- All scribing should be done with a #2 pencil; responses scribed in ink will not be scored.

<sup>6</sup> **Transcribing student responses** (student’s answers are documented in a manner other than in the scorable test book [e.g., large-print, Braille version, computer response, etc]):

- The answers must be transcribed into the regular WKCE test book or WAA-SwD student Answer Document with a #2 pencil to be scored.
- Test security must be maintained. After answers are transcribed, destroy all electronically-saved student responses, including audio tapes. All paper copies of student work (e.g., Braille tests, large-print tests, graph/lined/grid paper, printed copies of computer responses, etc.) must be returned with non-scorable test materials.

<sup>7</sup> **Test security during breaks:** Test security must be maintained during all breaks within a testing session. To lessen the risk of a security breach occurring during these breaks, a student requiring the use of restroom facilities should be escorted by either a test administrator or other school staff. In addition, a student must not be allowed to use any form of wireless communication during these breaks.

<sup>8</sup> **Test Administrator Read Aloud Accommodation:**

- Test administrator must read in a pace and tone that is appropriate for each individual student. Careful attention must be given such that no changes in tone or inflection are detectable which might indicate a correct answer.
- Students may direct test administrator to reread a portion of a passage, test question, or answer choice as needed.

<sup>9</sup> **For students who have test items and/or directions translated into native language:**

- A qualified translator and interpreter (see [http://oea.dpi.wi.gov/files/oea/pdf/translator\\_guidelines.pdf](http://oea.dpi.wi.gov/files/oea/pdf/translator_guidelines.pdf)) should have a Bachelor's Degree in Modern Languages or a certification in interpretation or translation. When this is not possible, be sure that a translator or interpreter has the following qualifications:
  - Mastery of the target language and dialect
  - Familiarity with both cultures
  - Extensive general and academic vocabulary in both languages
  - Ability to express thoughts clearly and concisely in both languages
- *Translators* work with the written word, transferring meaning from a source language into a target language. *Interpreters* work with the spoken word, transferring meaning from a source language into a target language.
- Translators and interpreters should participate in all aspects of staff training related to test administration and test security.
- For more information about state provided scripts available in Spanish and bilingual word lists in Spanish and Hmong for the WKCE, please see [http://oea.dpi.wi.gov/oea\\_ells](http://oea.dpi.wi.gov/oea_ells).
- In order for this support to be most effective, a student should have content-area knowledge in their native language.

<sup>10</sup> **Sign Language and Oral Interpreters**

- An interpreter needs to be able to translate in the same method of sign language typically used by the student (e.g., American Sign Language [ASL] or English-based Sign Language). The interpreters must not clarify, elaborate, or provide assistance with the meaning of words, intent of test questions, or responses to test items.

<sup>11</sup> **Simplified English:** The test administrator providing an accommodation in which English is simplified for words not related to content or vocabulary should be familiar with the content area being tested. The WAA-SwD is already in simplified language.

Example (Grade 5 WKCE Released Item) of a simplified English test item:

The sales receipt below shows the groceries that José purchased from the supermarket. What is the estimated cost of José's groceries?

*Simplified English:* The receipt below shows the food that José bought from the store. Estimate how much money José spent on the food.

*Note:* It is important that "estimate" remain in this test item because it is part of the standard which is being tested.

<sup>12</sup> **DPI-provided Picture Descriptions** are descriptions of the graphic found within an item. Picture descriptions are intended to replace, *not* supplement graphics for a student who is blind or is visually impaired who is not able to access the printed WAA-SwD, even with magnification, or the Braille WAA-SwD. Ordering information can be found at: [http://oea.dpi.wi.gov/oea\\_dacforms](http://oea.dpi.wi.gov/oea_dacforms).

<sup>13</sup> **Scorable Test Books** are the documents that are returned to the test vendor for scoring. For the WKCE, this is the test book itself. For the WAA-SwD, this is the student Answer Document. All student responses must be recorded on these documents in order to be scored.

