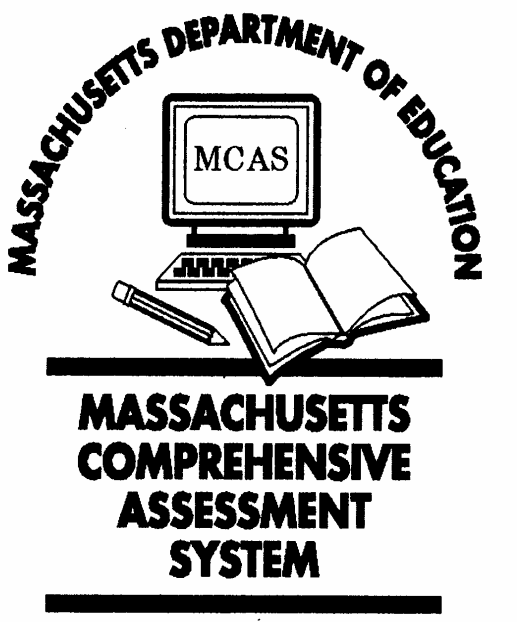



# 2007 MCAS
# Technical Report


This document was prepared by the
Massachusetts Department of Education.
Jeffrey Nellhaus, Acting Commissioner of Education



Massachusetts Department of Education
350 Main Street
Malden, MA 02148-5023
Phone 781-338-3000 TTY: N.E.T. Relay 800-439-2370
www.doe.mass.edu

# TABLE OF CONTENTS



**(cont.)**

# TABLE OF CONTENTS (CONT.)

# TABLE OF CONTENTS (CONT.)

# TABLE OF CONTENTS (CONT.)

# 1. PURPOSE AND OVERVIEW OF THIS REPORT

The Massachusetts Comprehensive Assessment System (MCAS) is the Commonwealth's program for student assessment developed in accordance with the *Education Reform Law of 1993*. The main purposes of MCAS are

- to measure student, school, and district performance in meeting the state's learning standards as detailed in the *Massachusetts Curriculum Frameworks*
- to improve student achievement and classroom instruction by providing diagnostic feedback with respect to the acquisition of skills and knowledge
- to help determine English language arts and mathematics competency at the grade 10 level for the awarding of high-school diplomas

The purpose of this *2007 MCAS Technical Report* is to document the technical quality and characteristics of the 2007 MCAS tests, and to present evidence of the validity and reliability of the intended uses of those tests' results. MCAS tests were administered in the following grades and content areas in 2007:

- grade 3: English Language Arts, Mathematics
- grade 4: English Language Arts, Mathematics
- grade 5: English Language Arts, Mathematics, Science and Technology/Engineering
- grade 6: English Language Arts, Mathematics
- grade 7: English Language Arts, Mathematics
- grade 8: English Language Arts, Mathematics, Science and Technology/Engineering
- grade 10: English Language Arts, Mathematics
- End-of-course high school (grades 9/10):Biology, Chemistry, Introductory Physics, Technology/Engineering

Since passing the grade 10 English Language Arts and Mathematics tests is one requirement for receiving a high school diploma, retest opportunities in those tests were offered in August 2006, November 2006, and March 2007 to students in grades 10 and higher who had not yet passed one or both tests.[1]
The following pilot tests were also administered:

- History and Social Science: grades 5 and 7
- End-of-course U.S. History: high school (grades 10/11)

This *Report* provides detailed information regarding test design and development; scoring; and analysis and reporting of MCAS 2007 results at student, school, district, and statewide levels. This detailed information includes but is not limited to the following:

[1] The August and November retests were identical test forms. Therefore, students who took the August retest in English Language Arts or Mathematics were not permitted to take the November retest for that subject.

- test administration
- equating and scaling of tests
- statistical and psychometric summaries, including
- item analyses
- reliability evidence
- validity evidence
- equating evidence

In addition, this *Report* includes technical appendices containing detailed item-level and summary statistics related to each 2007 MCAS test and its results.

The *2007 MCAS Technical Report* is designed to supplement the technical reports issued for previous MCAS administrations by providing information specific to the 2007 MCAS test administration. Previous technical reports, as well as other documents referenced in this report, provide additional background information about the MCAS program and its development and administration.

This *Report* is primarily intended for experts in psychometrics and educational measurement. It assumes a working knowledge of measurement concepts, such as reliability and validity, and statistical concepts of correlation and central tendency. For some chapters, the reader is presumed to have basic familiarity with advanced topics in measurement and statistics, such as item response theory (IRT) and factor analysis.

# 2. MCAS 2007 TEST DEVELOPMENT AND DESIGN

## 2.1 Standard MCAS Test Development and Design

The 2007 MCAS administration included operational tests in the following grades and content areas:

- grades 3–8 and grade 10 English Language Arts
- grades 3–8 and grade 10 Mathematics
- grades 5 and 8 Science and Technology/Engineering
- high school (grades 9 and 10) Science and Technology/Engineering end-of-course tests in Biology, Chemistry, Introductory Physics, and Technology/Engineering

The 2007 MCAS administration also included retest opportunities in English Language Arts and Mathematics for students in grades 10 and above who had not previously passed one or both tests. Retests were offered in August 2006, November 2006, and March 2007.[2]

Additionally, pilot tests in History and Social Science were administered in grades 5 and 7, and an end-of-course pilot test in U.S. History was administered to high school students in grades 10 and 11.

### 2.1.1 Item Design and Types

#### *2.1.1.1 Common/Matrix-Sampled Item Design*

The MCAS tests are constructed based on a *common/matrix-sampled item design*. Each test form contains both common and matrix-sampled items (with the exception of the English Language Arts Composition).

- Common. Individual student test scores and all student-level results are based exclusively on common items. All students in a grade are tested on the same set of common items. Common items comprise roughly 80 percent of items in each test form. These items are released to the public after testing is completed.

- Matrix-Sampled. Approximately 20 percent of the items in each test form are matrix-sampled items; these items differ across test forms. Some matrix-sampled items are used to equate tests across administrations; some are used to field-test new items for future use as common or equating items.

  Results of matrix-sampled equating items are combined with common item results to measure subtopics of the *Curriculum Framework* for that test's content area. These

[2] The August and November retests were identical test forms. Therefore, students who took the August retest in English Language Arts or Mathematics were not permitted to take the November retest for that subject.

results are reported at the school and districtlevels only (subject area subscores). Subject area subscores are the only reported MCAS scores that include results for matrix-sampled equating items (results for field-test items are not included).

#### *2.1.1.2 Item Types*

The four item types used on the MCAS tests allow for testing of broad knowledge and skills by the most efficient means. Each item type is described below.

- Multiple-Choice. Multiple-choice items appear on every MCAS test except the English Language Arts (ELA) Composition. Each multiple-choice item requires the student to select a single best answer from four response options.

  Multiple-choice items are machine-scored. A correct response is assigned a score of 1 raw score point; each incorrect, blank, or multiple-response answer is assigned a score of 0 raw score points.

- Open-Response. Open-response items appear on every MCAS test except the ELA Composition. Each open-response item requires the student to generate a response, rather than selecting a response from a list of options. Response types vary based on the tested content area (e.g., in English Language Arts, a written response one or two paragraphs; in Mathematics, creation of a chart, table, diagram, graph, and/or a written response).

  Open-response questions are scored from 0 to 4 (0 to 2 for grade 3 Mathematics) on the basis of item-specific rubrics and are scored by trained professional scorers.

- Short-Answer. Short-answer items appear only on MCAS Mathematics tests. Each short-answer item requires the student to generate a brief response to a prompt (e.g., a numeric solution prompted by a computation, or a short statement).

  Short-answer questions are scored by one or two trained professional scorers on a 0–1 scale, based on item-specific rubrics.

- Writing Prompts. Writing prompts appear only on ELA Composition tests. The prompt requires a student to draft a written composition; then, in a separate administration session, the student writes a final composition based on that draft.

  Each composition is scored by at least two professional scorers (100% double-scored) who have been trained to use the MCAS Writing Composition Score Point Descriptions (Appendix E). The Score Point Descriptions include two dimensions for scoring: Topic Development and Standard English Conventions. The range of scores for Topic Development is 1 to 6 points; the range of scores for Standard English Conventions is 1 to 4 points. Each scorer independently assigns a score in each area; the two scorers' scores in each area are combined (added together) to report a total score range from 2 to 12 for Topic Development and a total score range from 2 to 8 for Standard English Conventions. The score for each dimension is reported separately in MCAS reports.

### 2.1.2 General Test Development Specifications

All MCAS tests have been developed and created in adherence to the principles of sound and ethical test construction set forth in the *Standards for Educational and Psychological Testing* (1985, 1999). It should be noted that MCAS design and development have remained consistent across all test administrations. Listed below are the specifications that have guided the development of the MCAS tests.

#### *2.1.2.1 Alignment with Standards and Performance Levels*

***Content Standards***
All test items are based exclusively on the *Massachusetts Curriculum Framework* learning standards identified as eligible for assessment according to the *Guides to the MCAS* (http://www.doe.mass.edu/mcas/guides.html).

***MCAS Performance Levels***
Each MCAS test is designed to measure the range of performance identified by the four MCAS performance levels: *Warning/Failing, Needs Improvement, Proficient,* and *Advanced,*[3] which are described in detail in section 5.1.1.1 of this *Report*.

#### *2.1.2.2 Item Clarity*

In addition to adhering to the *Standards for Educational and Psychological Testing*, items are reviewed and edited to ensure uniform style in accordance with the *MCAS Style Guide* (based primarily on the *Chicago Manual of Style*, 15th edition). Each MCAS item also meets the following specifications:

- The item reflects correct grammar, punctuation, usage, and spelling.
- The item is written in a clear, concise style.
- The item is unambiguous to students in its nature and scope.

#### *2.1.2.3 Content Accuracy*

All items and, where applicable, scoring guides are subjected to rigorous internal checks for content accuracy by DOE and testing contractor staff. In addition, the DOE contracts with established scholars in each content area (External Content Expert Reviewers). These External Content Expert Reviewers, along with Assessment Development Committees[4], review test materials to assist in ensuring content accuracy.

---

[3] At grade 3, test results in the top performance level are reported as *Above Proficient* rather than *Advanced.* The performance level of *Failing* is used only on grade 10 tests.
For the MCAS-Alt, the *Warning/Failing* performance level is subdivided into three additional MCAS-Alt performance levels, *Awareness, Emerging,* and *Progressing.* These MCAS-Alt performance levels are further described in section 5.1.2 of this *Report.*

#### 2.1.2.4 Developmental Appropriateness

Developmental appropriateness guidelines for each tested grade level are provided in each content area's *Curriculum Framework*. The judgments of Assessment Development Committee members[4] are strongly considered where an interpretation is required about the appropriateness of an item as it relates to the relevant *Framework* and best classroom practice.

#### 2.1.2.5 Support and Model for Classroom Instruction

All MCAS items are developed to engage students and to support and model effective classroom instruction. The judgments of Assessment Development Committee members[4] are strongly considered where an interpretation is required about the appropriateness of an item as it relates to the relevant *Framework* and best classroom practice.

### 2.1.3 Test Construction

The process of assembling test forms is a critical final phase of test development. To construct the MCAS 2007 operational tests, Department of Education and testing contractor staff, including content, editorial, and psychometric experts, assembled a common/equating test in each grade and content area that met all test specifications and adhered to sound psychometric parameters.

Each test form includes distinct "positions" for common, equating, and field-test items, as discussed in section 2.1.4. The testing contractor nominates items for common, equating, and field-test positions based upon test specifications and item performance data. The testing contractor also comments on items and provides those comments to the Department's Assessment Development Committees, Bias Committee, and Content Experts.

Section 2.1.4 provides construction specifications for test forms used during the 2007 MCAS administration.

#### 2.1.3.1 Common Items

Each proposed common item is checked verbatim against the item as it appeared in field test administration. Nominations for the common test are accompanied by Test Characteristic Curves (TCCs) and Test Information Functions (TIFs) presenting the three projected cut scores for the proposed common test, compared to the previous year's test.

[4] Assessment Development Committee members are primarily classroom teachers in the grade and subject area being developed.

#### *2.1.3.2 Equating Items*

Once common items are chosen for a specific grade/subject area test, equating items are assigned to some of the matrix positions on the various forms of that test. Together, these equating items form a set that is used among all forms of the test.[5]

- No single test form utilizes the entire set of equating items.
- Whenever possible, equating items are placed in the same positions and on the same form numbers as the previous year's test.

Equating items are nominated and chosen to form a set that is as similar as possible to that test's common item set in the following areas:

- Number of Items: e.g., the 2007 grade 3 Mathematics test included a total of 35 common items; the equating set was also comprised of 35 total items

- Number of Each Item Type: e.g., the grade 6 Mathematics test included 5 common short-answer items; the equating set also contained 5 short-answer items

- Number of Points Possible: e.g., on the grade 5 English Language Arts (ELA) test, the set of common items was responsible for 52 possible score points (36 points from multiple-choice items plus 16 from open-response items); the set of equating items could receive up to 60 possible points (36 points from multiple-choice items plus 24 from open-response items); the 8-point difference in points possible is due to the ELA test blueprint requirement that **every** equating reading passage include an open-response item in its associated set of items—resulting in the inclusion of 6 open-reponse items in the equating set—while one of the common passage's associated set of items includes only multiple-choice items, for a total of 4 open-response common items

- Reporting Category Distribution: e.g., on the grade 7 Mathematics test, common items that tested the Number Sense and Operations strand were responsible for 14 points on the test; in the test's equating set, equating items that measured the Number Sense and Operations strand were also responsible for 14 points

- Average Difficulty (p-value or mean points scored) and Discrimination: e.g., the grade 8 Science and Technology/Engineering test's common multiple-choice items had an average p-value of 0.65; the test's equating multiple-choice items also had an average p-value of 0.65

For data regarding the extent to which each 2007 MCAS test achieved these goals, see Appendix M.

[5] In rare instances, equating items are repeated on more than one form (e.g., grade 10 Mathematics, where each equating item appears on two forms).

#### *2.1.3.3 Field-Test Items*

Department of Education content teams and testing contractor staff then selected field-test items that met the annual test development coverage specifications. Field-test items were placed into matrix positions on each common test form; placement considerations included whether the item would clue other matrix or common items within the form. Field test items were also placed to ensure the overall integrity of each test form in terms of content breadth and depth of coverage.

#### *2.1.3.4 Special Test Formats*

All MCAS 2007 operational tests were available in the following special formats, which were made available to eligible students with disabilities, as indicated:

- Large-Print. This form contained all common and matrix items found in the first form of the operational test (see Appendix H, accommodation 11).

- Braille. This form contained only common test items found in the operational test (see Appendix H, accommodation 12).

- Electronic Text Reader CD. This CD in Kurzweil format contained only common test items found in the operational test (see Appendix H, accommodations 18 and 28).

The following special test format was offered only for the grade 10 English Language Arts and Mathematics tests, and was made available to the students indicated:

- Recording for the Blind and Dyslexic (RFB&D) CD. This audio CD text reader contained only common test items found in the operational test (see Appendix H, accommodations 18 and 28).

The following special test formats were created only for the grade 10 Mathematics test, and were made available to the students indicated:

- American Sign Language video. This video contained only common test items found in the operational test (see Appendix H, accommodations 17 and 27).

- Spanish/English version. This form of the test contained all common and matrix items found in the first form of the operational test. Each item was presented twice: once in Spanish on a left-facing page, and once in English on a right-facing page. This form was made available to Spanish-speaking limited English proficient students who had been enrolled in school in the continental United States for **fewer than three years** if they could read and write in Spanish at or near grade-level.

The August 2006, November 2006, and March 2007 retests were available in large-print, Braille, Electronic Text Reader (Kurzweil) CD, and Spanish/English formats.

### 2.1.4 Content-Related Test Specifications

The 2007 MCAS administration included tests in three *Massachusetts Curriculum Framework* content areas:

- English Language Arts
- Mathematics
- Science and Technology/Engineering

It also included pilot tests at grades 5 and 7 in History and Social Science, and at the high school level (grades 10/11) in U.S. History.

Information is provided below about the development and design of each content area operational test and pilot test. The *Frameworks* can be found at www.doe.mass.edu/frameworks.

#### *2.1.4.1 English Language Arts*

***Test Development***

- **Grades 3–8 and 10 English Language Arts Reading Comprehension tests**. The Reading Comprehension portion of the MCAS English Language Arts (ELA) tests in grades 3–8 and 10 and of the ELA Retests measured the following learning standards of the *Massachusetts English Language Arts Curriculum Framework*:
  - Language strand: standards 4, 5, and 6
  - Reading and Literature strand: standards 8–17

  *Passages*
  Test sessions presented either two or three reading passages; each passage was followed by a group of associated assessment items. Each passage and its associated items were always assessed as an intact unit. The grade 3 test included 50 percent literary and 50 percent informational passages. The grades 4–8 and 10 tests and the Retests included 60 percent literary and 40 percent informational passages. Approximately 50 percent of the authors of test passages are listed in the *Framework*'s Appendices A and B.

- **Grades 4, 7, and 10 Composition**. The Composition portion of the ELA tests at grades 4, 7, and 10 and of the ELA Retests measured learning standards 19–23 of the Composition strand of the *Massachusetts English Language Arts Curriculum Framework.*

Learning standards 1, 2, 3, 7, 18, and 24–27 of the *Framework*, which were not feasible to incorporate into a large-scale state assessment program such as MCAS, were locally assessed (e.g., Language Standard 3, "Students will make oral presentations that demonstrate appropriate consideration of audience, purpose, and the information to be conveyed").

Table 2.1.4.1.1 shows the test specifications regarding distribution of common item points across *Framework* strands for the MCAS 2007 English Language Arts tests.

**Table 2.1.4.1.1: MCAS 2007 Tests**
**Common Item Point Distribution across *Framework* Strands:**
**Grades 3–8 and 10 English Language Arts**

| | Grade | | | | | | |
|---|---|---|---|---|---|---|---|
| ***Framework* Strand** | **3** | **4** | **5** | **6** | **7** | **8** | **10** |
| Language | 15% | 8% | 12% | 12% | 8% | 12% | 8% |
| Reading and Literature | 85% | 64% | 88% | 88% | 64% | 88% | 64% |
| Composition | | 28% | | | 28% | | 28% |
| **Total** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** | **100%** |

***Test Design***

Table 2.1.4.1.2 shows the test design for each ELA test by grade level and item type.

## Table 2.1.4.1.2: 2007 MCAS Administration
## Test Design:
## Grades 3–8 and 10 English Language Arts

| Grade and Test<br>Re1 and Re2 = Retests | | | Types of Items<br>MC = Multiple-choice SA = Short-answer<br>OR = Open-response WP = Writing prompt | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Items per Form | | | | | | | | Matrix Items Across Forms | | | | | | | | | | | |
| | | | *Common* | | | | *Matrix* | | | | *Total Positions* | | | | *Equating Positions* | | | | *Field-Test Positions* | | | |
| *Grade* | *Test Name* | *Number of Forms* | *MC* | *SA* | *OR* | *WP* | *MC* | *SA* | *OR* | *WP* | *MC* | *SA* | *OR* | *WP* | *MC* | *SA* | *OR* | *WP* | *MC* | *SA* | *OR* | *WP* |
| 3 | Reading Comprehension | 20 | 40 | | 2 | | 8 | | 1 | | 160 | | 20 | | 32 | | 4 | | 128 | | 16 | |
| 4 | Reading Comprehension | 15 | 36 | | 4 | | 12 | | 2 | | 180 | | 30 | | 36 | | 6 | | 144 | | 24 | |
| 4 | Composition | *2 | | | | 1 | | | | | | | | | | | | | | | | **10 |
| 5 | Reading Comprehension | 15 | 36 | | 4 | | 12 | | 2 | | 180 | | 30 | | 36 | | 6 | | 144 | | 24 | |
| 6 | Reading Comprehension | 15 | 36 | | 4 | | 12 | | 2 | | 180 | | 30 | | 36 | | 6 | | 144 | | 24 | |
| 7 | Reading Comprehension | 15 | 36 | | 4 | | 12 | | 2 | | 180 | | 30 | | 36 | | 6 | | 144 | | 24 | |
| 7 | Composition | *2 | | | | 1 | | | | | | | | | | | | | | | | **10 |
| 8 | Reading Comprehension | 15 | 36 | | 4 | | 12 | | 2 | | 180 | | 30 | | 36 | | 6 | | 144 | | 24 | |
| 10 | Reading Comprehension | 38 | 36 | | 4 | | 12 | | 2 | | 456 | | 76 | | 96 | | 16 | | 360 | | 60 | |
| 10 | Composition | *2 | | | | 1 | | | | | | | | | | | | | | | | **25 |
| 10Re1 | Reading Comprehension | 1 | 36 | | 4 | | | | | | | | | | | | | | | | | |
| 10Re1 | Composition | 1 | | | | 1 | | | | | | | | | | | | | | | | |
| 10Re2 | Reading Comprehension | 1 | 36 | | 4 | | | | | | | | | | | | | | | | | |
| 10Re2 | Composition | 1 | | | | 1 | | | | | | | | | | | | | | | | |

* "# of Forms" includes makeup operational forms.

** The ELA Composition is field tested out-of-state (rather than by an embedded field test).

**GRADE 3 READING COMPREHENSION TEST**

Common forms include 3 long passages and 4 short passages.
Each common long passage has 8 MC; each common short passage has 4 MC; 2 of the long common passages have one OR each.
Matrix forms include either one long passage (with 8 MC, 1 OR) or two short passages (one with 4 MC; one with 4 MC, 1 OR).
For equating, passages and their associated items appear in only one form.
All passages are field tested in 2 forms; short passages include an OR on one form but not on the other.

**GRADES 4–8 AND 10 READING COMPREHENSION TESTS**

**All Grades**

Common forms include 3 long passages and 3 short passages.
Each common long passage typically has 8 MC, 1 OR. Each common short passage typically has 4 MC; only one short passage has an OR.
Each matrix form includes 1 long passage and 1 short passage. Each passage has 1 OR item.
All passages are field tested in two forms.

**Grades 4–8**

Equating items are divided among 3 forms; each passage and associated items appear on one form only.
Field test consists of 6 long passages (each with a total of 16 MC, 2 OR) and 6 short passages (each with a total of 8 MC, 2 OR).

**Grade 10**

Equating consists of 4 long passages and 4 short passages; each passage appears on two different test forms.
Field test consists of 15 long passages (each with a total of 16 MC, 2 OR) and 15 short passages (each with a total of 8 MC, 2 OR).

**GRADE 10 RETEST**

The grade 10 ELA Retest was administered in August 2006 (Re1), November 2006 (Re1), and March 2007 (Re2).

### *2.1.4.2 Mathematics*

***Test Development***

The MCAS Mathematics tests at grades 3 through 8 and at grade 10 measured the learning standards of the five strands of the *Massachusetts Mathematics Curriculum Framework*:

- Number Sense and Operations
- Patterns, Relations, and Algebra
- Geometry
- Measurement
- Data Analysis, Statistics, and Probability

Table 2.1.4.2.1 shows the test specifications regarding distribution of common item points across *Framework* strands for the MCAS 2007 Mathematics tests.

**Table 2.1.4.2.1: MCAS 2007 Tests**
**Common Item Point Distribution across *Framework* Strands:**
**Mathematics**

| | **Grade**<br># = number of points per form<br>% = percent per form | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **3** | | **4** | | **5** | | **6** | | **7** | | **8** | | **10** | |
| ***Framework* Strand** | % | # | % | # | % | # | % | # | % | # | % | # | % | # |
| Number Sense and Operations | 35% | 14 | 35% | 19 | 33% | 18 | 33% | 18 | 26% | 14 | 26% | 14 | 20% | 12 |
| Patterns, Relations, and Algebra | 20% | 8 | 20% | 11 | 26% | 14 | 26% | 14 | 28% | 15 | 28% | 15 | 30% | 18 |
| Geometry | 12.5% | 5 | 12.5% | 7 | 13% | 7 | 13% | 7 | 13% | 7 | 13% | 7 | 15% | 9 |
| Measurement | 12.5% | 5 | 12.5% | 6 | 13% | 7 | 13% | 7 | 13% | 7 | 13% | 7 | 17% | 10 |
| Data Analysis, Statistics, and Probability | 20% | 8 | 20% | 11 | 15% | 8 | 15% | 8 | 20% | 11 | 20% | 11 | 18% | 11 |
| **Total** | **100%** | **40** | **100%** | **54** | **100%** | **54** | **100%** | **54** | **100%** | **54** | **100%** | **54** | **100%** | **60** |

### *Test Design*

Table 2.1.4.2.2 shows the test design for each Mathematics test by grade level and item type.

**Table 2.1.4.2.2: 2007 MCAS Administration**
**Test Design: Mathematics**

| | | **Types of Items** MC = Multiple-choice SA = Short-answer OR = Open-response WP = Writing prompt | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Items per Form** | | | | | | | | **Matrix Items Across Forms** | | | | | | | | | | | |
| | | ***Common*** | | | | ***Matrix*** | | | | ***Total Positions*** | | | | ***Equating Positions*** | | | | ***Field-Test Positions*** | | | |
| **Grade Tested** | **# of Forms** | *MC* | *SA* | *OR* | *WP* | *MC* | *SA* | *OR* | *WP* | *MC* | *SA* | *OR* | *WP* | *MC* | *SA* | *OR* | *WP* | *MC* | *SA* | *OR* | *WP* |
| 3 | 15 | 25 | 5 | 5 | | 5 | 1 | 1 | | 75 | 15 | 15 | | 25 | 5 | 5 | | 50 | 10 | 10 | |
| 4 | 15 | 29 | 5 | 5 | | 7 | 1 | 1 | | 105 | 15 | 15 | | 29 | 5 | 5 | | 76 | 10 | 10 | |
| 5 | 15 | 29 | 5 | 5 | | 7 | 1 | 1 | | 105 | 15 | 15 | | 29 | 5 | 5 | | 76 | 10 | 10 | |
| 6 | 15 | 29 | 5 | 5 | | 7 | 1 | 1 | | 105 | 15 | 15 | | 29 | 5 | 5 | | 76 | 10 | 10 | |
| 7 | 16 | 29 | 5 | 5 | | 7 | 1 | 2 | | 112 | 16 | 32 | | 29 | 5 | 5 | | 83 | 11 | 27 | |
| 8 | 16 | 29 | 5 | 5 | | 7 | 1 | 2 | | 112 | 16 | 32 | | 29 | 5 | 5 | | 83 | 11 | 27 | |
| 10 | 32 | 32 | 4 | 6 | | 7 | 1 | 2 | | 224 | 32 | 64 | | 64 | 8 | 12 | | 160 | 24 | 52 | |
| 10 Retest 1 | 1 | 32 | 4 | 6 | | | | | | | | | | | | | | | | | |
| 10 Retest 2 | 1 | 32 | 4 | 6 | | | | | | | | | | | | | | | | | |

**GRADE 3**
OR are only 2 points (rather than 4 points).
Each equating item appears in only one form.
Each field test item is unique.

**GRADES 4–6**
Each field test item is unique.

**GRADES 7–8**
Each equating item appears in only one form.
For field tests, 14 unique OR items (7 non-calculator; 7 calculator-allowed) fill the 27 OR field-test positions.

**GRADE 10**
Each equating item appears in two forms.
Only 27 unique OR items (14 non-calculator; 13 calculator-allowed) fill the 52 OR field-test positions.
NOTE: The original test design called for 24 unique OR items (12 non-calculator; 12 calculator-allowed). During form pulling, 27 OR items were included.

**GRADE 10 RETEST**
The Mathematics Retest was administered in August 2006 (Retest 1), November 2006 (Retest 1), and March 2007 (Retest 2).

### *2.1.4.3 Science and Technology/Engineering*

***Test Development***

Grades 5 and 8
The MCAS Science and Technology/Engineering tests at grades 5 and 8 measured the learning standards of the four strands of the *Massachusetts Science and Technology/Engineering Curriculum Framework*:

- Earth and Space Science
- Life Science
- Physical Sciences
- Technology/Engineering

Table 2.1.4.3.1 shows the test specifications regarding distribution of common item points across *Framework* strands for the MCAS 2007 Science and Technology/Engineering tests at grades 5 and 8.

**Table 2.1.4.3.1: MCAS 2007 Tests**
**Common Item Point Distribution across *Framework* Strands:**
**Science and Technology/Engineering**
**Grades 5 and 8**

| | Grade | |
|---|---|---|
| ***Framework* Strand** | **5** | **8** |
| Earth and Space Science | 25% | 25% |
| Life Science | 25% | 25% |
| Physical Sciences | 25% | 25% |
| Technology/Engineering | 25% | 25% |
| **Total** | **100%** | **100%** |

High School End-of-Course Tests
During the 2007 MCAS administration, four high school end-of-course tests were administered to students in grades 9 and 10:

- Biology
- Chemistry
- Introductory Physics
- Technology/Engineering

Each test measured the *Framework* learning standards outlined for its specific discipline.

Any grade 10 student enrolled in one of these four disciplines was required to take the test for that discipline; any grade 9 student enrolled in one of these four disciplines was eligible but not required to take the test for that discipline. If a student had taken or was enrolled in courses in more than one discipline, he or she was given the option of selecting which test to take.

*Biology Modules*
For the High School Biology test only, modules, comprised of a stimulus (e.g., graphic, scenario) and a group of associated assessment items, were utilized. Each stimulus and its associated items were always assessed as an intact unit.

*High School Science and Technology/Engineering Reporting Categories*
Most MCAS tests report results through reporting categories that bear the same names as strands within the test's relevant *Curriculum Framework.* However, MCAS reporting categories for each high school end-of-course Science and Technology/Engineering test addressed one or more **subtopics** listed in the *Science and Technology/Engineering Curriculum Framework* for that discipline.

Tables 2.1.4.3.2 through 2.1.4.3.5 show the test specifications regarding distribution of common item points across reporting categories for each MCAS 2007 Science and Technology/Engineering high school end-of-course test. These tables also show which *Framework* subtopics are associated with each reporting category; a footnote to each table provides the *Framework* page numbers where these subtopics and their learning standards are found.

**Table 2.1.4.3.2: MCAS 2007**
**High School Biology Test**
**Common Item Point Distribution Across MCAS Reporting Categories**

| MCAS Reporting Category | % | Related *Curriculum Framework* Subtopic(s)[1] |
|---|---|---|
| Biochemistry and Cell Biology | 25% | ▪ The Chemistry of Life<br>▪ Cell Biology |
| Genetics | 20% | Genetics |
| Anatomy and Physiology | 15% | Anatomy and Physiology |
| Evolution and Biodiversity | 20% | Evolution and Biodiversity |
| Ecology | 20% | Ecology |
| **Total** | **100%** | |

1. High School Biology subtopics are found on pages 54–56 of the *Massachusetts Science and Technology/Engineering Curriculum Framework.*

**Table 2.1.4.3.3: MCAS 2007**
**High School Chemistry Test**
**Common Item Point Distribution Across MCAS Reporting Categories**

| MCAS Reporting Category | % | Related *Curriculum Framework* Subtopic(s)[2] |
|---|---|---|
| Properties of Matter and Thermochemistry | 25% | ▪ Properties of Matter<br>▪ States of Matter, Kinetic Molecular Theory, and Thermochemistry |
| Atomic Structure and Periodicity | 25% | ▪ Atomic Structure and Nuclear Chemistry<br>▪ Periodicity |
| Bonding and Reactions | 30% | ▪ Chemical Bonding<br>▪ Chemical Reactions and Stoichiometry<br>▪ standard 8.4 from subtopic Acids and Bases and Oxidation-Reduction Reactions |
| Solutions, Equilibrium, and Acid-Base Theory | 20% | ▪ Solutions, Rates of Reaction, and Equilibrium<br>▪ Acids and Bases and Oxidation-Reduction Reactions (except standard 8.4, included in reporting category Bonding and Reactions) |
| **Total** | **100%** | |

2. High School Chemistry subtopics are found on pages 69–71 of the *Massachusetts Science and Technology/Engineering Curriculum Framework.*

**Table 2.1.4.3.4: MCAS 2007**
**High School Introductory Physics Test**
**Common Item Point Distribution Across MCAS Reporting Categories**

| MCAS Reporting Category | % | Related *Curriculum Framework* Subtopic(s)[3] |
|---|---|---|
| Motion and Forces | 40% | ▪ Motion and Forces<br>▪ Conservation of Energy and Momentum |
| Heat and Heat Transfer | 15% | Heat and Heat Transfer |
| Waves and Radiation | 25% | ▪ Waves<br>▪ Electromagnetic Radiation |
| Electromagnetism | 20% | Electromagnetism |
| **Total** | **100%** | |

3. High School Introductory Physics subtopics are found on pages 74–75 of the *Massachusetts Science and Technology/Engineering Curriculum Framework.*

**Table 2.1.4.3.5: MCAS 2007**
**High School Technology/Engineering**
**Common Item Point Distribution Across MCAS Reporting Categories**

| MCAS Reporting Category | % | Related *Curriculum Framework* Subtopic(s)[4] |
|---|---|---|
| Engineering Design | 20% | Engineering Design |
| Construction and Manufacturing | 20% | ▪ Construction Technologies<br>▪ Manufacturing Technologies |
| Fluid and Thermal Systems | 30% | ▪ Energy and Power Technologies—Fluid Systems<br>▪ Energy and Power Technologies—Thermal Systems |
| Electrical and Communications Systems | 30% | ▪ Energy and Power Technologies—Electrical Systems<br>▪ Communication Technologies |
| **Total** | **100%** | |

4. High School Technology/Engineering subtopics are found on pages 92–94 of the *Massachusetts Science and Technology/Engineering Curriculum Framework.*

### *Test Design*

Table 2.1.4.3.6 shows the test design for each Science and Technology/Engineering test by grade level and item type.

## Table 2.1.4.3.6: 2007 MCAS Administration
## Test Design: Science and Technology/Engineering

| **Grade**<br>HS = High School End-of-Course<br>**Test Type**<br>ST = Science and Technology/Engineering<br>Bio = Biology<br>Chem = Chemistry<br>Intro. Phy = Introductory Physics<br>Tech/Eng = Technology/Engineering | | | **Types of Items**<br>MC = Multiple-choice SA = Short-answer<br>OR = Open-response WP = Writing prompt | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Items per Form** | | | | | | | | **Matrix Items Across Forms** | | | | | | | | | | | |
| | | | ***Common*** | | | | ***Matrix*** | | | | ***Total Positions*** | | | | ***Equating Positions*** | | | | ***Field-Test Positions*** | | | |
| *Grade* | *Test Name* | *# of Forms* | *MC* | *SA* | *OR* | *WP* | *MC* | *SA* | *OR* | *WP* | *MC* | *SA* | *OR* | *WP* | *MC* | *SA* | *OR* | *WP* | *MC* | *SA* | *OR* | *WP* |
| 5 | ST | 17 | 34 | | 5 | | 7 | | 1 | | 119 | | 17 | | 34 | | 5 | | 85 | | 12 | |
| 8 | ST | 17 | 34 | | 5 | | 7 | | 1 | | 119 | | 17 | | 34 | | 5 | | 85 | | 12 | |
| HS | Bio | 14 | 40 | | 5 | | 12 | | 2 | | 168 | | 28 | | 40 | | 5 | | 128 | | 23 | |
| HS | Chem | 12 | 40 | | 5 | | 12 | | 2 | | 144 | | 24 | | 40 | | 5 | | 104 | | 19 | |
| HS | Intro. Phy | 10 | 40 | | 5 | | 12 | | 2 | | 120 | | 20 | | 40 | | 5 | | 80 | | 15 | |
| HS | Tech/Eng | 5 | 40 | | 5 | | 20 | | 2 | | 100 | | 10 | | 21 | | 1 | | 79 | | 9 | |

**ALL TESTS (except HS Technology/Engineering)**
Each equating item appears in only one form.

**HIGH SCHOOL TECHNOLOGY/ENGINEERING**
A total of 38 MC and 3 OR were used for equating. Both common and matrix items were used as equating items (17 MC and 2 OR common equating; 21 MC and 1 OR matrix equating).

### *2.1.4.4 History and Social Science (Pilot Tests)*

***Pilot Test Development***
During the 2007 MCAS administration, pilot tests in History and Social Science were administered at grades 5 and 7, and an end-of-course pilot test in U.S. History was administered at the high school level (grade 10 or 11).

These pilot tests were based on the learning standards of the *Massachusetts History and Social Science Curriculum Framework*.

The pilot tests served two purposes: 1) to produce item field-test classical statistics that would inform selection of common and equating items for future operational assessments; and 2) to release a common set of items for each pilot test, for which only Test Item Analysis Reports were generated. No scaled score or performance level results were reported for pilot tests. Test Item Analysis Reports were distributed only to schools and districts.

*Modules*
The pilot tests utilized modules that were comprised of a stimulus (e.g., graphic, map, historical document, scenario) and a group of associated assessment items. Each stimulus and its associated items were always assessed as an intact unit.

***Pilot Test Design***
Table 2.1.4.4 shows the design for each History and Social Science pilot test by grade level and item type.

## Table 2.1.4.4: 2007 MCAS Administration
## Pilot Test Design: History and Social Science

| **Grade**<br>HS = High School<br><br>**Pilot Test Name**<br>HSS = History and Social Science<br>USH = End-of-Course U.S. History | | | **Types of Items**<br>MC = Multiple-choice SA = Short-answer<br>OR = Open-response WP = Writing Prompt | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | **Items per Form** | | | | | | | | **Matrix Items Across Forms*** | | | | | | | | | | | |
| | | | ***Common*** | | | | ***Matrix*** | | | | ***Total Positions*** | | | | ***Equating Positions*** | | | | ***Field-Test Positions*** | | | |
| *Grade* | *Test Name* | *# of Forms* | *MC* | *SA* | *OR* | *WP* | *MC* | *SA* | *OR* | *WP* | *MC* | *SA* | *OR* | *WP* | *MC* | *SA* | *OR* | *WP* | *MC* | *SA* | *OR* | *WP* |
| 5 | HSS | 7 | 29 | | 1 | | 19 | | 3 | | 133 | | 21 | | N/A | | N/A | | 133 | | 21 | |
| 7 | HSS | 7 | 29 | | 1 | | 19 | | 3 | | 133 | | 21 | | N/A | | N/A | | 133 | | 21 | |
| HS | USH | 6 | 41 | | 1 | | 17 | | 5 | | 102 | | 30 | | N/A | | N/A | | 102 | | 30 | |

***** Some matrix items were repeated across forms. Number of positions indicates available slots.

**GRADE 5**
125 unique MC items filled the 133 field-test positions.
19 unique OR items filled the 21 field-test positions.

**GRADE 7**
124 unique MC items filled the 133 field-test positions.
19 unique OR items filled the 21 field-test positions.

**HIGH SCHOOL**
Each field-test position was filled by a unique MC item.
27 unique OR items filled the 30 field-test positions.

## 2.2 MCAS Alternate Assessment (MCAS-Alt) Test Development and Design

Students with significant disabilities whose IEP or 504 teams determine that they cannot participate in standard MCAS tests, even with accommodations (see table 3.2.1.1), instead take the MCAS Alternate Assessment (MCAS-Alt). The MCAS-Alt assesses the same *Massachusetts Curriculum Framework* content areas and learning standards as those assessed by the standard MCAS tests (see section 2.1.4 and table 2.2.1 below).

Evidence of student performance is submitted in an MCAS-Alt portfolio, as outlined in the sections below.

### 2.2.1 Required Strands in Each Content Area

The MCAS-Alt portfolio indicates evidence of student performance in required strands within each content area assessed in that portfolio's grade. Table 2.2.1 shows the strands for which evidence is required in each content area, by grade.

**Table 2.2.1: Content Areas and Strands Required on the 2007 MCAS-Alt, in Each Grade**

| Grade | English Language Arts Strands Required | Mathematics Strands Required | Science and Technology/Engineering Strands Required |
|---|---|---|---|
| 3 | ▪ Language (General Standard 4)<br>▪ Reading and Literature (General Standard 8) | ▪ Number Sense and Operations<br>▪ Patterns Relations, and Algebra | |
| 4 | ▪ Language (General Standard 4)<br>▪ Reading and Literature (General Standard 8)<br>▪ Composition | ▪ Number Sense and Operations<br>▪ Data Analysis, Statistics, and Probability | |
| 5 | ▪ Language (General Standard 4)<br>▪ Reading and Literature (General Standard 8) | ▪ Number Sense and Operations<br>▪ Measurement | Any three of the four Science and Technology/ Engineering strands |
| 6 | ▪ Language (General Standard 4)<br>▪ Reading and Literature (General Standard 8) | ▪ Number Sense and Operations<br>▪ Patterns Relations, and Algebra | |
| 7 | ▪ Language (General Standard 4)<br>▪ Reading and Literature (General Standard 8)<br>▪ Composition | ▪ Number Sense and Operations<br>▪ Data Analysis, Statistics, and Probability | |
| 8 | ▪ Language (General Standard 4)<br>▪ Reading and Literature (General Standard 8) | ▪ Number Sense and Operations<br>▪ Geometry | Any three of the four Science and Technology/ Engineering strands |
| 10 | ▪ Language (General Standard 4)<br>▪ Reading and Literature (General Standard 8)<br>▪ Composition | ▪ Any three of the five Mathematics strands | Any three learning standards in either<br>▪ Biology<br>▪ Chemistry<br>▪ Introductory Physics<br>or<br>▪ Technology/ Engineering |

### *2.2.1.1 Core Set of Evidence*

Portfolios must include three or more pieces of primary evidence in each strand being assessed. Each piece of primary evidence must be labeled with the following:

- the student's name
- the date of the student performance
- the percentage of accuracy for the performance
- the percentage of independence for the performance

Accuracy refers to the percentage of correct responses or the score given the student's work. Independence refers to the level of assistance the student received during the activity.

One of the three required pieces of primary evidence must be a data chart (e.g., field data chart, line graph, bar graph) that shows the following information, at minimum:

- the targeted skill based on the learning standard being assessed
- five tasks performed by the student on five distinct dates
- percentage of accuracy for each performance
- percentage of independence for each performance
- growth over time, indicating that the student attempted a new skill

The two or more additional pieces of primary evidence must document the student's performance of the same skill or outcome identified on the data chart. The data chart plus at least two additional pieces of primary evidence form the "core set of evidence" required in each portfolio strand.

### *2.2.1.2 Examples of Portfolio Evidence*

Table 2.2.1.2.1 gives examples of primary evidence in a sample mathematics portfolio, organized by strand.

**Table 2.2.1.2.1: Examples of Evidence in a Grade 10 Mathematics Portfolio**

| **Mathematics Strands** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| ***Number Sense and Operations*** | | | ***Patterns, Relations, and Algebra*** | | | ***Geometry*** | | |
| *Possible Evidence* | | | *Possible Evidence* | | | *Possible Evidence* | | |
| Line Graph | Field Data Chart | Worksheet | Data Chart | Worksheet | Line Graph | Bar Graph | Work Sample | Work Sample |

Table 2.2.1.2.2 lists examples of different types of primary evidence that could be provided in a portfolio.

**Table 2.2.1.2.2: Sample Primary Evidence in MCAS-Alt Portfolios for Different Grades**

| Type of Evidence | Evidence Provided in Portfolio<br>(L.S. = learning standard) |
|---|---|
| Data Chart | Bar graph showing percentages of accuracy and independence on 8 trials of "using a dictionary to determine the meanings of unfamiliar words."<br>(ELA, Language, grade 4, L.S. 4.25) |
| | Line graph showing percentages of accuracy and independence on 10 trials of "identifying community access words."<br>(ELA, Language, grade 4, L.S. 4.13) |
| | Field data chart showing the student's responses to yes or no questions to distinguish between fact and opinion of a story that was read aloud.<br>(ELA, Reading and Literature, grade 8, L.S. 8.17) |
| Work Sample<br>(open responses<br>By the student) | Student-created story using figurative language.<br>(ELA, Reading and Literature, grade 8, L.S. 8.12) |
| | Student's journal entry describing their favorite part of a story.<br>(ELA, Reading and Literature, grade 8, L.S. 8.22) |
| | Student-created list of substances, sorted in categories of acid or base.<br>(STE, Physical Sciences, grade 8, L.S. 8.1) |
| Worksheet<br>(simple activities with<br>one correct response) | Completed worksheet on which student has matched the name of a shape to its corresponding picture.<br>(Mathematics, Geometry, grade 10, L.S. 10.G.1) |
| | Completed worksheet on which student has matched earth science vocabulary words to their definitions.<br>(STE, Earth and Space Science, grade 6, L.S. 7) |
| | Completed worksheet identifying different parts of a plant.<br>(STE., Life Science, grade 7, L.S. 3) |
| Video | Video of a student using a spring balance to measure selected items, accompanied by a description of the activity indicating the percentages of accuracy and independence.<br>(STE, Technology and Engineering, grade 8, L.S. 1.3) |
| Photo | Photograph of a student-created relief map, accompanied by a product description of the activity, and percentages of accuracy and independence.<br>(STE, Earth and Space Science, grade 6, L.S. 1) |

In addition to the required primary evidence, secondary evidence may be included, at the discretion of the teacher. Secondary evidence shows the context of the activity and may include, for example

- notes from teachers or peers describing the activity
- a photograph showing the context of the learning activity
- a self-evaluation or reflection sheet
- a work description label

## 2.2.2 Required Documentation

In addition to evidence of student performance in the content area being assessed, the MCAS-Alt portfolio must include the following:

- Portfolio Cover Sheet. Provides basic demographic information on the student and information about the contents of the portfolio

- Required Portfolio Contents Checklist. Ensures that all required elements of the portfolio have been included

- Student Introduction. The student introduces the portfolio and expresses what he or she wants others to know about him or her as a learner

- Verification Letter. Assurance that parents have viewed the contents of their child's portfolio or, at minimum, have been invited by the school to do so

- Weekly Schedule. Demonstrates that the student is participating in the general education academic curriculum

- Strand Cover Sheet. Lists the strand and learning standard documented by the evidence, and how the student addressed the measurable goal; also helps educators make certain all required information and evidence are included

- Principal's Certification of Proper Administration of MCAS-Alt (PCPA). Requires the principal to certify that the work in the portfolio reflects that of the participating student and that all proper MCAS-Alt procedures have been followed

### 2.2.3 MCAS-Alt Competency Portfolios for Students in Grade 10 and Beyond

In order to meet the Competency Determination standard for high school graduation, all publicly funded students in Massachusetts, including students with disabilities, must participate in MCAS and earn a score of *Needs Improvement* or higher on both the English Language Arts (ELA) assessment and the Mathematics grade 10 MCAS assessments. When a student has met both the Competency Determination standard and all local graduation requirements, the student is eligible to receive a high school diploma. Students are given multiple opportunities beyond grade 10 to pass these assessments.