## **Appendix 3: WKCE Glossary**

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## Glossary

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### Abbreviations used in the WKCE Technical Report

**2PPC:** The two-parameter partial credit (2PPC) item response theory model. A mathematical model that shows the relationship between student achievement on a test and the discrimination and difficulty of score points for a constructed response item.

**3PL:** Three-parameter logistic (3PL) item response theory model. A mathematical model that shows the relationship between student achievement on a test and a single MC item by decomposing the item into three components: difficulty, discrimination, and guessing.

**AERA:** American Education Research Association. A professional organization whose purpose is to advance the science of educational research and its application.

**APA:** American Psychological Association. A professional organization centered in psychology.

**AYP:** Adequate Yearly Progress. A state-defined criteria of educational accountability required as an outcome of the Federal NCLB law.

**CR:** Constructed-response item. A type of question, designed to elicit student knowledge of content, that typically comprises a question for which students create (write) a response.

**DIF:** Differential item functioning. DIF is the degree to which an item performs differently for one group of examinees than it performs for another group of equally able examinees. DIF refers to differential statistical properties of an item in two equally able groups.

**DOK:** Depth of Knowledge. A system of describing the cognitive level a test item elicits from a student. Items are coded such that level 1 indicates students use lower cognitive levels, such as recall to answer the item correctly, and level 4 indicates students use higher cognitive levels, such as analysis skills, to answer the item correctly.

**DPI:** Wisconsin Department of Public Instruction. The state agency overseeing the implementation of federal and state laws related to public education in Wisconsin.

**ELP:** English Language Proficiency. A student population subgroup category describing students for whom English is a second language. Students are described as fully English proficient or limited English proficient.

**FT:** Field test item. A field test item is a newly developed item in a content area that is being administered to students for the first time. It does not contribute to student's score in a content area on WKCE.

HOSS: Highest obtainable scale score. The highest possible scale score on a test.

ICC: Item characteristic curve. ICCs show the mathematical probabilities of students of varying degrees of achievement answering an item correctly as well as the characteristics of the item (e.g., item difficulty, item discrimination, item guessing).

IRT: Item response theory. IRT is a mathematic model that shows the relationship between student achievement on a test and the performance on a test item.

LA: Language Arts. A content area in the WKCE.

LH: Linn-Harnisch. A DIF statistic that utilizes information provided by the three-parameter IRT model for multiple-choice and constructed-response items.

LOSS: Lowest obtainable scale score. The lowest possible scale score on a test.

MA: Mathematics. A content area in the WKCE.

MC: Multiple-choice item. A type of question, designed to elicit student knowledge of content, that typically comprises a stem and four options. Students must select the correct option.

MH: Mantel-Haenszel. The Mantel-Haenszel (MH  $\chi^2_{MH}$ ) statistic is a commonly used DIF statistic for multiple-choice items.

NCLB: No Child Left Behind Act. The name of Federal Public Law No. 107-110, 115 Stat. 1425

NCME: National Council on Measurement in Education. A professional organization centered in assessment, evaluation, testing, and educational measurement.

OP: Operational item. An operational item is one that has previously undergone field testing so it contributes to a student's score in a specific content area on the WKCE.

RD: Reading. A content area in the WKCE.

SC: Science. A content area in the WKCE.

SD: Standard deviation. The SD is a measure of the variability of observations from the mean.

SEM: Standard error of measurement. The SEM is an estimated average standard deviation of the observed score.

SES: Socioeconomic status. A student population subgroup category describing students as economically disadvantaged or not economically disadvantaged.

**SMD:** Standardized mean difference. SMD is commonly used DIF statistic for constructed-choice items.

**SPI:** Standardized performance indicator score. A subcontent area reporting score based on the items from a single content standard within given content area.

**SS:** Social Studies. A content area in the WKCE.

**TCC:** Test characteristic curve. TCCs show the mathematical relationship between students with varying degrees of achievement and their estimated overall test performance.

**WKCE:** Wisconsin Knowledge and Concepts Examinations. A criterion-referenced test designed to measure student achievement on the Wisconsin Model Academic Standards

**WR:** Writing. A content area in the WKCE.