When the IEP Team determines that a student requires an alternate assessment, an MCAS-Alt portfolio must be submitted in place of taking the standard MCAS test in that subject. If the student is able to demonstrate a level of performance in his or her portfolio **comparable to or higher than** that of a student who has received scores of *Needs Improvement* or higher on the grade 10 MCAS tests in ELA and Mathematics, the student will be awarded a Competency Determination. The requirements for the competency portfolio are described in detail in the section of the *Educator's Manual* entitled "Requirements in Each Subject to Earn a Competency Determination." The Department strongly encourages collaboration between general and special educators on the development of these portfolios.

A panel of ELA and mathematics experts reviews the work samples in each portfolio and makes individual determinations regarding scores in each subject.

# 3. TEST ADMINISTRATION AND PARTICIPATION REQUIREMENTS

## 3.1 MCAS 2007 Test Administration Schedule

MCAS tests were administered during two periods in the spring of 2007:

- In March–April
  - Grades 3–8 and 10 English Language Arts

- In May–June
  - Grades 3–8 and 10 Mathematics
  - Grades 5 and 8 Science and Technology/Engineering
  - High School (grades 9/10) end-of-course Biology
  - High School (grades 9/10) end-of-course Chemistry
  - High School (grades 9/10) end-of-course Introductory Physics
  - High School (grades 9/10) end-of-course Technology/Engineering
  - Grades 5 and 7 History and Social Science pilot test
  - High School (grades 10/11) U.S. History pilot test

The 2007 MCAS administration also included retest opportunities in English Language Arts and Mathematics for students in grades 10 and above who had not previously passed one or both tests. Retests were offered in August 2006, November 2006, and March 2007.[6]

MCAS Alternate Assessment (MCAS-Alt) portfolios were required to be submitted no later than April 13, 2007.

Table 3.1 shows the complete 2006–2007 MCAS test administration schedule.

[6] The August and November retests were identical test forms. Therefore, students who took the August retest in English Language Arts or Mathematics were not permitted to take the November retest for that subject.

**Table 3.1: 2006–2007 MCAS Test Administration Schedule**

| Test Grade and Content Area | Test Administration Date(s) | Deadline for Return of Materials to Contractor | Deadline for Receipt of Returned Materials by Contractor |
|---|---|---|---|
| **Retest Administration Windows** | | | |
| ***August 1–3, 2006*** | | | |
| Mathematics Retest | August 1 | August 4 | August 8 |
| ELA Composition Retest | August 2 | | |
| ELA Reading Comprehension Retest | | | |
| *Session 1* | *August 2* | | |
| *Sessions 2 and 3* | *August 3* | | |
| ***November 8–17, 2006*** | | | |
| Mathematics Retest | | November 21 | November 28 |
| *Session 1* | *November 8* | | |
| *Session 2* | *November 9* | | |
| ELA Composition Retest | November 15 | | |
| ELA Reading Comprehension Retest | | | |
| *Sessions 1 and 2* | *November 16* | | |
| *Session 3* | *November 17* | | |
| ***March 5–9, 2007*** | | | |
| Mathematics Retest | | March 13 | March 16 |
| *Session 1* | *March 5* | | |
| *Session 2* | *March 6* | | |
| ELA Composition Retest | March 7 | | |
| ELA Reading Comprehension Retest | | | |
| *Sessions 1 & 2* | *March 8* | | |
| *Session 3* | *March 9* | | |
| **March–April 2007 Standard Test Administration Window** | | | |
| Grades 3–8 ELA Reading Comprehension | March 19–April 4 | April 11 | April 20 |
| Grades 4, 7, and 10 ELA Composition | March 20 | | |
| Grades 4, 7, 10 ELA Composition Make-Up | April 2 | | |
| Grade 10 ELA Reading Comprehension | | | |
| *Sessions 1 and 2* | *March 21* | | |
| *Session 3* | *March 22* | | |
| **May–June 2007 Test Administration Window** | | | |
| ***Standard Tests and Pilot Tests*** | | | |
| Grades 3–8 Mathematics | May 14–31 | June 1 | June 8 |
| Grades 5 and 8 Science and Technology/Engineering | | | |
| Grades 5, 7, and High School (grades 10/11) History and Social Science Pilot Tests | | | |
| Grade 10 Mathematics, *Session 1* | May 22 | | |
| Grade 10 Mathematics, *Session 2* | May 23 | | |
| ***End-of-Course High School (Grades 9/10) Science and Technology/Engineering Tests*** | | | |
| Biology | June 5–7 | June 11 | June 15 |
| Chemistry | | | |
| Introductory Physics | | | |
| Technology/ Engineering | | | |

Administration windows included time for makeup testing except for retest windows. The *Principal's Administration Manual* was provided to each school prior to the testing windows; this document gave written guidelines for test scheduling, student participation, test security, and test administration. In addition, the Massachusetts Department of Education provided guidance on test administration procedures through regional workshops conducted prior to testing, and toll-free telephone support throughout the test administration period.

MCAS tests are administered in untimed sessions. Tests are designed so that each individual session can be completed in approximately 45 or 60 minutes. Schools were instructed to schedule a two-hour block of time for each test session to allow sufficient time for all students to complete each test session. However, schools were allowed to provide additional time to students who required more time to complete a session, provided that no test session could extend beyond the school day and that both ELA Composition sessions were completed on the same day.

Testing spaces were required to meet the following conditions:

- be free from noise or distractions
- be adequately lit and ventilated
- be furnished so that students can work comfortably and without disruption
- provide adequate individual work space so that each student is sufficiently separated from other students, ensuring test security
- be free from any and all materials containing content in the subject areas being tested, including classroom support materials (e.g., posters, maps, charts) and, when administering the ELA Reading Comprehension test, English-language dictionaries

## 3.2 MCAS Participation Requirements

All students educated in publicly funded Massachusetts schools must participate in MCAS, including

- students enrolled in public schools
- students enrolled in charter schools
- students enrolled in educational collaboratives
- students enrolled in approved and unapproved private special education schools and programs within and outside of Massachusetts
- students receiving educational services in institutional settings
- students in the custody of the Department of Social Services
- students in the custody of the Department of Youth Services

This policy of measuring the performance of all students and holding schools and districts accountable for the performance of all students increases the likelihood that all Massachusetts students educated with public funds are provided an opportunity to acquire the content knowledge and skills identified by the *Massachusetts Curriculum Framework* learning standards. Additionally, the participation of all students in MCAS is crucial because all students educated with public funds must earn a Competency Determination, which is awarded based on MCAS test results, as one condition for receiving a high school diploma.

### 3.2.1 Requirements for Participation of Students with Disabilities

As stated in the Purpose and Overview section of this document (section 1), MCAS fulfills the requirements of the *Education Reform Law of 1993*. The fundamental goal of education reform is to improve the performance of all students. Therefore, all students, including students with disabilities, are required to participate in MCAS.

For purposes of MCAS, a student with a disability has either an Individualized Education Program (IEP) provided under the Individuals with Disabilities Education Act or a plan provided under Section 504 of the Rehabilitation Act of 1973. All students with disabilities must be engaged in an instructional program guided by the standards in the *Massachusetts Curriculum Frameworks*. Students with disabilities must participate in grade-level tests that correspond with the grades in which they are enrolled as reported to the Department's Student Information Management System (SIMS); students with significant disabilities who are unable to take the standard MCAS tests, even with accommodations, must take the MCAS Alternate Assessment (MCAS-Alt).

During its annual meeting, a student's IEP or 504 team must determine how the student will participate in MCAS for each subject scheduled for assessment. This information, including any accommodations that a student will use (see Appendix H), must be documented in the student's IEP and should also be documented, when appropriate, in the student's 504 plan.

Table 3.2.1.1 describes which students should be considered for the standard tests, with or without accommodations, and which students should take the MCAS-Alt.

**Table 3.2.1.1: MCAS Participation Options for Students with Disabilities**

| Characteristics of Student's Instructional Program and Local Assessment | Recommended Participation in MCAS |
|---|---|
| OPTION 1<br>***If the student is***<br>a) Generally able to demonstrate knowledge and skills on a paper-and-pencil test, either with or without test accommodations;<br>***and*** is<br>b) Working on learning standards at or near grade-level expectations<br>***or*** is<br>c) Working on learning standards that have been modified and are **somewhat below grade-level expectations** due to the nature of the student's disability | ***Then***<br>The student should take the **standard MCAS test**, either with or without accommodations that are consistent with the instructional accommodation(s) used in the student's instructional program and that are documented in the approved IEP or 504 plan prior to testing. (see Appendix H for a list of MCAS test accommodations) |
| OPTION 2<br>***If the student is***<br>d) **generally unable** to demonstrate knowledge and skills on a paper-and-pencil test, even with accommodations,<br>***and*** is<br>e) working on learning standards that have been **substantially modified** due to the nature and severity of his or her disability,<br>***and*** is<br>f) receiving **intensive, individualized instruction** in order to acquire, generalize, and demonstrate knowledge and skills | ***Then***<br>The student should take the **MCAS Alternate Assessment** in this subject |

OPTION 3

| *If the student is* | *Then* |
|---|---|
| g) working on learning standards at or near grade-level expectations,<br>***and*** is<br>h) **sometimes able** to take a paper-and-pencil test, either without or with one or more test accommodations(s),<br>***but*** is<br>i) presented with **unique and significant challenges** in demonstrating knowledge and skills on a test of this format and duration | The student should take the **standard MCAS test** with necessary accommodations that are consistent with the instructional accommodation(s) used in the student's instructional program and that are documented in the approved IEP or 504 plan prior to testing. (see Appendix H for a list of MCAS test accommodations)<br><br>***However***<br>The Team may recommend the **MCAS Alternate Assessment** when the nature and complexity of the disability prevent the student from demonstrating knowledge and skills on the test even with accommodations<br><br>(Instances in which a student in this category may require an alternate assessment are provided below.) |

The following examples of unique circumstances are provided to expand a Team's understanding of the appropriate use of the MCAS-Alt. The MCAS-Alt may be administered if any of the following conditions exist:

- a student, as a consequence of either severe emotional or behavioral impairment or other disability(ies), is unable to maintain sufficient concentration to participate in standard testing, even with test accommodations
- a student with a severe health-related disability, neurological disorder, or other complex disability(ies) cannot meet the demands of a prolonged test administration
- a student with a significant motor, communication, or other disability would require more time than is reasonable or available for testing, even with the allowance of extended time

### 3.2.2 Requirements for Participation of Limited English Proficient Students

A student who is limited English proficient (LEP) is defined as "a student whose first language is a language other than English and who is unable to perform ordinary classroom work in English."

Spanish/English versions of the 2007 grade 10 MCAS Mathematics test and retest were available for Spanish-speaking LEP students who were eligible (see section 2.1.3).

MCAS participation requirements for LEP students are as follows:

- **All** LEP students, regardless of the number of years enrolled in U.S. schools, are required to participate in MCAS Mathematics and Science and Technology/Engineering tests scheduled for their grades.
- LEP students in their **first year** of enrollment in U.S. public schools (i.e., for 2007, students not enrolled prior to the 2006–2007 school year) have the option, but are not required, to take the grades 3–8 and 10 English Language Arts tests; the grades 5 and 7 History and Social Science pilot tests; and the grades 10/11 U.S. History end-of-course pilot test. Students who opt not to take these assessments are excused from MCAS examination in **only** these content areas for these grades; these students are required to take the Massachusetts English Proficiency Assessment (MEPA) tests in ELA.
- Results for tests taken by first-year LEP students were reported to the individual students' parents/guardians (see section 5.6 for a description of the report and Appendix I for a sample report). However, results for these students were not included in performance level or scaled-score aggregated 2007 school, district, or statewide results.
- LEP students in their **second year** of enrollment or beyond (i.e., for 2007, students who were enrolled in U.S. schools in 2004–2005 or before) are required to participate in **all** testing scheduled for their grades.

Additional information on the participation of LEP students is available in the publication *Requirements for the Participation of Students with Limited English Proficiency in MCAS and MEPA*, posted on the Department's Web site at http://www.doe.mass.edu/mcas/part_req.html.

# 4. MCAS 2007 SCORING

## 4.1 Scoring of Standard Test Items

Upon receipt of used MCAS answer booklets following testing, the testing contractor scans all student responses, along with student identification and demographic information. Imaged data for multiple-choice responses are machine-scored. Images of short-answer items, open-response items, and ELA Compositions are processed and organized by iScore, a secure, server-to-server electronic scoring software designed by Measured Progress, for hand-scoring.

Student responses that cannot be physically scanned (e.g., answer documents damaged during shipping) and typed responses submitted using test accommodation 23 are physically reviewed and scored on an individual basis by trained, qualified scorers. These scores are linked to the student's demographic data and merged with the student's scoring file by Measured Progress's data processing department.

### 4.1.1 Machine-Scored Items

Multiple-choice item responses are compared to scoring keys using item analysis software. Correct answers are assigned a score of one point; incorrect answers are assigned a score of zero points. Student responses with multiple marks and blank responses are also assigned zero points.

The hardware elements of the scanners monitor themselves continuously for correct read, and the software which drive these scanners monitor correct data reads. Standard checks include recognition of a sheet that does not belong, is upside down, or is backwards; and identification of critical data that is missing, including a student ID number or test form that is out of range or missing, and of page/document sequence errors. When a problem is detected, the scanner stops and displays an error message directing the operator to investigate and to correct the situation.

### 4.1.2 Hand-Scored Items

The images of student responses to short-answer and open-response items and to writing prompts are hand-scored. Imaged responses from all answer booklets are sorted into item-specific groups for scoring purposes. Readers review responses from only one item at a time; however, if necessary for scoring purposes, imaged responses from a student's entire booklet are always available for viewing, and the actual physical booklet is also available onsite.

For scoring of 2007 MCAS responses, at least 200 responses to items from previous MCAS administrations were "seeded" among all 2007 MCAS 4- and 6-point item responses (open-response items and ELA Compositions) for scaling and equating purposes (see section 4.3 for further information about scaling and equating).

During scoring, use of iScore minimizes the need for scorers to physically handle actual answer booklets and related scoring materials. Student confidentiality is easily maintained, as all MCAS scoring is "blind" (i.e., district, school, and student names are not visible to readers). Scorers have access to answer booklet numbers, which are readily linked within iScore to student scores.

The use of iScore also ensures that access to student response images is limited to only those who are scoring or who are working for Measured Progress in a scoring management capacity.

#### *4.1.2.1 Scoring Locations and Staff*

***Scoring Locations***
The iScore database, its operation, and its administrative controls are all based in Dover, NH; however, MCAS 2007 test item responses were scored in the following locations:

- Troy, NY
  - grade 7 English Language Arts Composition
  - high school (grades 9/10) Biology, Chemistry, Introductory Physics, and Technology/Engineering
- Longmont, CO
  - grades 3–8 and 10 English Language Arts Reading Comprehension
  - grades 5–8 and 10 Mathematics
- Dover, NH
  - grades 4 and 10 English Language Arts Composition
  - grades 5 and 7 History and Social Science (pilot test)
  - grades 10/11 U.S. History (pilot test)
- Louisville, KY
  - grades 3–4 Mathematics
  - grades 5 and 8 Science and Technology/Engineering

The iScore system monitored accuracy, reliability, and consistency across all scoring sites. Constant daily communication and coordination were accomplished through e-mail, telephone, faxes, and secure Web sites, to ensure that critical information and scoring modifications were shared/implemented across all scoring sites.

***Staff Positions***
The following staff members were involved with scoring the 2007 MCAS responses:

- The **MCAS Scoring Manager**, an employee of Measured Progress, was located in Dover, NH and oversaw communication and coordination of scoring across all scoring sites.

- The **iScore administrator and assistant administrator**, an employee of Measured Progress, was located in Dover, NH and coordinated technical communication across all scoring sites.

- A **Site Manager (SM)**, an employee of Measured Progress, was located at each scoring site and provided logistical coordination for his or her scoring site.

- A **Chief Reader (CR)** in each content area (Mathematics; Science and Technology/Engineering; History and Social Science/U.S. History; and, for English Language Arts, two CRs, one for Reading Comprehension and one for Writing/Composition) ensured consistency of scoring across all scoring sites for all grades tested in that content area. CRs also provided read-behind activities for Assistant Chief Readers. CRs were employees of Measured Progress.

- An **Assistant Chief Reader (ACR)** or **Senior Quality Assurance Coordinator (QAC),** selected from a pool of experienced Senior Readers, participated in benchmarking activities for each specific grade and content area combination. ACRs provided read-behind activities for QACs at their sites.

- Numerous **Senior Readers (SRs)**, selected from a pool of skilled and experienced readers, provided read-behind activities for the scorers at their scoring tables (2–12 scorers at each table). SRs, with QACs, were trained and qualified immediately prior to scorer training.

- **Scorers** at each scoring site scored the operational MCAS 2007 student responses. The recruitment of scorers is described in section 4.1.2.2.

#### *4.1.2.2 Scorer Recruitment and Qualifications*

For scoring of the 2007 MCAS tests, Measured Progress actively sought a diverse scoring pool that was representative of the population of Massachusetts. The broad range of scorer backgrounds included scientists, editors, business professionals, authors, teachers, graduate school students, and retired educators. Demographic information for scorers (e.g., gender, race, educational background) was electronically captured and reported.

A Bachelor of Arts or a Bachelor of Science degree was required for scorers (also referred to as *readers*) of high school (grades 9–11 and retest) student responses. A four-year college degree was preferred for all other scorers. Scorers of the responses of grade 3 through grade 8 students were required to have successfully completed at least two years of college and to have demonstrated knowledge of the particular subject they scored. Potential scorers submitted documentation (e.g., resume and/or transcripts) of their qualifications.

Scorers were either temporary Measured Progress employees or were secured through the services of one or more temporary employment agencies. Due to confidentiality and test security concerns, teachers and administrators (principals, guidance counselors, etc.) employed by Massachusetts schools were not eligible to be MCAS scorers. All scorers signed a nondisclosure/confidentiality agreement.

#### *4.1.2.3 Methodology for Scoring Constructed-Response Items*

Constructed-response items were scored based on possible score points and scoring procedures, as shown in Table 4.1.2.3.1.

***Possible Score Points***

**Table 4.1.2.3.1: Possible Score Points for MCAS Constructed-Response Item Types**

| Constructed-Response Item Type | Possible Score Points | Possible Highest Score |
|---|---|---|
| Open-Response | 0–4 | 4 |
| Short-Answer | 0–2 | 2 |
| English Language Arts Composition Topic Development | 1–6 | 12* |
| English Language Arts Composition Standard English Conventions | 1–4 | 8* |
| Non-Scorable Items | 0 | 0 |

*Each English Language Arts Composition was scored by two scorers. Each scorer assigned two scores: one for Topic Development and one for Standard English Conventions. The total of the scores in each area became the student's reported score in that area. (For additional details, see section 2.1.1.2.)

Non-Scorable Items. Scorers could designate a response as non-scorable for any of the following reasons:

- response was blank (no attempt to respond to the question)
- response was unreadable (illegible, too faint to see, or only partially legible/visible)—see Note below
- response was written in the wrong location (seemed to be a legitimate answer to a different question)—see Note below
- response was written in a language other than English
- response was completely off-task or off-topic
- response included an insufficient amount of material to make scoring possible
- response was an exact copy of the assignment
- response was incomprehensible
- student made a statement refusing to write a response to the question

**Note:** "Unreadable" and "wrong location" responses were eventually resolved, whenever possible, by researching the actual answer document to identify the correct location or to more closely examine the response and then assign a score.

***Scoring Procedures***

Scoring procedures for constructed-response items included both single-scoring and double-scoring. Single-scored items were scored by one scorer. Double-scored items were scored independently by two scorers, whose scores were tracked for agreement ("inter-rater agreement"; for further discussion of double-scoring and inter-rater agreement, also see section 4.1.2.6 and Appendix F).

Table 4.1.2.3.2 shows by which method(s) common and equating constructed-response item responses for each operational test were scored.

**Table 4.1.2.3.2: MCAS 2007 Methods of Scoring Common and Equating Constructed-Response Items by Grade and Test**

| Grade | Test/Pilot Test Name | Responses Single-Scored (per grade and test/pilot test) | Responses Double-Scored (per grade and test/pilot test) |
|---|---|---|---|
| 3 | ELA Reading Comprehension | 100% | 10% randomly |
| 4–8 | ELA Reading Comprehension | 100% | 10% randomly |
| | Mathematics | 100% | 10% randomly |
| 4, 7, and 10 | ELA Composition | | 100% |
| 5, 7, and 10/11 | History and Social Science: one common item per pilot test | 100% | 10% randomly |
| 5 and 8 | Science and Technology/Engineering | 100% | 10% randomly |
| 9 | Biology | | 100% |
| | Chemistry | | 100% |
| | Introductory Physics | | 100% |
| | Technology/Engineering | | 100% |
| 10 | ELA Reading Comprehension | | 100% |
| | Mathematics | | 100% |
| | Biology | 100% | 10% randomly |
| | Chemistry | 100% | 10% randomly |
| | Introductory Physics | 100% | 10% randomly |
| | Technology/Engineering | 100% | 10% randomly |
| All | Unreadable responses | | 100% |
| | Blank responses | | 100% |

For each History and Social Science pilot test (in addition to the common item scored as indicated in the table), at least 1500 responses to each other open-response item were single-scored; of these responses, at least 150 were randomly double-scored.

### *4.1.2.4 Scorer Training*

Scorer training began with an introduction of onsite scoring staff, and an overview of the MCAS program's purpose and goals, including a discussion about the security, confidentiality, and proprietary nature of testing and scoring materials and procedures.

Next, scorers thoroughly reviewed and discussed the scoring guide for the item to be scored. Each item-specific scoring guide included the item itself and score point descriptions.

Following review of the item-specific scoring guide for any 2-, 4-, or 6-point constructed-response item, scorers began reviewing or scoring response sets that were organized for specific training purposes:

- Anchor Set
- Training Set
- Qualifying Set

During training, scorers were able to highlight or mark hard copies of the Anchor, Training, and first Qualifying Sets, even if all or part of the set was also presented online via computer.

### *Anchor Set*

Scorers first reviewed an Anchor Set of exemplary responses, approved by the Department, for the item to be scored. Responses in Anchor Sets were typical, rather than unusual or uncommon; solid, rather than controversial or borderline; and true, meaning that they had scores that could not be changed by anyone other than DOE test development staff.

For open-response items and ELA Compositions, each item-specific Anchor Set contained, whenever possible, the following:

- at least two responses representing the scoring guide's high score point
- at least two responses representing the scoring guide's low score point
- three responses representing each middle score point (one response representing the mid-high to high range for that score point; one response representing the middle range for that score point; and one response representing the mid-low to low range for that score point)

Anchor Sets for Mathematics short-answer items contained several responses representing the entire range of possible score points.

Responses were read aloud to the room of scorers and presented in descending score order. Trainers then announced the true score of each anchor response and facilitated a group discussion of the response in relation to the score point descriptions to allow scorers to internalize typical characteristics of each score point.

This Anchor Set served as a reference for scorers as they continued with calibration, scoring, and recalibration activities for that item.

### *Training Set*

Next, scorers practiced applying the scoring guide to responses in the Training Set. The Training Set included 10 to 15 student responses designed to help establish the score point range and the range of responses within each score point. The Training Set often included unusual responses that were less clear or solid (e.g., were shorter than normal, employed atypical approaches, contained both very low and very high attributes, or were written in writing that was difficult to decipher). Responses in the Training Set were also presented in randomized score point order.

After scorers had independently read and scored a Training Set response, trainers would poll scorers or use online training system reports to record the initial range of scores. Then they would lead a group discussion of one or two responses, directing scorer attention to scoring issues that were particularly relevant to the specific scoring group, such as the line between two score points. Trainers modeled for scorers how to discuss scores by referring to the Anchor Set and to scoring guides.

Training Sets for ELA Compositions (Writing): A separate training set was used for each of the two scoring dimensions, Topic Development and Standard English Conventions; during training using these sets, scorers issued only a score for the appropriate dimension. Next, scorers trained using a "mixed" Training Set, for which they assigned both a Topic Development and a Standard English Convention score to each composition in the set.

Training Set for Mathematics Short-Answer Items: In cases in which there was only one correct response to a short-answer item, no Training Set was provided. When there was more than one correct response to a short-answer item, the Training Set included only the number of correct-response samples necessary to illustrate all possible correct solutions (e.g., when there were two possible correct responses, two samples were included in the Training Set).

***Qualifying Set***

After the Training Set had been completed, for all items except Mathematics short-answer items, scorers were required to measurably demonstrate their ability to accurately and reliably score the item according to its scoring rubric by scoring responses in the Qualifying Set. The ten responses in the Qualifying Set, selected from an array of responses which clearly illustrated the range of score points for that item, were approved by the Department. Hard copies of the responses were also available to scorers so that they could make notes and refer back to specific responses during the post-qualifying discussion.

To be eligible to score operational 2007 MCAS responses, scorers of all items other than Mathematics short-answer items were required to demonstrate scoring accuracy rates of minimum 70 percent exact agreement and at least 90 percent exact-or-adjacent agreement. In other words, exact scores were required on at least seven of the Qualifying Set responses and either exact or adjacent scores were required on a total of nine of the 10 responses; scorers were allowed one discrepant score, as long as they had at least seven exact scores. ELA Composition (Writing) scorers had to qualify at the 70/90 percent threshold for both Topic Development and Standard English Conventions in the same Qualifying Set before they were allowed to score any operational responses.

Scorers who met the percentage requirements were allowed to score operational student responses. There were no specific Qualifying Sets for Mathematics short-answer items; to be eligible to score Mathematics short-answer items, scorers must have successfully met the minimum accuracy requirements for one or more of the Mathematics open-response items for that grade.

Retraining

Scorers who did not pass the first Qualifying Set were retrained as a group by reviewing their performance with scoring leadership and then scoring a second Qualifying Set of responses. If they achieved a scoring accuracy rate of minimum 70 percent exact and at least 90 percent exact-or-adjacent agreement on this second Qualifying Set (100 percent exact agreement for Mathematics short-answer items), they were allowed to score operational responses.

If scorers did not achieve the required scoring accuracy rates on the second Qualifying Set, they were not allowed to score responses for that item; they instead either began training on a different item or were dismissed.

#### *4.1.2.5 Senior Quality Assurance Coordinator (QAC) and Senior Reader (SR) Training*

QACs and select SRs were trained in a separate training session that occurred immediately prior to scorer training. QAC and SR training was identical to scorer training, with the following two exceptions:

1. Scoring accuracy rates for Qualifying Sets were higher for QACs and SRs than for regular scorers.

   - On Qualifying Sets for grades 3–8 items, QACs and SRs were required to achieve a scoring accuracy rate of minimum 80 percent exact agreement with at least 90 percent exact-or-adjacent agreement.
   - On Qualifying Sets for high school (grades 9/10, 10, and 10/11, and retest) items, QACs and SRs were required to achieve a scoring accuracy rate of minimum 80 percent exact agreement with 100 percent exact-or-adjacent agreement (no discrepant scores).

   Any QAC or SR who did not achieve the required accuracy rate on a Qualifying Set was removed from leadership responsibilities for that item, and either served as a regular scorer for the item (if his or her accuracy rate was equal to the required eligibility rate) or began training on a different item.

   During actual scoring of MCAS items, QACs and SRs were required to maintain the scoring accuracy rates described in section 4.1.2.6 below.

2. Items and their responses, as well as the Department's rationale behind the score points, were often discussed in greater detail with QACs and SRs than with regular scorers, so that they would be well equipped to handle questions from the regular scorers.

#### *4.1.2.6 Monitoring of Scoring Quality Control and Consistency*

Scorers were monitored for continued accuracy rates and scoring consistency throughout the scoring process, using the following methods and tools:

- Calibration Assessments
- Embedded Committee-Reviewed Responses (CRRs)
- "Read-Behind" Procedures
- Double-Scoring
- Scoring Reports

A scoring accuracy rate of minimum 70 percent exact and at least 90 percent exact-or-adjacent agreement was required on CRRs, read-behinds, and double-scoring (except for Mathematics short-answer item responses, which required 100 percent exact agreement). The required scoring accuracy rate for Calibration Assessments is discussed below.

If scorers met or exceeded the required accuracy rate, they continued scoring operational responses. Any scorer whose accuracy rate fell below the required rate for the particular item and monitoring method was retrained on that item and, upon approval by the QAC or CR, as appropriate (see below), allowed to resume scoring.

Scorers were given only two opportunities to be retrained on a particular item. If they fell below the required accuracy rate a third time on a Compilation Report, they were dismissed from scoring that MCAS item.

***Calibration Assessments***

Each scoring shift began with an individual or group review of the item, scoring guide, training notes, and Anchor Set. After scoring leadership confirmed that each scorer had completed this review, scorers of Mathematics short-answer items began scoring operational responses; scorers of other constructed-response items took an online Calibration Assessment to determine whether they were still calibrated to the scoring standard. The Calibration Assessment consisted of five responses representing the entire range of possible scores, including some with a score point of "0." If scorers were exact on 4 of the 5 responses, and at least adjacent on the fifth response, they began scoring operational responses.

Scorers who did not meet the accuracy requirement were retrained by discussing the Calibration Assessment responses in terms of the score point descriptions and the original Anchor Set. The QAC determined whether or when scorers received enough retraining to begin scoring operational responses. Scoring leadership also carefully monitored any scorer who did not pass a Calibration Assessment by significantly increasing the number of read-behinds for that scorer.

***Embedded Committee-Reviewed Responses (CRRs)***

Previously scored "embedded" CRRs were selected and loaded into iScore for "blind" distribution to scorers as a way to monitor scorer accuracy. CRRs, either chosen before scoring began or selected by scoring leadership during scoring, were formatted to appear identical to operational student responses so that scorers could not perceive any difference.

Between 5 and 30 CRRs were distributed at random points throughout the first full day of scoring to ensure that scorers were sufficiently calibrated at the beginning of the scoring period. Individual scorers often received up to 20 CRRs within the first 100 responses scored, and up to 10 additional responses within the next 100 responses scored on that first day of scoring.

If any scorer fell below the required scoring accuracy rate, no new responses were sent to his or her computer screen and he or she was retrained before being allowed by the QAC to continue scoring. Once allowed to resume scoring, scoring leadership carefully monitored these scorers by increasing the number of read-behinds.

***"Read-Behind" Procedures***

*Read-behind scoring* refers to the practice of having scoring leadership, usually an SR, score a response after another scorer has already scored the same response. QACs performed read-behinds for SRs.

Responses to be placed into the read-behind queue were randomly selected by scoring leadership. The iScore system allowed 1, 2, or 3 responses per scorer to be placed into the read-behind queue at a time. CRRs scored by a scorer for whom a read-behind was being performed were automatically placed into the read-behind queue.

The SR entered his or her score into iScore before being allowed to see the score assigned by the scorer for whom the read-behind was being performed. The SR then compared scores and the reported score was determined as follows:

- If there was exact agreement between the scores, no action was taken; the regular scorer's score remained.
- If the scores were adjacent (i.e., the difference was not greater than 1), the SR's score became the score of record; if there were a significant number of adjacent scores for this scorer, an individual scoring consultation was held with the scorer and the QAC determined whether or when the scorer could resume scoring.
- If there was a discrepant difference between the scores (a difference greater than 1 point), the SR's score became the score of record (see table 4.1.2.6.1). An individual consultation was held with the scorer, with the QAC determining whether or when the scorer could resume scoring.

**Table 4.1.2.6.1: Examples of MCAS Read-Behind Scoring Resolutions**

| Reader | QAC/SR Resolution | Final* |
|---|---|---|
| 4 | 4 | 4 |
| 4 | 3 | 3 |
| 4 | 2 | 2 |
| * QAC score is score of record. | | |

A minimum of 5 read-behinds per scorer was conducted throughout each half-scoring day, with a minimum of 10 read-behinds per scorer conducted throughout each full-scoring day. If a scorer's scoring rate fell below the required accuracy percentage, additional read-behinds were performed.

In addition to the minimum daily read-behinds and read-behinds performed to maintain scoring accuracy percentages, scoring leadership could choose to do read-behinds on any scorer at any point during the scoring process, thereby providing an immediate, real-time "snapshot" of a scorer's accuracy.

***Double-Scoring***

*Double-scoring* refers to the practice of having two readers independently score a response, without knowing either the identity of the other scorer or the score assigned to the response by the other scorer. Section 4.1.2.3 provides information about which responses were double-scored.

If there was a discrepancy (a difference greater than 1 for items with 4 or more possible score points; a difference of 1 for 2-point, dichotomous, or correct/not correct items) between scores, the response was placed into an arbitration queue. Arbitration responses were reviewed by scoring leadership (SR, QAC, or ACR) without any background knowledge of scores assigned

by the two previous readers, and were resolved according to table 4.1.2.6.2 below. Appendix F provides the MCAS 2007 percentages of agreement between scorers for each grade and content area test.

**Table 4.1.2.6.2: Examples of MCAS Double-Scoring Resolutions**

**English Language Arts Composition Topic Development***

| Reader #1 | Reader #2 | Resolution #1 | Chief | Final #1 |
|---|---|---|---|---|
| **6** | **6** | | | **12** |
| **6** | **5** | | | **11** |
| **6** | **4** | **4** | | **8** |
| **6** | **4** | **5** | | **11** |
| **6** | **2** | **4** | **4** | **8** |
| **6** | **2** | **4** | **3** | **6** |
| **6** | **2** | **3** | | **5** |

*Identical or adjacent reader scores are summed to obtain final score. If needed, resolution score is summed with identical reader score; or, if resolution score is adjacent to reader #1 and/or #2 but not identical with either, final score sums two highest adjacent scores. If resolution score is still discrepant, a Chief Reader (only) assigns a fourth score, which is doubled to obtain a final score.

**English Language Arts Composition Standard English Conventions***

| Reader #1 | Reader #2 | Resolution #1 | Final |
|---|---|---|---|
| **4** | **4** | | **8** |
| **4** | **4** | | **8** |
| **4** | **3** | | **7** |
| **4** | **2** | **4** | **8** |
| **4** | **2** | **3** | **7** |
| **4** | **1** | **3** | **7** |
| **4** | **1** | **2** | **3** |

*Identical or adjacent reader scores are summed to obtain final score. If needed, resolution score is summed with identical reader score; or, if resolution score is between readers #1 and #2, or is adjacent but not identical to either, then final score sums two highest scores.

**Open-Response and Short-Answer Items***

| Reader #1 | Reader #2 | QAC/SR Resolution | Final |
|---|---|---|---|
| **4** | **4** | | **4** |
| **4** | **3** | | **4** |
| **3** | **4** | | **4** |
| **4** | **2** | **3** | **3** |
| **4** | **1** | **2** | **2** |
| **3** | **1** | **1** | **1** |

*If reader scores are identical or adjacent, highest score is used as final. If reader scores are neither identical nor adjacent, resolution score is used as final.

Scoring leadership consulted individually with any scorer whose scoring rate fell below the required accuracy percentage and the QAC determined whether or when the scorer could resume scoring. Once allowed to resume scoring, scoring leadership carefully monitored these scorers by increasing the number of read-behinds.

***Scoring Reports***
Measured Progress's electronic scoring software, iScore, generated multiple reports that were used by scoring leadership to measure and monitor readers for scoring accuracy and consistency. These reports are further discussed in section 4.1.2.7 below.

### *4.1.2.7 Reports Generated During Scoring*

The 2007 MCAS administration was complex; computer-generated reports were necessary to ensure all of the following:

- overall group-level accuracy, consistency, and reliability of scoring were maintained and acceptable
- immediate, real-time individual scorer data were available to allow early scorer intervention when necessary
- scoring schedules were maintained

The following reports were produced by iScore:

- The **Read-Behind Summary** report showed the total number of read-behind responses for each scorer, and noted the numbers and percentages of scores that were exact, adjacent, and discrepant between that scorer and the SR/QAC. Scoring leadership could choose to generate this report at pre-set times by choosing options (such as every 15 minutes, 30 minutes, or cumulatively for the day) from a pull-down menu. The report could also be filtered to select data for a particular item or across all items.

- The **Double-Blind Summary** report showed the total number of double-score responses scored by each scorer, and noted the numbers and percentages of scores that were exact, adjacent, and discrepant between that scorer and the SR/QAC.

- The **Accuracy Summary** report combined read-behind and double-score data, showing the total number of double-score and read-behind responses scored for each scorer, and noting his or her accuracy percentages and score point distributions.

- The **Embedded CRR Summary** showed, for each scorer and for either a particular item or across all items, the total number of responses scored, the number of CRRs scored, and the numbers and percentages of scores that were exact, adjacent, and discrepant between the scorer and the SR/QAC.

- **Compilation Reports** were generated multiple times during each scoring day. Each Compilation Report showed, for each item and all scorers, each scorer's Calibration Assessment results and combined read-behind statistics (a minimum of either 5 read-behinds per scorer for each half-scoring day or 10 read-behinds for each full scoring day). Compilation Reports highlighted scorers who fell below the minimum scoring accuracy percentages, and included one column noting any action taken by scoring leadership as a result (e.g., "retrained," "scores voided").

At the end of each scoring shift, a final Compilation Report was generated, rank-ordered so that the lowest exact percentage was listed first, and continuing lowest to highest. This report showed, for each scorer and for a particular item, the following:

- total number of responses scored
- total number of read-behind responses
- total number of Calibration Assessment responses scored (at least 5 per shift), and, of this number, the percentages of scores that were exact, adjacent, and discrepant between the scorer and the SR/QAC

If any scorer's accuracy percentage did not meet the required standard, all scores assigned for that shift by that scorer were voided and sent back out on the floor to be scored by other scorers during a subsequent scoring shift. Only this end-of-shift report was used to determine whether a scorer's scores would be voided.

- The **Qualification Statistics Report** listed each scorer by name and ID number, identified which Qualifying Set(s) they did and did not take and, for the ones they did take, whether they passed or failed. The total number of qualifications passed and failed was noted for each reader, as was the total number of individuals passing or failing a particular Qualifying Set.

  The QAC could use this report to determine how the scorers within their specific scoring group performed on a specific Qualifying Set. QACs were able to highlight the word "passed" or "failed" in the report on a screen that described how a scorer performed on each question within that Qualifying Set. Each response within the set was identified by a booklet number. QACs could view an individual scorer's response by double-clicking the response's booklet number and could conference with the scorer as needed.

- The **Summary Report** showed the total number of student responses for an item, and identified, for the time at which the report was generated, the following:
  - the number of single and double-scorings that had been performed
  - the number of single and double-scorings yet to be performed

The following daily reports were sent to the Department of Education electronically:

- Compilation Report (by item)
- Summary Report (by field)

All other reports were also available to the Department. On reports provided to the Department, scorers were identified by unique ID numbers, rather than by name.

## 4.2 Scoring of MCAS-Alt Portfolios

All MCAS-Alt portfolios were reviewed and hand-scored by trained scorers according to the procedures described in this section and in Appendix D. Scores were entered onto score forms designed by Measured Progress and the DOE; score forms were scanned for accuracy and completeness.

About 10 percent of all portfolios were submitted electronically, using proprietary software (MCAS-Alt EV). These EV-submitted portfolios were scored electronically by scorers who viewed the on-screen portfolio images.

Security was maintained at the scoring site, with access to unscored portfolios and completed score forms restricted to DOE and Measured Progress staff. MCAS-Alt scoring leadership staff at each site included a Floor Manager (FM) and Table Leaders (TLs). Each Table Leader managed a table with four scorers. The FM managed all tables in a room of scorers.

Communication and coordination among scorers were maintained through daily meetings with TLs to ensure that critical information and scoring rules were implemented across all grade clusters.

### 4.2.1 MCAS-Alt Scoring Methodology

All portfolios in grades 3–8 were single-scored by one qualified scorer, with at least 20 percent double-scored (every fifth portfolio, or more frequently at the table leader's discretion; see section 4.2.2.6 for discussion of double-scoring).

All grade 10 portfolios were double-scored. In addition, any portfolio that received a score of "M" in any rubric area (i.e., missing or insufficient information submitted) was double-scored.

If scoring discrepancies were found on a double-scored portfolio, the portfolio was sent to the table leader, who assigned a resolution score that became the score of record.

#### *4.2.1.1 Portfolio Completeness*

Scorers ensured that each portfolio contained all required forms; that evidence was submitted for all required strands in each content area; and that all required evidence (i.e. one data chart and two related pieces of evidence) was submitted in each strand. If these requirements were not met, the portfolio received scores of M in Demonstration of Skills and Concepts and Independence (see sections B and C of section 4.2.1.2 below).

### *4.2.1.2 Scoring Dimensions*

Once the completeness of the portfolio was ascertained, each strand was scored in all of the following scoring dimensions, in the order listed:

A. Level of Complexity
B. Demonstration of Skills and Concepts
C. Independence
D. Self-Evaluation
E. Generalized Performance

MCAS-Alt 2007 score distributions for all scoring dimensions are provided in section 5.4 of this *Report*.

#### *A. Level of Complexity*

The score for Level of Complexity indicates how the student addressed *Curriculum Framework* learning standards. MCAS-Alt 2007 score distributions for individual strand and composite Level of Complexity are provided in section 5.4.1 of this *Report*.

- Level of Complexity Score for Each Strand
  Each strand was given a Level of Complexity score based on the scoring rubric for Level of Complexity (table 4.2.1.2.A1). Scorers assigned a Level of Complexity score based on the following:
  - whether or not the evidence was aligned with a learning standard in the required strand
  - whether the evidence met grade-level performance expectations, was modified below grade-level expectations, or addressed "access skills"

**Table 4.2.1.2.A1: Scoring Rubric for Level of Complexity**

| Score Point | | | | |
|---|---|---|---|---|
| **1** | **2** | **3** | **4** | **5** |
| Portfolio reflects **little or no basis** on C*urriculum Framework* learning standards in this strand. | Student primarily addresses social, motor, and communication "**access skills**" during instruction based on *Curriculum Framework* learning standards in this strand. | Student addresses *Curriculum Framework* learning standards that have been modified **below grade-level expectations** in this strand. | Student addresses a narrow sample of *Curriculum Framework* learning standards (**1 or 2) at grade-level** expectations in this strand. | Student addresses a broad range of *Curriculum Framework* learning standards (**3 or more**) **at grade-level** expectations in this strand. |

- Composite Level of Complexity Score
  A Composite Level of Complexity (CLC) score was determined for each assessed content area by averaging the three individual strand scores for Level of Complexity, according to table 4.2.1.2.A2 or, in the case of a two-strand content area, by combining the strand scores according to table 4.2.1.2.A3. This Composite score was used to determine whether the student's work would be measured against alternate achievement standards (ALT), indicating that the student had a significant cognitive disability; modified achievement standards (MOD); or grade-level achievement standards (GL).

**Table 4.2.1.2.A2: Determination of Score for Composite Level of Complexity in Each Content Area: 3-Strand Portfolio**

| Strand 1 Level of Complexity Score | Strand 2 Level of Complexity Score | Strand 3 Level of Complexity Score | Composite Level of Complexity Standard |
|---|---|---|---|
| 3, 2, or 1 | 3, 2, or 1 | 3, 2, or 1 | **ALT** |
| 3 (at or near grade level) | 3 | 3 | **MOD** |
| 3, 2, or 1 | 3, 2, or 1 | 4 or 5 | **MOD** |
| 3, 2, or 1 | 4 | 4 | **MOD** |
| 3, 2, or 1 | 4 | 5 | **MOD** |
| 3, 2, or 1 | 5 | 5 | **GL** |
| 4 | 4 | 4 | **GL** |
| 4 | 4 | 5 | **GL** |
| 4 | 5 | 5 | **GL** |
| 5 | 5 | 5 | **GL** |

**Table 4.2.1.2.A3: Determination of Score for Composite Level of Complexity in Each Content Area: 2-Strand Portfolio**

| Strand 1 Level of Complexity Score | Strand 2 Level of Complexity Score | Composite Level of Complexity Standard |
|---|---|---|
| 3, 2, or 1 | 3, 2, or 1 | **ALT** |
| 3 (at or near grade level) | 3 | **MOD** |
| 3, 2, or 1 | 4 | **MOD** |
| 3, 2, or 1 | 5 | **MOD** |
| 4 | 4 | **GL** |
| 4 | 5 | **GL** |
| 5 | 5 | **GL** |

### *B. Demonstration of Skills and Concepts*

Each strand is given a score for Demonstration of Skills and Concepts that indicates the degree to which a student gave a correct (accurate) performance or response in demonstrating the targeted skill. The MCAS-Alt 2007 score distributions for Demonstration of Skills and Concepts are provided in section 5.4.2 of this *Report*.

Scorers confirmed that all portfolio evidence was correctly labeled with the following information:

- student's name
- date of performance
- percentage of accuracy
- percentage of independence

If any piece of evidence was not labeled correctly, that piece was not scorable and, if at least two other pieces of correctly labeled primary evidence were not submitted, the strand received scores of M in both Demonstration of Skills and Concepts and Independence (see section C below).

Scorers assigned a score to the strand for Demonstration of Skills and Concepts based on the average percentage of accuracy found in the data points in the final one-third time frame of the data chart, as described in section 5.1.2 of this document. Scores ranged from M ("Missing") to 4, based on the scoring rubric in table 4.2.1.2.B1.

**Table 4.2.1.2.B1: Scoring Rubric for Demonstration of Skills and Concepts**

| Score Point | | | | |
|---|---|---|---|---|
| **M** | **1** | **2** | **3** | **4** |
| The portfolio strand contains insufficient information to determine a score. | Student's performance is primarily inaccurate and demonstrates minimal understanding in this strand (0–25% accurate). | Student's performance is limited and inconsistent with regard to accuracy and demonstrates limited understanding in this strand (26–50% accurate). | Student's performance is mostly accurate and demonstrates some understanding in this strand (51–75% accurate). | Student's performance is accurate and of consistently high quality in this strand (76–100% accurate). |

### *C. Independence*

The score for Independence shows the degree to which the student performed independently (i.e., without cues or prompts) during tasks or activities based on the learning standards being assessed. The MCAS-Alt 2007 score distributions for Independence are provided in section 5.4.3 of this *Report*.

Scorers assigned a score for Independence to each strand. If the percentage of independence was not indicated on at least three pieces of evidence, the strand was considered incomplete, and received scores of M in both Demonstration of Skills and Concepts and Independence. Scores ranged from M to 4 based on the scoring rubric for Independence (table 4.2.1.2.C1).

The procedure for determining a score for Independence in each strand was identical to that used to determine Demonstration of Skills and Concepts. For a more detailed explanation, including examples and exceptions to the standard procedures, see Appendix D.

**Table 4.2.1.2.C1: Scoring Rubric for Independence**

| Score Point | | | | |
|---|---|---|---|---|
| **M** | **1** | **2** | **3** | **4** |
| The portfolio strand contains insufficient information to determine a score. | Student requires extensive verbal, visual, and physical assistance to demonstrate skills and concepts in this strand. (0-25% independent) | Student requires frequent verbal, visual, and physical assistance to demonstrate skills and concepts in this strand. (26-50% independent) | Student requires some verbal, visual, and physical assistance to demonstrate skills and concepts in this strand. (51-75% independent) | Student requires minimal verbal, visual, and physical assistance to demonstrate skills and concepts in this strand. (76-100% independent) |

### *D. Self-Evaluation*

The score for Self-Evaluation shows the frequency of self-correction, self-monitoring, goal-setting, reflection, and overall awareness by the student of his or her own learning. The MCAS-Alt 2007 overall score distributions for Self-Evaluation are provided in section 5.4.4 of this *Report*.

- Self-Evaluation Score in Each Strand
  Each strand was given a score ranging from M to 2+ based on the scoring rubric shown in table 4.2.1.2.D1.

**Table 4.2.1.2.D1: Scoring Rubric for Self-Evaluation, Individual Strand Score**

| Score Point | | |
|---|---|---|
| **M** | **1** | **2+** |
| Evidence of self-correction, task-monitoring, goal-setting, and reflection was **not found** in this strand. | Student self-corrects, monitors, sets goals, and reflects on only **one occasion** in this strand. | Student self-corrects, monitors, sets goals, and reflects on **two or more occasions** in this strand. |

- Combined Self-Evaluation Score

  A final score for Self-Evaluation in the content area was determined by combining the three individual strand scores according to table 4.2.1.2.D2 or, in the case of a two-strand portfolio, by combining the two individual strand scores according to table 4.2.1.2.D3. Descriptors of the overall content area scores are shown in table 4.2.1.2.D4.

**Table 4.2.1.2.D2: Determination of Combined Self-Evaluation Score for Each Content Area: 3-Strand Portfolio**

| Strand Score 1 | Strand Score 2 | Strand Score 3 | Combined Content Area Score |
|---|---|---|---|
| M | M | M | **M** |
| M | M | 1 | **1** |
| M | M | 2+ | **1** |
| M | 1 | 1 | **2** |
| M | 1 | 2+ | **2** |
| M | 2+ | 2+ | **2** |
| 1 | 1 | 1 | **3** |
| 1 | 1 | 2+ | **3** |
| 1 | 2+ | 2+ | **3** |
| 2+ | 2+ | 2+ | **4** |

**Table 4.2.1.2.D3: Determination of Combined Self-Evaluation Score for Each Content Area: 2-Strand Portfolio**

| Strand Score 1 | Strand Score 2 | Combined Content Area Score |
|---|---|---|
| M | M | **M** |
| M | 1 | **1** |
| M | 2+ | **1** |
| 1 | 1 | **2** |
| 1 | 2+ | **3** |
| 2+ | 2+ | **4** |

**Table 4.2.1.2.D4: Rubric for Combined Self-Evaluation Score in Each Content Area**

| Score Point | | | | |
|---|---|---|---|---|
| **M** | **1** | **2** | **3** | **4** |
| Evidence of self-correction, task-monitoring, goal-setting, and reflection was not found in the student's portfolio in this content area. | Student infrequently self-corrects, monitors, sets goals, and reflects in this content area—evidence of Self-Evaluation was found in only one strand. | Student occasionally self-corrects, monitors, sets goals, and reflects in this content area—evidence of Self-Evaluation was found in two strands. | Student frequently self-corrects, monitors, sets goals, and reflects in this content area—evidence of Self-Evaluation was found either in three strands; or two or more examples were found in only one strand. | Student self-corrects, monitors, sets goals, and reflects all or most of the time in this content area—two or more examples of Self-Evaluation were found in each strand. |

### *E. Generalized Performance*

The score for Generalized Performance shows the numbers of contexts and instructional approaches in which knowledge and skills were demonstrated in the portfolio strand. The MCAS-Alt 2007 score distributions for Generalized Performance in each content area are provided in section 5.4.5 of this *Report*.

- Generalized Performance Score in Each Strand
  Scorers totaled the numbers of contexts and approaches in each strand to determine the score of either 1 or 2+, based on the rubric shown in table 4.2.1.2.E1.

**Table 4.2.1.2.E1: Scoring Rubric for Generalized Performance**

| Score Point | |
|---|---|
| **1** | **2+** |
| Student uses a single context or instructional approach to demonstrate knowledge and skills in this strand. | Student uses multiple contexts or instructional approaches to demonstrate knowledge and skills in this strand. |

- Combined Generalized Performance Score
  A final Generalized Performance score was determined in the content area by combining the three scores for individual strands, as shown in table 4.2.1.2.E2 or, in the case of a two-strand portfolio, by combining the two individual strand scores as shown in table 4.2.1.2.E3. Descriptors for the Combined Generalized Performance scores are shown in table 4.2.1.2.E4.

**Table 4.2.1.2.E2: Determination of Combined Generalized Performance Score for Each Content Area: 3-Strand Portfolio**

| Strand Score 1 | Strand Score 2 | Strand Score 3 | Resulting Overall Score |
|---|---|---|---|
| 1 | 1 | 1 | **1** |
| 1 | 1 | 2+ | **2** |
| 2+ | 2+ | 1 | **3** |
| 2+ | 2+ | 2+ | **4** |

**Table 4.2.1.2.E3: Determination of Combined Generalized Performance Score for Each Content Area: 2-Strand Portfolio**

| Strand Score 1 | Strand Score 2 | Resulting Overall Score |
|---|---|---|
| 1 | 1 | **1** |
| 1 | 2 | **2** |
| 1 | 3+ | **2** |
| 2 | 2 | **3** |
| 3+ | 2 | **3** |
| 3+ | 3+ | **4** |

**Table 4.2.1.2.E4: Rubric for Combined Generalized Performance Score in Each Content Area**

| Score Point | | | |
|---|---|---|---|
| **1** | **2** | **3** | **4** |
| Student demonstrates knowledge and skills in one context; or uses one approach and/or method of response and participation in each strand. | Student demonstrates knowledge and skills in two or more contexts; or uses two or more approaches and/or methods of response and participation in only one strand. | Student demonstrates knowledge and skills in two contexts; or uses two approaches and/or methods of response and participation in each strand. | Student demonstrates knowledge and skills in three or more contexts; or uses three or more approaches and/or methods of response and participation in each strand. |

### *4.2.1.3 Scoring of "Competency Portfolios" for Grade 10 and Beyond*

A student may earn a Competency Determination by submitting an MCAS-Alt portfolio that demonstrates knowledge and skills at levels comparable to a student who has earned a score of *Needs Improvement* or higher on the standard grade 10 MCAS tests in English Language Arts (ELA) and Mathematics. Specific requirements for submission of competency portfolios are described in the *2007 Educator's Manual for MCAS-Alt*.

Each 2007 competency portfolio was evaluated by a panel of content area experts to determine whether it met grade 10 *Needs Improvement* performance level requirements. To receive a score of *Needs Improvement* or higher on a portfolio, the portfolio was required to demonstrate the following:

- knowledge and skills at the levels of a student who received scores of *Needs Improvement* or higher on the grade 10 ELA and Mathematics tests
- that the student had independently and accurately addressed all required learning standards and strands described in the portfolio requirements for ELA and mathematics

If the student's portfolio demonstrated a level of performance comparable to or higher than that of students who passed the standard grade 10 MCAS tests in ELA and Mathematics, the student was awarded a Competency Determination.

In 2007, of a total of 35 English Language Arts, 41 Mathematics, and 20 Science and Technology/Engineering portfolios submitted for consideration to earn a Competency Determination, eight English Language Arts portfolios and six Mathematics portfolios earned the Competency Determination. No Science and Technology/Engineering portfolios earned the Competency Determination.

### 4.2.2 Recruitment, Training, Qualification, and Monitoring of MCAS-Alt Scorers

#### *4.2.2.1 Scorer Recruitment and Qualifications*

The Department invited licensed Massachusetts educators to apply to participate in the three-week summer MCAS-Alt Scoring Institute. Prospective scorers were required to meet all of the following conditions:

- must be a licensed educator or related-service provider in Massachusetts
- must have familiarity and experience with the following:
  - the MCAS-Alt
  - students with significant disabilities who take the MCAS-Alt
  - the *Massachusetts Curriculum Frameworks*
  - curriculum alignment for students with significant disabilities
- must be directly involved either with students taking the MCAS-Alt or their teachers

After a selection process conducted by the Department of Education, scorers were assigned to either a one- or a two-week session, based on scorer preference, experience, and level of responsibility. All scoring personnel participated in intensive training and signed a confidentiality agreement before reviewing actual student portfolios.

#### *4.2.2.2 Selection of Training Materials*

The MCAS-Alt Project Leadership Team (PLT) was comprised of DOE and Measured Progress staff, plus five Teacher Consultants.The PLT met for two days in order to accomplish the following:

- select sample portfolio strands to use for training, calibration, and qualification of scorers
- field test the 2007 Guidelines for Scoring Student Portfolios (Appendix D)

On the first day, the group reviewed and scored approximately 140 portfolios using the draft of the *2007 Guidelines*, noting any scoring problems that arose during the review. All concerns were resolved either using the *Educator's Manual* or through additional scoring rules agreed upon by the Project Leadership Team and subsequently addressed in the final *2007 Guidelines*.

Of the 140 portfolios reviewed, 62 sample strands were set aside as possible exemplars to train and calibrate scorers. These strands consisted of "solid" examples of each score point on the scoring rubric.

Each of these samples was triple-scored. Of the 62 double-scores, 37 were in exact agreement in all five scoring dimensions: Level of Complexity, Demonstration of Skills and Concepts, Independence, Self-Evaluation, and Generalized Performance.

These 37 samples were set aside and rescored. Scoring rationale sheets were developed and printed for scorer training. Of these 37 sample strands, the PLT decided to use 20, including several complete content areas, for scorer training and calibration. These 20 portfolio samples became the scorers' "sample set."

#### *4.2.2.3 Recruitment and Training of Scorers*

***Recruitment***

In April 2007, scorer applications were sent out to all Massachusetts teachers who had attended a training session for the MCAS-Alt during the previous year. Over 450 applications were returned. During the month of May, the PLT chose 274 applicants based on their familiarity with the MCAS-Alt to attend MCAS-Alt Scorer Training sessions.

***Training***

Scorers were thoroughly trained in all rubric areas and score points through review and "mock scoring" of a sample set of student portfolios selected to illustrate clear examples of each rubric score point.

First, scorers were given detailed instructions regarding how to review each piece of evidence and tally the data using a Strand Organizer (a sample is provided on page 33 of Appendix D). Scorers were then taught to then apply the resulting data to the rubrics (see section 4.2.1.2) for Level of Complexity, Demonstration of Skills and Concepts, Independence, Self-Evaluation, and Generalized Performance. After some basic instructions regarding the assignment of rubric scores, trainers reviewed the set of portfolio samples with scorers, discussing each piece of evidence and the score it should receive in each dimension. Trainers facilitated discussion and review among scorers to clarify the characteristics of each score point.

#### *4.2.2.4 Scorer Qualification*

Prior to scoring actual student portfolios, each scorer was required to demonstrate the ability to score by taking a qualifying assessment of 24 questions and scoring a sample portfolio of four strands. The qualifying score on the assessment was 85 (21 correct of 24 total questions). The qualifying rate of accuracy on the sample portfolio was 85 percent exact agreement overall for the five scoring dimensions (Level of Complexity, Demonstration of Skills and Concepts, Independence, Self-Evaluation, and Generalized Performance; i.e., exact agreement on 17 of 20 total scorable dimensions for the four strands).

Scorers who did not achieve the required accuracy rate on the qualifying assessment were retrained before taking another qualifying assessment. If they achieved an accuracy rate of at least 85 percent exact agreement, they were authorized to begin scoring student portfolios.

If a scorer did not meet the required accuracy rate on the second qualifying assessment, he or she was released from scoring. Virtually all scorers who had taken one or two qualifying assessments met the required accuracy rate.

#### 4.2.2.5 Recruitment, Training, and Qualification of Table Leaders and Floor Managers

Table Leaders (TLs) and Floor Managers (FMs) were invited by the PLT to apply for the position based on their familiarity with MCAS-Al scoring procedures. All TLs were scorers (or TLs) from the previous year who had distinguished themselves as having an exemplary understanding of the scoring procedures. All FMs were TLs (or FMs) from the previous year who had distinguished themselves as having an exemplary understanding of the TL procedures.

TLs and FMs were trained and qualified prior to scorers by the DOE using the same methods and criteria used for scorers, with the exception that they were required to score 90 percent or better on both the test and the qualifying assessment. TLs and FMs also received training in logistical, management, and security procedures.

#### 4.2.2.6 Monitoring of Scorers and Quality Control Procedures

The TL ensured that scorers at his or her table were consistent and accurate in their scoring. The FM monitored scoring consistency and the general flow of work in the room. TLs who had questions were referred to the FM.

Scorers were required to maintain a 80 percent exact agreement rate on all double-scored portfolios. When a scorer's rate of accuracy fell below this rate, the scorer was retrained. The FM determined whether a scorer could resume scoring. The TL regulated the number of double-scored portfolios for each scorer; on average, every fifth portfolio was double-scored.

Scoring consistency and accuracy were maintained using the following methods, described below:

- Read-Behind Scoring
- Double-Scoring
- Scorer Tracking Forms

***Read-Behind Scoring***

*Read-behind scoring* refers to the practice of a TL rescoring a portfolio and comparing his or her score with the one assigned by the previous scorer. If there was exact score agreement, the first scorer's score was retained as the score of record. If the scores differed, the TL's score became the score of record.

Read-behinds were performed on every scorer's first three portfolios. If those scores were consistent with the TL's resolution scores, a read-behind was performed on every fifth subsequent portfolio per scorer.

If a scorer's first three portfolio scores were inconsistent with the TL's resolution scores, the scorer was retrained. The TL determined when a retrained scorer could resume scoring. Additionally, a read-behind was performed on each subsequent portfolio for any scorer permitted to resume scoring, until consistency with the TL's scores was established.

The required rate of agreement for read-behinds (after the first 3 portfolios) was 80 percent exact agreement.

***Double-Scoring***
*Double-scoring* refers to a single portfolio being scored by two scorers at different tables, without knowledge by either scorer of the score assigned to the portfolio by the other.

All portfolios for students in grades 10–12 were double-scored. Scorers at grades 3–8 had at least one of their portfolios double-scored each morning and afternoon, and every fifth portfolio thereafter. At least 20 percent of portfolios for students in grades 3–8 were double-scored.

The required rate of scoring accuracy for double-scored portfolios was 80 percent exact agreement. When there was a discrepancy between scores, the TL scored the portfolio a third time and the TL's score became the score of record. The TL discussed discrepant areas with the responsible scorers and determined when they could resume scoring.

Tables showing the percentages of inter-scorer agreement for the 2007 MCAS-Alt are provided in section 4.2.3 below.

***Scorer Tracking Forms***
The TL maintained both a daily and a cumulative Scorer Tracking Form for each scorer. The daily form showed the number of portfolios scored by that scorer each day, along with the scorer's percentage of accuracy on read-behinds and double-scores.

Scoring leadership monitored scorers for output, with slower scorers remediated to increase their production.

### 4.2.3 MCAS-Alt Inter-Scorer Consistency

Appendix G contains tables showing rates of scoring consistency among MCAS-Alt scorers for 2007.

## 4.3 MCAS Equating and Scaling Procedures

### 4.3.1 Equating

The purpose of equating is to ensure that scores obtained from different forms of a test are equivalent to one another. Equating may be used when multiple test forms are administered in the same year and/or to equate one year's forms to those given in the previous year. Equating ensures that students are not given an unfair advantage or disadvantage because the items on the test form they took are easier or harder than items on forms taken by other students.

The data and rigorous procedures used to equate MCAS test results include evaluations of standard errors around item parameters, as well as the test characteristic curves (TCCs) that are the basis for MCAS equating and scaling procedures (see section 4.3.2). The TCCs for the MCAS 2007 tests are provided in section 6.1.5 of this *Report*.

#### *4.3.1.1 Equating Methods*

A raw-score-to-theta equating procedure was used to equate the MCAS 2007 tests. In each year of MCAS administration, every new form is equated back to the theta scale of the previous year's test form in a "chained linking design." Because the chain originates from the reference form, the theta scale of every new test form can be assumed to be the same as the theta scale of the reference form. Therefore, the following equating activities were involved for the MCAS 2007 administration:

- grades 4 and 8 Mathematics test scores were equated to the 1998 theta scale
- grades 3, 4, and 7 English Language Arts (ELA) and grade 6 Mathematics test scores were equated to the 2001 theta scale
- grades 5 and 8 Science and Technology/Engineering test scores were equated to the 2003 theta scale
- grades 5, 6, and 8 English Language Arts (ELA) and grades 3, 5, and 7 Mathematics test scores were equated to the 2006 theta scale

This method of equating has been used for MCAS tests since the 1998 scale was established, and it has been reviewed and approved by the MCAS Technical Advisory Committee (also see "Modification to 2007 Equating" below).

Previous equating for MCAS tests used the *anchor-test-nonequivalent-groups* design described by Petersen, Kolen, and Hoover (1989). In this equating design, no assumption is made about the equivalence of the examinee groups taking different test forms (i.e., the groups occur naturally). Instead, the comparability of the groups is evaluated through utilization of a set of anchor items (i.e., linking items). Equating for the MCAS 2007 administration used an external anchor test design in which linking items are not counted toward students' test scores.

For MCAS 2007 item calibration, the three-parameter logistic (3PL) model was used for dichotomous items, and the graded response model (GRM) was used for polytomous items. Calibration of parameter estimates in 2007 placed items on the 2005–06 scale by fixing the

parameters for the anchor items to 2005–06 calibration values. Again, the students who took the field test in 2005–06 and those who took the operational test in 2007 are not equivalent groups. Item Response Theory (IRT) is particularly useful in equating for nonequivalent groups (Allen and Yen, 1979). The item parameters are provided in Appendix B.

Prior to fixing their parameter values, the anchor items were evaluated for use as equating items using the delta method. Each dichotomous item has two p-values, one for the previous year's administration and one for the current year's administration. The p-values of each item were transformed to the delta metric. The delta scale is an inverse normal transformation of percentage correct to a linear scale with a mean of 13 and standard deviation of 4 (Holland and Wainer, 1993). A high delta value indicates a difficult item. For open-response items, the adjusted p-value (the average score divided by the maximum possible score) was transformed to the delta metric. The delta values were computed for the potential equating items for each grade-content category.

Figure 4.3.A is an example of a delta plot for equating items. Different shapes are used to identify different item types:

♦ = multiple-choice items
▲ = short-answer items
● = open-response items

The perpendicular distance of each item to the regression line is computed. (Note that the line shown in Figure 4.3.A is the identity line, not the regression line.) The un-shaded (in this case, triangular) shape indicates the item with the greatest perpendicular distance from the regression line. Items that were not more than three standard deviations away from the regression line were used as equating items. For the 2007 MCAS administration, test items were excluded from use in equating, based on delta analysis results, for the following tests:

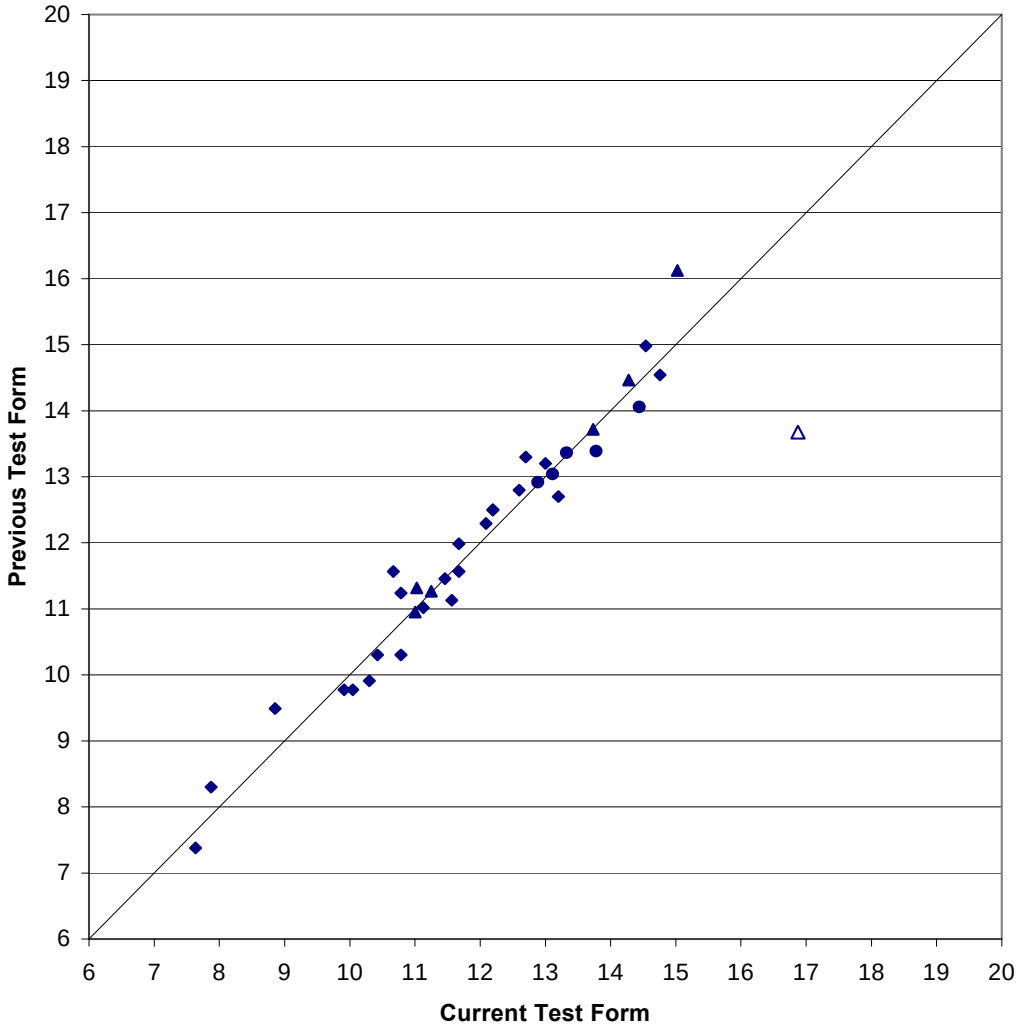
- One item was excluded from use in equating for each of the following tests:
  - grade 3 ELA
  - grade 5 Science and Technology/Engineering
  - grade 6 ELA
  - grade 7 ELA
  - grade 8 Mathematics
  - high school Biology

- Two items were excluded from use in equating for each of the following tests:
  - grade 4 Mathematics
  - grade 8 ELA

- No items were excluded from use in equating for the following tests:
  - grade 3 Mathematics
  - grade 4 ELA
  - grade 5 ELA
  - grade 5 Mathematics
  - grade 6 Mathematics
  - grade 7 Mathematics
  - grade 8 Science and Technology/Engineering
  - grade 10 ELA
  - grade 10 Mathematics
  - high school Chemistry
  - high school Introductory Physics
  - high school Technology/Engineering

The 2007 MCAS delta analyses tables are provided in Appendix A.

**Figure 4.3.A: Sample Delta Plot (♦ MC ▲ SA ● OR)**



***Modification to 2007 Equating***

In 2007, the Department made a minor modification to the statistical technique that it uses to ensure the stability of the measurement of MCAS performance standards from year to year. From 1999 to 2006 the Department used a procedure known as the Fixed Common Item Parameters (FCIP) method to ensure that scaled scores were comparable from one year to the next (e.g., Li, Griffith, & Tam (1997)). This means, for example, that a student scoring 220 on the grade 4 Mathematics test in 2005 had approximately the same performance as a student scoring 220 on the 2006 grade 4 Mathematics test. The fundamental approach taken in FCIP equating involves fixing the item parameters for equating items—those items that are the same in two test administrations—to their values from the previous year. When the current year's non-equating items are calibrated simultaneously with equating items, the item parameters of the non-equating items are placed onto the previous year's scale.

In the winter of 2006, the Department's own studies and independently published academic findings showed that adjustments to the technique were warranted to enhance the precision of the measurement of changes in performance from one year to another. After a thorough review, the Deparment's MCAS Technical Advisory Committee (TAC) recommended that the technique be modified, and the Department accepted that recommendation. The new procedure—referred to as FCIP2—represents a slight modification to the Fixed Common Item Parameters method.

The specific modification made in FCIP2 is related to the PARSCALE software program (the IRT software program used for the MCAS program). Prior to 2007, the MCAS program used the default settings of PARSCALE to equate MCAS test items. In a recent study investigating various IRT fixed calibration methods, Kim (2006) included the optional subcommands *free(noadjust, noadjust)* and *posterior*.[7] These two subcommands modify the manner in which PARSCALE updates the marginalized estimated ability distribution when doing IRT calibrations. When these subcommands are present, the IRT calibration process is more sensitive to differences in student performance across years. Consequently, a more accurate representation of student improvement (or decline) can be made.

After discussions with the MCAS TAC regarding the Kim study and FCIP equating, the Massachusetts Department of Education endorsed this refinement to the equating process. The two subcommands were added to the calibration statement in PARSCALE's command file to equate 2007 MCAS test items to items on the 2006 tests.

Internal and external analyses reveal that the 2007 threshold scores did not shift uniformly as a result of the adoption of the modified procedure—some shifted downward, some did not change, while others shifted upward. Therefore threshold score changes observed this fall are not *solely* due to the modified procedure. Internal and external analyses have affirmed that the adoption of this modified procedure has improved the measurement of change in student performance since 2006, as intended. Please note that the adoption of this method does not in any way inflate or deflate actual student performance. Instead, this method more precisely captures actual changes in student performance from year to year.

[7] It should be noted that these subcommands were not the focus of the Kim study.

Because 2007 grade 10 results are pre-equated, this modification does not affect grade 10 results. The modified procedure will be applied to grade 10 English Language Arts and Mathematics results and high school Science and Technology/Engineering results for the first time in 2008.

#### *4.3.1.2 Rescore Analyses*

***Testing Contractor Analysis***

For the MCAS tests in English Language Arts, Mathematics, and grades 5 and 8 Science and Technology/Engineering, a rescore analysis was conducted by the testing contractor to evaluate potential constructed-response equating items. For each potential equating item, approximately 200 responses from the previous year's test were randomly selected and rescored during the 2007 scoring sessions. The scores for the two years were compared; any items found to have a large difference between average scores were excluded as equating items.

Using Cohen's effect size rules-of-thumb (wherein items with effect sizes greater than 0.80 are automatically removed as equating items), a handful of items whose effect sizes slightly exceeded the "negligible" range—up to 0.20 (e.g., grade 3 English Language Arts Item #234903)—were added to a "watch list" and were further studied in terms of content and model fit.

Results of this rescore analysis are shown in tables 4.3.1.2.1 through 4.3.1.2.3. As indicated in the last column of each table, no items were discarded from use as equating items on the 2007 tests as a result of the watch list evaluation or due to large differences between average scores over two years.

## Table 4.3.1.2.1: MCAS 2007 Rescore Analyses: English Language Arts

| Item Reference | Maximum Score | Old Mean | New Mean | Old SD | New SD | Effect Size | Absolute Difference | Discard? |
|---|---|---|---|---|---|---|---|---|
| ***Grade 3*** | | | | | | | | |
| 220259 | 4 | 2.2488 | 2.2927 | 0.9885 | 1.0108 | 0.0444 | 0.0439 | NO |
| 234903 | 4 | 2.0878 | 2.3439 | 1.1737 | 1.1775 | 0.2182 | 0.2561 | NO |
| 214025 | 4 | 1.4390 | 1.6268 | 1.2735 | 1.2395 | 0.1475 | 0.1878 | NO |
| 214108 | 4 | 2.5415 | 2.6195 | 1.3231 | 1.2636 | 0.0590 | 0.0780 | NO |
| ***Grade 4*** | | | | | | | | |
| 228281 | 4 | 1.8439 | 1.8927 | 0.9902 | 0.9769 | 0.0493 | 0.0488 | NO |
| 227667 | 4 | 1.7756 | 1.8585 | 0.8770 | 0.905 | 0.0946 | 0.0829 | NO |
| 227660 | 4 | 1.9512 | 2.1195 | 0.8010 | 0.885 | 0.2101 | 0.1683 | NO |
| 244114 | 4 | 2.1366 | 2.0390 | 0.8728 | 0.9745 | -0.1118 | 0.0976 | NO |
| 234967 | 4 | 1.8585 | 2.1829 | 1.0286 | 1.1447 | 0.3154 | 0.3244 | NO |
| 225967 | 4 | 1.9415 | 2.0024 | 1.1203 | 1.1032 | 0.0544 | 0.0610 | NO |
| ***Grade 5*** | | | | | | | | |
| 205153 | 4 | 1.9978 | 1.875 | 0.7933 | 0.8608 | -0.1548 | 0.1228 | NO |
| 255425 | 4 | 2.0244 | 2.1659 | 0.9183 | 0.9062 | 0.1540 | 0.1415 | NO |
| 208765 | 4 | 2.4341 | 2.3659 | 0.9275 | 0.9307 | -0.0736 | 0.0683 | NO |
| 224817 | 4 | 1.8634 | 1.878 | 0.8894 | 0.8997 | 0.0165 | 0.0146 | NO |
| 205102 | 4 | 2.1220 | 2.1268 | 0.7649 | 0.9179 | 0.0064 | 0.0049 | NO |
| 241467 | 4 | 1.8976 | 1.9683 | 0.8803 | 0.8505 | 0.0804 | 0.0707 | NO |
| ***Grade 6*** | | | | | | | | |
| 207339 | 4 | 1.8927 | 1.839 | 1.0064 | 0.9362 | -0.0533 | 0.0537 | NO |
| 250604 | 4 | 2.3512 | 2.4244 | 0.9645 | 1.0314 | 0.0759 | 0.0732 | NO |
| 203165 | 4 | 2.2780 | 2.1659 | 0.8866 | 0.8789 | -0.1265 | 0.1122 | NO |
| 207670 | 4 | 2.2000 | 2.1902 | 0.902 | 0.9411 | -0.0108 | 0.0098 | NO |
| 245085 | 4 | 1.9073 | 2.0293 | 1.0712 | 1.0725 | 0.1138 | 0.1220 | NO |
| 207360 | 4 | 2.3171 | 2.2098 | 0.9788 | 0.8944 | -0.1096 | 0.1073 | NO |
| ***Grade 7*** | | | | | | | | |
| 224918 | 4 | 2.5366 | 2.4415 | 0.9802 | 0.9254 | -0.0970 | 0.0951 | NO |
| 225667 | 4 | 2.0560 | 1.8881 | 0.9713 | 0.8972 | -0.1729 | 0.1679 | NO |
| 225565 | 4 | 1.6058 | 1.5669 | 1.0230 | 1.0817 | -0.0381 | 0.0389 | NO |
| 225640 | 4 | 2.0439 | 1.9195 | 1.0039 | 0.9807 | -0.1239 | 0.1244 | NO |
| 225707 | 4 | 1.9781 | 1.9221 | 0.9052 | 0.9507 | -0.0618 | 0.0560 | NO |
| 225597 | 4 | 2.1024 | 2.0171 | 0.9996 | 0.9888 | -0.0854 | 0.0854 | NO |
| ***Grade 8*** | | | | | | | | |
| 207639 | 4 | 2.5902 | 2.5000 | 0.9515 | 0.8978 | -0.0948 | 0.0902 | NO |
| 207124 | 4 | 1.9122 | 1.8171 | 1.0463 | 1.0351 | -0.0909 | 0.0951 | NO |
| 207248 | 4 | 2.6049 | 2.5829 | 0.9951 | 1.0473 | -0.0221 | 0.0220 | NO |
| 207193 | 4 | 2.4029 | 2.4733 | 0.9019 | 0.9613 | 0.0780 | 0.0704 | NO |
| 227783 | 4 | 2.6019 | 2.3786 | 0.9357 | 0.9815 | -0.2386 | 0.2233 | NO |
| 204185 | 4 | 2.2195 | 1.9537 | 0.9954 | 0.9215 | -0.2671 | 0.2659 | NO |
| ***Grade 10*** | | | | | | | | |
| 228468 | 4 | 2.2353 | 2.0588 | 1.0772 | 1.1361 | -0.1638 | 0.1765 | NO |
| 253938 | 4 | 1.7805 | 1.8976 | 0.9706 | 1.0045 | 0.1206 | 0.1171 | NO |
| 227212 | 4 | 2.5545 | 2.4356 | 0.9225 | 0.9639 | -0.1288 | 0.1188 | NO |
| 227168 | 4 | 2.2000 | 2.2341 | 1.0236 | 1.0091 | 0.0334 | 0.0341 | NO |
| 228485 | 4 | 2.1881 | 2.099 | 1.0313 | 1.0293 | -0.0864 | 0.0891 | NO |
| 227083 | 4 | 2.2439 | 2.2049 | 1.1683 | 1.0851 | -0.0334 | 0.0390 | NO |
| 254237 | 4 | 2.1073 | 2.2049 | 1.0161 | 1.0985 | 0.0960 | 0.0976 | NO |
| 227186 | 4 | 1.9853 | 2.0637 | 1.1047 | 1.0985 | 0.0710 | 0.0784 | NO |

## Table 4.3.1.2.2: MCAS 2007 Rescore Analyses: Mathematics

| Item Reference | Maximum Score | Old Mean | New Mean | Old SD | New SD | Effect Size | Absolute Difference | Discard? |
|---|---|---|---|---|---|---|---|---|
| ***Grade 3*** | | | | | | | | |
| 203598 | 2 | 1.2537 | 1.2732 | 0.8229 | 0.7985 | 0.0237 | 0.0195 | NO |
| 203608 | 2 | 1.8390 | 1.8293 | 0.4288 | 0.4363 | -0.0228 | 0.0098 | NO |
| 218575 | 2 | 1.5659 | 1.5317 | 0.6565 | 0.7226 | -0.0520 | 0.0341 | NO |
| 208002 | 2 | 1.3714 | 1.3667 | 0.8865 | 0.8965 | -0.0054 | 0.0048 | NO |
| 203629 | 2 | 1.3902 | 1.4049 | 0.8911 | 0.8762 | 0.0164 | 0.0146 | NO |
| ***Grade 4*** | | | | | | | | |
| 221891 | 4 | 1.9707 | 1.9366 | 1.5770 | 1.6172 | -0.0217 | 0.0341 | NO |
| 221891 | 4 | 1.9707 | 1.9366 | 1.5770 | 1.6172 | -0.0217 | 0.0341 | NO |
| 221949 | 4 | 1.8010 | 1.8204 | 1.5992 | 1.6106 | 0.0121 | 0.0194 | NO |
| 222147 | 4 | 2.2049 | 2.3220 | 1.2753 | 1.2855 | 0.0918 | 0.1171 | NO |
| 227323 | 4 | 2.4780 | 2.4878 | 1.4162 | 1.3348 | 0.0069 | 0.0098 | NO |
| 227312 | 4 | 2.8537 | 2.9512 | 1.2757 | 1.3206 | 0.0765 | 0.0976 | NO |
| ***Grade 5*** | | | | | | | | |
| 207742 | 4 | 1.7854 | 1.7951 | 1.5626 | 1.4872 | 0.0062 | 0.0098 | NO |
| 198686 | 4 | 2.5951 | 2.6439 | 1.2943 | 1.3270 | 0.0377 | 0.0488 | NO |
| 198678 | 4 | 2.0780 | 2.0390 | 1.4663 | 1.4712 | -0.0266 | 0.0390 | NO |
| 204647 | 4 | 1.7854 | 1.7756 | 1.3188 | 1.2986 | -0.0074 | 0.0098 | NO |
| 217432 | 4 | 1.5073 | 1.5707 | 1.7011 | 1.7225 | 0.0373 | 0.0634 | NO |
| ***Grade 6*** | | | | | | | | |
| 229936 | 4 | 2.5047 | 2.5802 | 1.4092 | 1.4002 | 0.0536 | 0.0755 | NO |
| 229754 | 4 | 2.0439 | 2.0585 | 1.4256 | 1.4538 | 0.0103 | 0.0146 | NO |
| 217646 | 4 | 2.4780 | 2.3951 | 1.0756 | 1.0661 | -0.0771 | 0.0829 | NO |
| 227711 | 4 | 1.4976 | 1.4976 | 1.1837 | 1.2042 | 0 | 0 | NO |
| 227723 | 4 | 2.0244 | 2.0585 | 1.5631 | 1.6399 | 0.0218 | 0.0341 | NO |
| ***Grade 7*** | | | | | | | | |
| 205696 | 4 | 1.5756 | 1.5951 | 1.2728 | 1.2676 | 0.0153 | 0.0195 | NO |
| 208698 | 4 | 2.4634 | 2.5610 | 1.4090 | 1.3113 | 0.0692 | 0.0976 | NO |
| 205646 | 4 | 1.6976 | 1.8829 | 1.4836 | 1.4836 | 0.1249 | 0.1854 | NO |
| 205689 | 4 | 2.3073 | 2.3561 | 1.5612 | 1.5508 | 0.0312 | 0.0488 | NO |
| 198433 | 4 | 2.0483 | 2 | 1.2731 | 1.2664 | -0.0379 | 0.0483 | NO |
| ***Grade 8*** | | | | | | | | |
| 226913 | 4 | 2.8829 | 2.8829 | 1.0481 | 0.9191 | 0 | 0 | NO |
| 219722 | 4 | 1.4878 | 1.5073 | 1.0712 | 1.1460 | 0.0182 | 0.0195 | NO |
| 227822 | 4 | 1.1220 | 1.1561 | 0.9575 | 0.9951 | 0.0357 | 0.0341 | NO |
| 229646 | 4 | 2.1268 | 2.1610 | 1.2469 | 1.2796 | 0.0274 | 0.0341 | NO |
| 228132 | 4 | 3.1122 | 3.1122 | 1.1902 | 1.1820 | 0 | 0 | NO |
| ***Grade 10*** | | | | | | | | |
| 229618 | 4 | 2.9254 | 2.9403 | 1.0924 | 1.1181 | 0.0137 | 0.0149 | NO |
| 254553 | 4 | 1.8146 | 1.7854 | 1.4193 | 1.4492 | -0.0206 | 0.0293 | NO |
| 229564 | 4 | 1.6863 | 1.8186 | 1.2601 | 1.3029 | 0.1050 | 0.1324 | NO |
| 229645 | 4 | 2.3610 | 2.3366 | 1.3674 | 1.3503 | -0.0178 | 0.0244 | NO |
| 227958 | 4 | 2.0293 | 1.9756 | 1.5299 | 1.483 | -0.0351 | 0.0537 | NO |

**Table 4.3.1.2.3: MCAS 2007 Rescore Analyses:**
**Science and Technology/Engineering**
**Grades 5 and 8**

| Item Reference | Maximum Score | Old Mean | New Mean | Old SD | New SD | Effect Size | Absolute Difference | Discard? |
|---|---|---|---|---|---|---|---|---|
| ***Grade 5*** | | | | | | | | |
| 229272 | 4 | 2.3561 | 2.3463 | 1.2707 | 1.1527 | -0.0077 | 0.0098 | NO |
| 245091 | 4 | 2.3317 | 2.3268 | 1.1717 | 1.3198 | -0.0042 | 0.0049 | NO |
| 227843 | 4 | 1.8244 | 1.9024 | 1.3135 | 1.3105 | 0.0594 | 0.0780 | NO |
| 229060 | 4 | 1.8634 | 1.6634 | 1.1047 | 1.1848 | -0.1810 | 0.2000 | NO |
| 227828 | 4 | 2.1602 | 2.2767 | 1.1357 | 1.1767 | 0.1026 | 0.1165 | NO |
| ***Grade 8*** | | | | | | | | |
| 246325 | 4 | 2.4293 | 2.4683 | 1.1898 | 1.1956 | 0.0328 | 0.0390 | NO |
| 229478 | 4 | 2.1659 | 2.1561 | 1.186 | 1.1996 | -0.0082 | 0.0098 | NO |
| 227911 | 4 | 2.2341 | 2.1805 | 1.3771 | 1.2770 | -0.039 | 0.0537 | NO |
| 227954 | 4 | 1.9561 | 1.8634 | 1.3300 | 1.2844 | -0.0697 | 0.0927 | NO |
| 229455 | 4 | 2.4195 | 2.4878 | 0.9625 | 1.0294 | 0.0710 | 0.0683 | NO |

***Redundant Analysis***
In order to verify the accuracy of the testing contractor's equating analysis, a separate and independent equating analysis was conducted by the Research and Evaluation Methods Program at the University of Massachusetts at Amherst (UMass), using the same data, software (PARSCALE), and general procedures.

All discrepancies between the two analyses were thoroughly reviewed and the Department determined that discrepancies were all due to a combination of rounding procedures and idiosyncracies related to the particular scaling methodologies used in MCAS (see section 4.3.2 for details regarding scaling procedures).

## 4.3.2 Scaling

In the same way that a given temperature can be expressed as either degrees Fahrenheit or degrees Celsius, and a given distance can be expressed in either miles or kilometers, student scores on the MCAS tests can be expressed as either raw scores or scaled scores. Scaled scores supplement the MCAS proficiency-level results by providing information about the position of a student's results within a proficiency level. It is important to note that converting from raw scores to scaled scores does not change students' proficiency-level classifications.

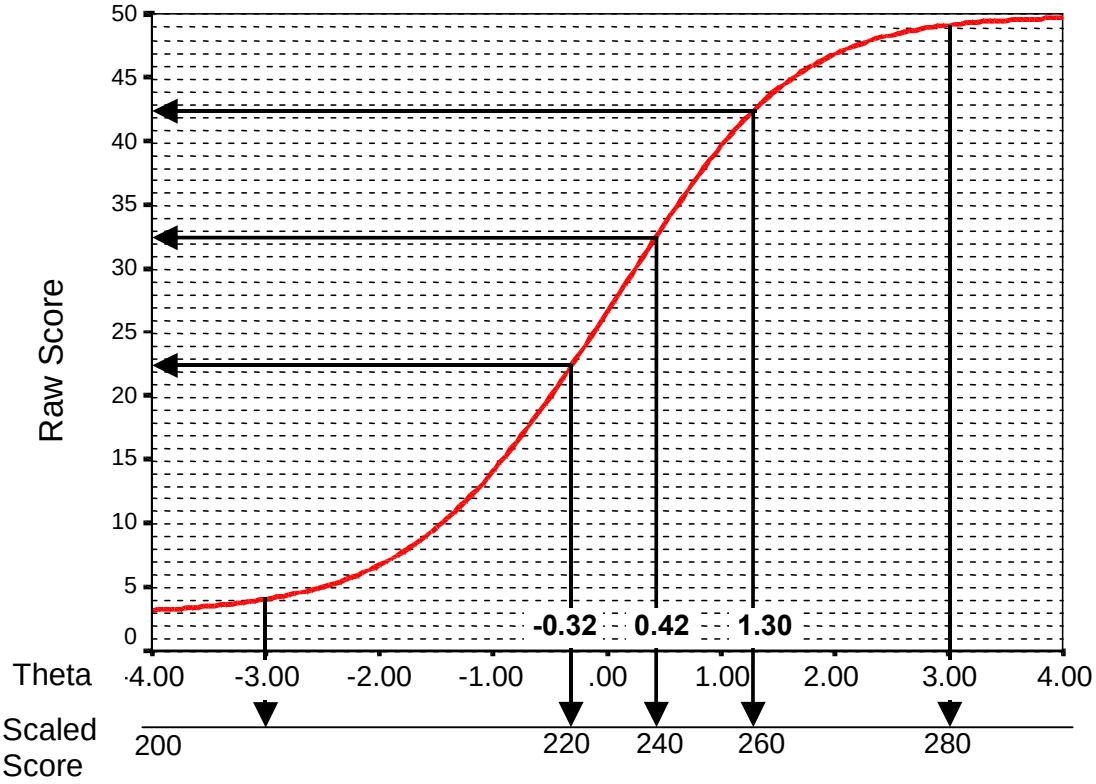
With the exception of the grade 3 English Language Arts and Mathematics tests, for which results are reported only as raw scores (i.e., number correct), a student's MCAS 2007 test score in each content area is reported as an even-integer value on a scale that ranges from 200 to 280. The student's raw score, or total number of points, on the test is converted to a scaled score using the test characteristic curve (TCC).

Scaled scores offer the advantage over raw scores of simplifying the reporting of results across content areas, grade levels, and years. Because the standard-setting process (see section 5.1) typically results in different cut scores across content areas on a raw score basis, it is useful to

transform these raw cut scores to a scale that is more easily interpretable. For the MCAS tests, a scaled score of 240 is the cut score between the *Needs Improvement* and *Proficient* performance levels, regardless of the content area or year of testing, whereas the raw cut score between those two levels could be 35 in Mathematics but 33 in ELA. Using scaled scores greatly simplifies the task of understanding how a student performed.

Figure 4.3.B depicts the mechanics of the scaling procedure used for all grades and content areas in the MCAS program.

**Figure 4.3.B: Illustration of the Raw Score-Theta-Scaled Score Transformation Using TCC**




The scaled scores of 220, 240, and 260 represent the cut scores between performance levels. Therefore, scaled scores for the four performance levels include the following scores:

- *Warning/Failing* = 200–218
- *Needs Improvement* = 220–238
- *Proficient* = 240–258
- *Advanced* = 260–280

Scaled scores are obtained by a simple translation of ability estimates ($\hat{\theta}$s) using the linear relationship between threshold values on the θ metric and their equivalent values on the scaled score metric. Students' ability estimates are based on their responses to test items. Scaled scores are calculated using the linear equation

$$SS = m\hat{\theta} + b$$

where *m* is the slope and *b* is the intercept. A separate linear transformation was used for each performance level.

Appendix C contains the raw score-to-scaled score conversion tables for the MCAS 2007 administration.

#### 4.3.2.1 Scaled Scores for Low-Scoring and High-Scoring Students

In the performance level of *Warning/Failing*, the upper threshold on the theta metric was established via standard setting, but there is no corresponding lower threshold. This is also true for the upper threshold of the *Advanced* performance level. Therefore, a modified procedure was necessary to calculate the scaling coefficients for the *Warning/Failing* and *Advanced* performance levels. Details of this procedure can be found in the *2001 MCAS Technical Report*.

#### 4.3.2.2 Scaled-Score Error Band

In addition to an overall scaled score, an error band was also reported for each student. It was estimated by using the inverse of the square root of the test information function (Hambleton, Swaminathan, & Rogers, 1991).

$$SEM(\hat{\theta}_j) = \frac{1}{\sqrt{I(\theta_j)}}$$

where $SEM(\hat{\theta}_j)$ is standard error of measurement (SEM) and $I(\theta_j)$ is the test information at given $\theta_j$.

The obtained SEMs were used to determine confidence intervals of the students' scaled scores for each MCAS 2007 test (specifically, $\pm 1$ SEM). Transformation of the confidence interval from the theta metric onto the MCAS scaled-score metric was carried out by applying the same linear transformations used to convert student scores from the theta scale onto the MCAS scale.

# 5. REPORTING OF MCAS 2007 RESULTS

## 5.1 Standard Setting

The thresholds that define each performance level category are determined through the process of *standard setting*. Standard setting is a means of examining student performance in relation to a set of common, well-defined standards and determining what specific test scores define the boundaries of each performance category.

### 5.1.1 Standard Setting for the Standard MCAS Tests

MCAS results are reported in the form of performance levels and as scaled scores (except for grade 3 test results, which are reported only as raw scores) for individual students, schools, districts, and the state.[8]

Standards were validated in 2007 for grade 3 Mathematics. Standards were set in 2007 for the following tests:

- high school end-of-course Biology
- high school end-of-course Chemistry
- high school end-of-course Introductory Physics
- high school end-of-course Technology/Engineering

Detailed standard-setting procedures are described in the *2007 MCAS Standard Setting Report* (www.mcasservicecenter.com, then click "MCAS"). Descriptions of the reports that provide MCAS 2007 results are provided in section 5.6; sample reports are provided in Appendices I, J, and K.

#### *5.1.1.1 Performance Levels*

MCAS results for standard MCAS tests are reported in four performance level categories:

- *Advanced/Above Proficient*: Students at this level demonstrate a comprehensive and in-depth understanding of rigorous subject matter, and provide sophisticated solutions to complex problems. The performance level of *Above Proficient* is used only at grade 3.

- *Proficient*: Students at this level demonstrate a solid understanding of challenging subject matter and solve a wide variety of problems.

[8] Results for first-year LEP students are reported only at the individual student level in Parent/Guardian Reports.

- *Needs Improvement*: Students at this level demonstrate a partial understanding of subject matter and solve some simple problems.

- *Warning/Failing*: Students at this level demonstrate a minimal understanding of subject matter and do not solve simple problems. The performance level category of *Failing* is used only for high school (grades 9/10, grade 10, grades 10/11) tests.

#### *5.1.1.2 Scaled-Score Cut Scores*

The total range of MCAS scaled scores (which are reported as even integers from 200–280) is equally divided among the four performance categories, as shown in table 5.1.1.2.1:

**Table 5.1.1.2.1: MCAS Performance Levels and Scaled Score Ranges***

| Performance Level | Scaled Score Range |
|---|---|
| *Advanced* | 260–280 |
| *Proficient* | 240–258 |
| *Needs Improvement* | 220–238 |
| *Warning/Failing* | 200–218 |

*No scaled scores are computed for the grade 3 tests; the grade 3 performance level of *Above Proficient* is based on raw score points.

It should be noted that scaled scores indicate comparable student position information *within* a performance level but not *across* performance levels. That is, the units of the scale can be assumed to be identical for a given performance level, though this assumption does not necessarily hold when compared to scale units within another performance level.

The steps for developing initial MCAS scaled scores are described in detail in the *1998 MCAS Technical Report*. These steps were substantially changed in 2001 to reduce error and enhance reporting of the lowest and highest test scores. Details of these changes can be found in the *2001 MCAS Technical Report* and are summarized in the *2002 MCAS Technical Report. MCAS Technical Reports* from 1998–2002 may be found online at www.doe.mass.edu/mcas/publications.html.

#### *5.1.1.3 Raw-Score Cut Scores*

Table 5.1.1.3 presents the raw scores relating to the various cuts for each grade/content area combination. For example, in Grade 3 Mathematics, the raw score cuts for *Warning: Needs Improvement, Needs Improvement: Proficient,* and *Proficient: Above Proficient* are 22, 30, and 37 out of a total possible score point of 40, so students with raw scores of 0–21, 22–29, 30–36, and 37–40 are classified as *Warning*, *Needs Improvement*, *Proficient*, and *Above Proficient*, respectively.

**Table 5.1.1.3:**
**MCAS 2007 Performance Level Raw Cut Scores**

| Content Area | Grade Level | Cut Score (W = Warning/Failing, NI = Needs Improvement, P = Proficient, A = Advanced/Above Proficient) | | | Maximum Score |
|---|---|---|---|---|---|
| | | W:NI | NI:P | P:A | |
| English Language Arts | 3 | 22 | 37 | 45 | 48 |
| | 4 | 37 | 52 | 62 | 72 |
| | 5 | 22 | 36 | 46 | 52 |
| | 6 | 22 | 35 | 47 | 52 |
| | 7 | 34 | 49 | 63 | 72 |
| | 8 | 20 | 33 | 47 | 52 |
| | 10 | 32 | 48 | 61 | 72 |
| Mathematics | 3 | 22 | 30 | 37 | 40 |
| | 4 | 24 | 41 | 48 | 54 |
| | 5 | 24 | 38 | 48 | 54 |
| | 6 | 26 | 38 | 47 | 54 |
| | 7 | 26 | 38 | 49 | 54 |
| | 8 | 23 | 37 | 48 | 54 |
| | 10 | 19 | 34 | 46 | 60 |
| Science and Technology/Engineering | 5 | 24 | 36 | 44 | 54 |
| | 8 | 24 | 38 | 49 | 54 |
| | 9/10 Biology | 21 | 35 | 50 | 60 |
| | 9/10 Chemistry | 24 | 36 | 48 | 60 |
| | 9/10 Intro.Phys | 20 | 34 | 49 | 60 |
| | 9/10 Tech/Eng | 24 | 37 | 52 | 60 |

For details regarding the method by which raw scores are converted to scaled scores, see section 4.3.2. The MCAS 2007 raw-score to scaled-score conversion tables for all grades and content area tests are presented in Appendix C.

## 5.1.2 Standard Setting for the MCAS-Alt

### *5.1.2.1 MCAS-Alt Performance Levels and Descriptors*

MCAS-Alt performance levels and their descriptors are as follows:

- *Incomplete:* Insufficient evidence and information was included to allow a performance level to be determined in the content area (see section 2.2 for details regarding required portfolio evidence).

- *Awareness:* Students at this level demonstrate very little understanding of learning standards and core knowledge topics contained in the *Massachusetts Curriculum Framework* for the content area. Students require frequent prompting and assistance, and their performance is primarily inaccurate.

- *Emerging:* Students at this level demonstrate a simple understanding at below-grade-level expectations of a limited number of learning standards and core knowledge topics contained in the *Massachusetts Curriculum Framework* for the content area. Students require frequent prompting and assistance, and their performance is limited and inconsistent.

- *Progressing:* Students at this level demonstrate a partial understanding at below-grade-level expectations of some learning standards and core knowledge topics contained in the *Massachusetts Curriculum Framework* for the content area. Students appear to be receiving challenging instruction, and are steadily learning new knowledge, skills, and concepts. Students require minimal prompting and assistance, and their performance is fundamentally accurate.

- *Needs Improvement:* Students at this level demonstrate a partial understanding of grade-level subject matter and solve some simple problems.

- *Proficient:* Students at this level demonstrate a solid understanding of challenging grade-level subject matter and solve a wide variety of problems.

- *Advanced/Above Proficient:* Students at this level demonstrate a comprehensive understanding of challenging grade-level subject matter and provide sophisticated solutions to complex problems. The performance level of *Above Proficient* is used only at grade 3.

The MCAS-Alt performance levels of *Incomplete, Awareness, Emerging,* and *Progressing* are included in the *Warning/Failing* performance level category figures on MCAS reports of school and district results, as shown in Figure 5.1.2.A.

#### *5.1.2.2 Standard Setting for the MCAS-Alt*

The standard-setting process used for the MCAS-Alt was described in a National Center on Educational Outcomes (NCEO) publication entitled "Massachusetts: One State's Approach to Setting Performance Levels on the Alternate Assessment (Synthesis Report 48) 2002" (http://education.umn.edu/NCEO/OnlinePubs/Synthesis 48.html). Following is a summary of the process:

Staff from the Department's offices of Student Assessment, Special Education, and Instruction and Curriculum, together with Measured Progress, its subcontractors, and the MCAS-Alt Statewide Advisory Committee began discussing performance levels in 1998. In order to define the MCAS-Alt performance levels, several important questions had to be answered:

- What will each performance level be called; how many performance levels will there be; and how will each be defined?
- Which numerical scores in which rubric areas will be counted in determining the overall performance level?
- How will numerical scores in those rubric areas be combined to yield a performance level?
- What range or combination of scores will yield a particular performance level?

***What will each performance level be called; how many performance levels will there be; and how will each be defined?***

A stakeholder technical advisory group recommended that performance levels be identical to performance levels on standard MCAS tests, but that the lowest performance level, called *Warning/Failing* for results on standard tests, be subdivided into three distinct levels to provide more meaningful descriptions of performance at these lower levels. Figure 5.1.2.A illustrates the performance levels and definitions used to report MCAS results for the standard tests and the alternate assessment, and the relationship between the two reporting scales.

**Figure 5.1.2.A: Method Used to Aggregate Results of MCAS-Alt with Standard MCAS Tests**

**Standard MCAS Tests**

| *Warning (Failing at Grade 10)* | *Needs Improvement* | *Proficient* | *Advanced* |
|---|---|---|---|
| Students at this level demonstrate a minimal understanding of the subject matter and do not solve even simple problems. | Students at this level demonstrate a partial understanding of the subject matter and solve some simple problems. | Students at this level demonstrate a solid understanding of challenging subject matter and solve a wide variety of problems. | Students at this level demonstrate a comprehensive and in-depth understanding of subject matter and provide sophisticated solutions to complex problems. |

**MCAS Alternate Assessment**

| *Awareness* | *Emerging* | *Progressing* | *Needs Improvement* | *Proficient* | *Advanced* |
|---|---|---|---|---|---|
| Students at this level demonstrate very little understanding of learning standards in the content area. | Students at this level demonstrate a rudimentary understanding of a limited number of learning standards in the content area and have addressed these at below-grade-level expectations. | Students at this level demonstrate a partial understanding of some learning standards in the content area and have addressed these at below-grade-level expectations. | (Same as above) | (Same as above) | (Same as above) |

***Which numerical scores in which rubric areas will be counted in determining the overall performance level?***

Although different approaches were discussed between 1998 and 2001 (when performance levels were first reported), it was decided to use an "analytical rubric" based on reasoned perceptions of every score combination to determine performance levels. The following three scoring dimensions are included in the calculation of a performance level for each strand:

- Level of Complexity
- Demonstration of Skills and Concepts
- Independence

***How will numerical scores in those rubric areas be combined to yield a performance level?***
There are 80 possible score combinations for the three scoring dimensions. Each score combination was discussed, and a performance level was assigned to it on the basis of reasoned perceptions of what that score combination revealed about a student's performance (i.e., how complex, how accurate, and how independent). Figure 5.1.2.B shows the rationale for assigning the performance level for each score combination.

Figure 5.1.2.C on page 78 (taken from the *2007 Educator's Manual for MCAS-Alt*) offers a different presentation of how raw scores in these three dimensions were analyzed to yield a performance level.

***What range or combination of scores will yield a particular performance level?***
A performance level was calculated for each of the required strands in each content area. The performance level scores for the strands of the content area were then averaged to yield an overall performance level for that content area.

Overall content area performance levels are aggregated with standard MCAS results as shown in Figure 5.1.2.A.

## Figure 5.1.2.B: 2007 MCAS-Alt Rationale of the Different Possible Strand Score Combinations

Performance Level 1 = *Awareness*
Performance Level 2 = *Emerging*
Performance Level 3 = *Progressing*
Performance Level 4 = *Needs Improvement* (and higher)

| Level of Complexity | Demonstration of Skills and Concepts | Independence | Performance Level | Rationale |
|---|---|---|---|---|
| 1 | 1 | 1 | 1 | Student is working on skills that are not related to the general curriculum, with little to no accuracy and with extensive verbal, visual, and physical assistance. |
| 1 | 1 | 2 | 1 | Student is working on skills that are not related to the general curriculum, with little to no accuracy and with frequent verbal, visual, and physical assistance. |
| 1 | 1 | 3 | 1 | Student is working on skills that are not related to the general curriculum, with little to no accuracy and with some verbal, visual, and physical assistance. |
| 1 | 1 | 4 | 1 | Student is working on skills that are not related to the general curriculum, with little to no accuracy and with minimal verbal, visual, and physical assistance. |
| 1 | 2 | 1 | 1 | Student is working on skills that are not related to the general curriculum, with limited and inconsistent accuracy and with extensive verbal, visual, and physical assistance. |
| 1 | 2 | 2 | 1 | Student is working on skills that are not related to the general curriculum, with limited and inconsistent accuracy and with frequent verbal, visual, and physical assistance. |
| 1 | 2 | 3 | 1 | Student is working on skills that are not related to the general curriculum, with limited and inconsistent accuracy and with some verbal, visual, and physical assistance. |
| 1 | 2 | 4 | 1 | Student is working on skills that are not related to the general curriculum, with limited and inconsistent accuracy and with minimal verbal, visual, and physical assistance. |
| 1 | 3 | 1 | 1 | Student is working on skills that are not related to the general curriculum, with a mostly accurate performance and with extensive verbal, visual, and physical assistance. |
| 1 | 3 | 2 | 1 | Student is working on skills that are not related to the general curriculum, with a mostly accurate performance and with frequent verbal, visual, and physical assistance. |
| 1 | 3 | 3 | 1 | Student is working on skills that are not related to the general curriculum, with a mostly accurate performance and with some verbal, visual, and physical assistance. |
| 1 | 3 | 4 | 1 | Student is working on skills that are not related to the general curriculum, with a mostly accurate performance and with minimal verbal, visual, and physical assistance. |

## Figure 5.1.2.B: 2007 MCAS-Alt Rationale of the Different Possible Strand Score Combinations

Performance Level 1 = *Awareness*
Performance Level 2 = *Emerging*
Performance Level 3 = *Progressing*
Performance Level 4 = *Needs Improvement* (and higher)

| Level of Complexity | Demonstration of Skills and Concepts | Independence | Performance Level | Rationale |
|---|---|---|---|---|
| 1 | 4 | 1 | 1 | Student is working on skills that are not related to the general curriculum, with an accurate performance and with extensive verbal, visual, and physical assistance. |
| 1 | 4 | 2 | 1 | Student is working on skills that are not related to the general curriculum, with an accurate performance and with frequent verbal, visual, and physical assistance. |
| 1 | 4 | 3 | 1 | Student is working on skills that are not related to the general curriculum, with an accurate performance and with some verbal, visual, and physical assistance. |
| 1 | 4 | 4 | 1 | Student is working on skills that are not related to the general curriculum, with an accurate performance and with minimal verbal, visual, and physical assistance. |
| 2 | 1 | 1 | 1 | Student is working on Access Skills, with little to no accuracy and with extensive verbal, visual, and physical assistance. |
| 2 | 1 | 2 | 1 | Student is working on Access Skills, with little to no accuracy and with frequent verbal, visual, and physical assistance. |
| 2 | 1 | 3 | 1 | Student is working on Access Skills, with little to no accuracy and with some verbal, visual, and physical assistance. |
| 2 | 1 | 4 | 1 | Student is working on Access Skills, with little to no accuracy and with minimal verbal, visual, and physical assistance. |
| 2 | 2 | 1 | 1 | Student is working on Access Skills, with limited and inconsistent accuracy and with extensive verbal, visual, and physical assistance. |
| 2 | 2 | 2 | 1 | Student is working on Access Skills, with limited and inconsistent accuracy and with frequent verbal, visual, and physical assistance. |
| 2 | 2 | 3 | 1 | Student is working on Access Skills, with limited and inconsistent accuracy and with some verbal, visual, and physical assistance. |
| 2 | 2 | 4 | 1 | Student is working on Access Skills, with limited and inconsistent accuracy and with minimal verbal, visual, and physical assistance. |
| 2 | 3 | 1 | 1 | Student is working on Access Skills, with a mostly accurate performance and with extensive verbal, visual, and physical assistance. |

## Figure 5.1.2.B: 2007 MCAS-Alt Rationale of the Different Possible Strand Score Combinations

Performance Level 1 = *Awareness*
Performance Level 2 = *Emerging*
Performance Level 3 = *Progressing*
Performance Level 4 = *Needs Improvement* (and higher)

| Level of Complexity | Demonstration of Skills and Concepts | Independence | Performance Level | Rationale |
|---|---|---|---|---|
| 2 | 3 | 2 | 1 | Student is working on Access Skills, with a mostly accurate performance and with frequent verbal, visual, and physical assistance. |
| 2 | 3 | 3 | 2 | Student is working on Access Skills, with a mostly accurate performance and with some verbal, visual, and physical assistance. |
| 2 | 3 | 4 | 2 | Student is working on Access Skills, with a mostly accurate performance and with minimal verbal, visual, and physical assistance. |
| 2 | 4 | 1 | 1 | Student is working on Access Skills, with an accurate performance and with extensive verbal, visual, and physical assistance. |
| 2 | 4 | 2 | 1 | Student is working on Access Skills, with an accurate performance and with frequent verbal, visual, and physical assistance. |
| 2 | 4 | 3 | 2 | Student is working on Access Skills, with an accurate performance and with some verbal, visual, and physical assistance. |
| 2 | 4 | 4 | 2 | Student is working on Access Skills, with an accurate performance and with minimal verbal, visual, and physical assistance. |
| 3 | 1 | 1 | 1 | Student is working on Entry Points, with little to no accuracy and with extensive verbal, visual, and physical assistance. |
| 3 | 1 | 2 | 1 | Student is working on Entry Points, with little to no accuracy and with frequent verbal, visual, and physical assistance. |
| 3 | 1 | 3 | 1 | Student is working on Entry Points, with little to no accuracy and with some verbal, visual, and physical assistance. |
| 3 | 1 | 4 | 1 | Student is working on Entry Points, with little to no accuracy and with minimal verbal, visual, and physical assistance. |
| 3 | 2 | 1 | 1 | Student is working on Entry Points, with limited and inconsistent accuracy and with extensive verbal, visual, and physical assistance. |
| 3 | 2 | 2 | 1 | Student is working on Entry Points, with limited and inconsistent accuracy and with frequent verbal, visual, and physical assistance. |
| 3 | 2 | 3 | 2 | Student is working on Entry Points, with limited and inconsistent accuracy and with some verbal, visual, and physical assistance. |
| 3 | 2 | 4 | 2 | Student is working on Entry Points, with limited and inconsistent accuracy and with minimal verbal, visual, and physical assistance. |
| 3 | 3 | 1 | 1 | Student is working on Entry Points, with a mostly accurate performance and with extensive verbal, visual, and physical assistance. |

## Figure 5.1.2.B: 2007 MCAS-Alt Rationale of the Different Possible Strand Score Combinations

Performance Level 1 = *Awareness*
Performance Level 2 = *Emerging*
Performance Level 3 = *Progressing*
Performance Level 4 = *Needs Improvement* (and higher)

| Level of Complexity | Demonstration of Skills and Concepts | Independence | Performance Level | Rationale |
|---|---|---|---|---|
| 3 | 3 | 2 | 2 | Student is working on Entry Points, with a mostly accurate performance and with frequent verbal, visual, and physical assistance. |
| 3 | 3 | 3 | 3 | Student is working on Entry Points, with a mostly accurate performance and with some verbal, visual, and physical assistance. |
| 3 | 3 | 4 | 3 | Student is working on Entry Points, with a mostly accurate performance and with minimal verbal, visual, and physical assistance. |
| 3 | 4 | 1 | 1 | Student is working on Entry Points, with an accurate performance and with extensive verbal, visual, and physical assistance. |
| 3 | 4 | 2 | 2 | Student is working on Entry Points, with an accurate performance and with frequent verbal, visual, and physical assistance. |
| 3 | 4 | 3 | 3 | Student is working on Entry Points, with an accurate performance and with some verbal, visual, and physical assistance. |
| 3 | 4 | 4 | 3 | Student is working on Entry Points, with an accurate performance and with minimal verbal, visual, and physical assistance. |
| 4 | 1 | 1 | 1 | Student is addressing a narrow sample of learning standards at grade-level expectations, with little to no accuracy and with extensive verbal, visual, and physical assistance. |
| 4 | 1 | 2 | 1 | Student is addressing a narrow sample of learning standards at grade-level expectations, with little to no accuracy and with frequent verbal, visual, and physical assistance. |
| 4 | 1 | 3 | 1 | Student is addressing a narrow sample of learning standards at grade-level expectations, with little to no accuracy and with some verbal, visual, and physical assistance. |
| 4 | 1 | 4 | 1 | Student is addressing a narrow sample of learning standards at grade-level expectations, with little to no accuracy and with minimal verbal, visual, and physical assistance. |
| 4 | 2 | 1 | 1 | Student is addressing a narrow sample of learning standards at grade-level expectations, with limited and inconsistent accuracy and with extensive verbal, visual, and physical assistance. |
| 4 | 2 | 2 | 1 | Student is addressing a narrow sample of learning standards at grade-level expectations, with limited and inconsistent accuracy and with frequent verbal, visual, and physical assistance. |

## Figure 5.1.2.B: 2007 MCAS-Alt Rationale of the Different Possible Strand Score Combinations

Performance Level 1 = *Awareness*
Performance Level 2 = *Emerging*
Performance Level 3 = *Progressing*
Performance Level 4 = *Needs Improvement* (and higher)

| Level of Complexity | Demonstration of Skills and Concepts | Independence | Performance Level | Rationale |
|---|---|---|---|---|
| 4 | 2 | 3 | 2 | Student is addressing a narrow sample of learning standards at grade-level expectations, with limited and inconsistent accuracy and with some verbal, visual, and physical assistance. |
| 4 | 2 | 4 | 2 | Student is addressing a narrow sample of learning standards at grade-level expectations, with limited and inconsistent accuracy and with minimal verbal, visual, and physical assistance. |
| 4 | 3 | 1 | 1 | Student is addressing a narrow sample of learning standards at grade-level expectations, with a mostly accurate performance and with extensive verbal, visual, and physical assistance. |
| 4 | 3 | 2 | 2 | Student is addressing a narrow sample of learning standards at grade-level expectations, with a mostly accurate performance and with frequent verbal, visual, and physical assistance. |
| 4 | 3 | 3 | 3 | Student is addressing a narrow sample of learning standards at grade-level expectations, with a mostly accurate performance and with some verbal, visual, and physical assistance. |
| 4 | 3 | 4 | 3 | Student is addressing a narrow sample of learning standards at grade-level expectations, with a mostly accurate performance and with minimal verbal, visual, and physical assistance. |
| 4 | 4 | 1 | 1 | Student is addressing a narrow sample of learning standards at grade-level expectations, with an accurate performance and with extensive verbal, visual, and physical assistance. |
| 4 | 4 | 2 | 2 | Student is addressing a narrow sample of learning standards at grade-level expectations, with an accurate performance and with frequent verbal, visual, and physical assistance. |
| 4 | 4 | 3 | 3 | Student is addressing a narrow sample of learning standards at grade-level expectations, with an accurate performance and with some verbal, visual, and physical assistance. |
| 4 | 4 | 4 | 3 | Student is addressing a narrow sample of learning standards at grade-level expectations, with an accurate performance and with minimal verbal, visual, and physical assistance. |

## Figure 5.1.2.B: 2007 MCAS-Alt Rationale of the Different Possible Strand Score Combinations

Performance Level 1 = *Awareness*
Performance Level 2 = *Emerging*
Performance Level 3 = *Progressing*
Performance Level 4 = *Needs Improvement* (and higher)

| Level of Complexity | Demonstration of Skills and Concepts | Independence | Performance Level | Rationale |
|---|---|---|---|---|
| 5 | 1 | 1 | 1 | Student is addressing a broad range of learning standards at grade-level expectations, with little to no accuracy and with extensive verbal, visual, and physical assistance. |
| 5 | 1 | 2 | 1 | Student is addressing a broad range of learning standards at grade-level expectations, with little to no accuracy and with frequent verbal, visual, and physical assistance. |
| 5 | 1 | 3 | 2 | Student is addressing a broad range of learning standards at grade-level expectations, with little to no accuracy and with some verbal, visual, and physical assistance. |
| 5 | 1 | 4 | 2 | Student is addressing a broad range of learning standards at grade-level expectations, with little to no accuracy and with minimal verbal, visual, and physical assistance. |
| 5 | 2 | 1 | 1 | Student is addressing a broad range of learning standards at grade-level expectations, with limited and inconsistent accuracy and with extensive verbal, visual, and physical assistance. |
| 5 | 2 | 2 | 2 | Student is addressing a broad range of learning standards at grade-level expectations, with limited and inconsistent accuracy and with frequent verbal, visual, and physical assistance. |
| 5 | 2 | 3 | 3 | Student is addressing a broad range of learning standards at grade-level expectations, with limited and inconsistent accuracy and with some verbal, visual, and physical assistance. |
| 5 | 2 | 4 | 3 | Student is addressing a broad range of learning standards at grade-level expectations, with limited and inconsistent accuracy and with minimal verbal, visual, and physical assistance. |
| 5 | 3 | 1 | 1 | Student is addressing a broad range of learning standards at grade-level expectations, with a mostly accurate performance and with extensive verbal, visual, and physical assistance. |
| 5 | 3 | 2 | 2 | Student is addressing a broad range of learning standards at grade-level expectations, with a mostly accurate performance and with frequent verbal, visual, and physical assistance. |
| 5 | 3 | 3 | 3 | Student is addressing a broad range of learning standards at grade-level expectations, with a mostly accurate performance and with some verbal, visual, and physical assistance. |

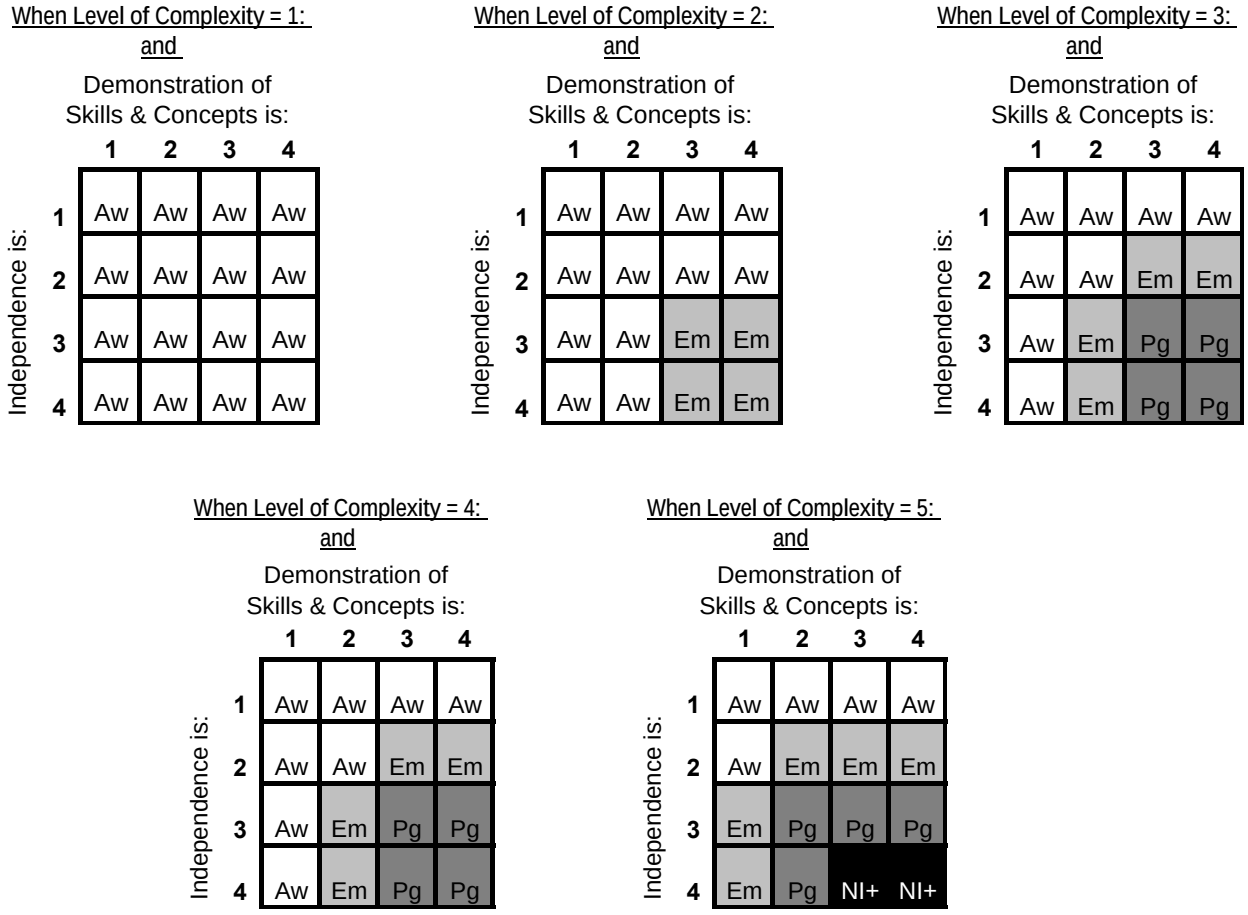
## Figure 5.1.2.B: 2007 MCAS-Alt Rationale of the Different Possible Strand Score Combinations

Performance Level 1 = *Awareness*
Performance Level 2 = *Emerging*
Performance Level 3 = *Progressing*
Performance Level 4 = *Needs Improvement* (and higher)

| Level of Complexity | Demonstration of Skills and Concepts | Independence | Performance Level | Rationale |
|---|---|---|---|---|
| 5 | 3 | 4 | 4 | Student is addressing a broad range of learning standards at grade-level expectations, with a mostly accurate performance and with minimal verbal, visual, and physical assistance. |
| 5 | 4 | 1 | 1 | Student is addressing a broad range of learning standards at grade-level expectations, with an accurate performance and with extensive verbal, visual, and physical assistance. |
| 5 | 4 | 2 | 2 | Student is addressing a broad range of learning standards at grade-level expectations, with an accurate performance and with frequent verbal, visual, and physical assistance. |
| 5 | 4 | 3 | 3 | Student is addressing a broad range of learning standards at grade-level expectations, with an accurate performance and with some verbal, visual, and physical assistance. |
| 5 | 4 | 4 | 4 | Student is addressing a broad range of learning standards at grade-level expectations, with an accurate performance and with minimal verbal, visual, and physical assistance. |

**Figure 5.1.2.C: 2007 MCAS-Alt Performance Level Calculation Charts**

*Aw = Awareness ; Em = Emerging; Pr = Progressing*



## 5.2 Performance Level Results

### 5.2.1 Standard MCAS Test Performance Level Results

Tables 5.2.1.1.1 through 5.2.1.4.2 include results in each category for *all* students educated with Massachusetts public funds. All tables in this section were taken from the document, *Spring 2007 MCAS Tests: Summary of State Results* (www.doe.mass.edu/mcas/2007/results/summary.doc).

Statewide performance level results are disaggregated in the following categories:

- content area, by grade (section 5.2.1.1)
- student status, by grade and content area test (section 5.2.1.2)
  - non-disabled students
  - students with disabilities
  - limited English proficient (LEP), **not** including first-year LEP students
  - formerly limited English proficient (formerly LEP)
  - LEP and formerly LEP
  - low income
- race/ethnicity (section 5.2.1.3)
  - African American/Black
  - Asian
  - Hispanic/Latino
  - Native American
  - White
  - Hawaiian/Pacific Islander
  - Multi-Race (non-Hispanic/Latino)
- gender (section 5.2.1.4)

Content area (5.2.1.1), race/ethnicity (5.2.1.3), and gender (5.2.1.4) results include results for all of the following students:

- students with disabilities who took the tests *with* accommodations
- students with disabilities who took the tests *without* accommodations
- students with disabilities who participated in MCAS through the MCAS-Alt
- limited English proficient students, including, for grade 10 Mathematics, those LEP students who took the Spanish/English version of the test (but excluding results for first-year LEP students)
- formerly limited English proficient students

MCAS-Alt performance level results are further discussed in section 5.2.2.

### *5.2.1.1 Percentages by Content Areas*

**Table 5.2.1.1.1: Statewide MCAS Results, Grade 3; English Language Arts/Reading 2001–2007 and Mathematics 2006–2007; Percentage of Students at Each Performance Level[1]**

| | Performance Level | | | |
|---|---|---|---|---|
| **Content Area and Year** | *Above Proficient* | *Proficient* | *Needs Improvement* | *Warning* |
| **ENGLISH LANGUAGE ARTS/READING [2]** | | | | |
| **2007** | **14** | **45** | **32** | **9** |
| 2006 | 18 | 40 | 33 | 8 |
| 2005 | -- | 62 | 31 | 7 |
| 2004 | -- | 63 | 30 | 7 |
| 2003 | -- | 63 | 31 | 6 |
| 2002 | -- | 67 | 27 | 6 |
| 2001 | -- | 62 | 31 | 7 |
| **MATHEMATICS [3]** | | | | |
| **2007** | **19** | **41** | **24** | **16** |
| 2006 | 4 | 48 | 32 | 16 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.
2. To comply with NCLB, Massachusetts added the *Above Proficient* performance level for the Grade 3 Reading test in 2006. When comparing grade 3 English Language Arts student performance across years, the total percent of students scoring *Above Proficient* and *Proficient* in 2006 or 2007 can be compared to the percent scoring *Proficient* for Grade 3 Reading in any single year 2001–2005.
3. The *Above Proficient* standard in Mathematics was reset in 2007 to better discriminate student performance in the top reporting category. Therefore, comparisons should **not** be made between the 2006 and 2007 *Above Proficient* percents. However, comparisons may be drawn between 2006 and 2007 using each year's combined percent of students scoring *Proficient* and *Above Proficient*.

## Table 5.2.1.1.2: Statewide MCAS Results, Grade 4; English Language Arts 2001–2007 and Mathematics 1998–2007; Percentage of Students at Each Performance Level[1]

| | Performance Level | | | |
|---|---|---|---|---|
| **Content Area and Year** | *Advanced* | *Proficient* | *Needs Improvement* | *Warning* |
| **ENGLISH LANGUAGE ARTS** | | | | |
| **2007** | **10** | **46** | **34** | **10** |
| 2006 | 8 | 42 | 39 | 11 |
| 2005 | 10 | 40 | 40 | 11 |
| 2004 | 11 | 45 | 35 | 10 |
| 2003 | 10 | 46 | 34 | 9 |
| 2002 | 8 | 46 | 37 | 10 |
| 2001 | 7 | 44 | 38 | 11 |
| **MATHEMATICS** | | | | |
| **2007** | **19** | **29** | **39** | **13** |
| 2006 | 15 | 25 | 45 | 15 |
| 2005 | 14 | 26 | 44 | 15 |
| 2004 | 14 | 28 | 44 | 14 |
| 2003 | 12 | 28 | 44 | 16 |
| 2002 | 12 | 27 | 42 | 19 |
| 2001 | 10 | 24 | 46 | 19 |
| 2000 | 12 | 28 | 42 | 18 |
| 1999 | 12 | 24 | 44 | 19 |
| 1998 | 11 | 23 | 44 | 23 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

## Table 5.2.1.1.3: Statewide MCAS Results, Grade 5; English Language Arts and Mathematics 2006–2007 and Science and Technology/Engineering 2003–2007; Percentage of Students at Each Performance Level[1]

| | Performance Level | | | |
|---|---|---|---|---|
| **Content Area and Year** | *Advanced* | *Proficient* | *Needs Improvement* | *Warning* |
| **ENGLISH LANGUAGE ARTS** | | | | |
| **2007** | **15** | **48** | **28** | **9** |
| 2006 | 15 | 44 | 31 | 9 |
| **MATHEMATICS** | | | | |
| **2007** | **19** | **32** | **31** | **18** |
| 2006 | 17 | 26 | 34 | 23 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | | | | |
| **2007** | **14** | **37** | **37** | **12** |
| 2006 | 17 | 33 | 39 | 11 |
| 2005 | 16 | 35 | 38 | 12 |
| 2004 | 20 | 35 | 33 | 13 |
| 2003 | 19 | 33 | 34 | 14 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

## Table 5.2.1.1.4: Statewide MCAS Results, Grade 6; English Language Arts 2006–2007 and Mathematics 2001–2007; Percentage of Students at Each Performance Level[1]

| Content Area and Year | Performance Level | | | |
|---|---|---|---|---|
| | *Advanced* | *Proficient* | *Needs Improvement* | *Warning* |
| **ENGLISH LANGUAGE ARTS** | | | | |
| **2007** | **9** | **58** | **26** | **7** |
| 2006 | 10 | 54 | 28 | 8 |
| **MATHEMATICS** | | | | |
| **2007** | **20** | **32** | **28** | **20** |
| 2006 | 17 | 29 | 29 | 25 |
| 2005 | 17 | 29 | 30 | 23 |
| 2004 | 17 | 26 | 32 | 25 |
| 2003 | 16 | 26 | 32 | 26 |
| 2002 | 13 | 28 | 29 | 30 |
| 2001 | 13 | 23 | 30 | 33 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

## Table 5.2.1.1.5: Statewide MCAS Results, Grade 7; English Language Arts 2001–2007 and Mathematics 2006–2007; Percentage of Students at Each Performance Level[1]

| Content Area and Year | Performance Level | | | |
|---|---|---|---|---|
| | *Advanced* | *Proficient* | *Needs Improvement* | *Warning* |
| **ENGLISH LANGUAGE ARTS** | | | | |
| **2007** | **9** | **60** | **23** | **8** |
| 2006 | 10 | 55 | 26 | 9 |
| 2005 | 10 | 56 | 27 | 8 |
| 2004 | 9 | 59 | 25 | 7 |
| 2003 | 8 | 58 | 28 | 7 |
| 2002 | 9 | 55 | 28 | 9 |
| 2001 | 6 | 49 | 32 | 12 |
| **MATHEMATICS** | | | | |
| **2007** | **15** | **31** | **30** | **24** |
| 2006 | 12 | 28 | 33 | 28 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

## Table 5.2.1.1.6: Statewide MCAS Results, Grade 8; English Language Arts 2006–2007, Mathematics 1998–2007, and Science and Technology/Engineering 2003–2007; Percentage of Students at Each Performance Level[1]

| | Performance Level | | | |
|---|---|---|---|---|
| **Content Area and Year** | *Advanced* | *Proficient* | *Needs Improvement* | *Warning* |
| **ENGLISH LANGUAGE ARTS** | | | | |
| **2007** | **12** | **63** | **18** | **6** |
| 2006 | 12 | 62 | 19 | 7 |
| **MATHEMATICS** | | | | |
| **2007** | **17** | **28** | **30** | **25** |
| 2006 | 12 | 28 | 31 | 29 |
| 2005 | 13 | 26 | 30 | 31 |
| 2004 | 13 | 26 | 32 | 29 |
| 2003 | 12 | 25 | 30 | 33 |
| 2002 | 11 | 23 | 33 | 33 |
| 2001 | 11 | 23 | 34 | 31 |
| 2000 | 10 | 24 | 27 | 39 |
| 1999 | 6 | 22 | 31 | 40 |
| 1998 | 8 | 23 | 26 | 42 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | | | | |
| **2007** | **3** | **30** | **44** | **24** |
| 2006 | 4 | 28 | 43 | 25 |
| 2005 | 4 | 29 | 41 | 26 |
| 2004 | 5 | 28 | 35 | 31 |
| 2003 | 4 | 28 | 37 | 30 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

## Table 5.2.1.1.7: Statewide MCAS Results, Grade 10; English Language Arts and Mathematics 1998–2007; Percentage of Students at Each Performance Level[1]

| Content Area and Year | Performance Level | | | |
|---|---|---|---|---|
| | *Advanced* | *Proficient* | *Needs Improvement* | *Failing* |
| **ENGLISH LANGUAGE ARTS** | | | | |
| **2007** | **22** | **49** | **24** | **6** |
| 2006 | 16 | 54 | 24 | 7 |
| 2005 | 22 | 42 | 25 | 11 |
| 2004 | 19 | 43 | 27 | 11 |
| 2003 | 20 | 41 | 28 | 11 |
| 2002 | 19 | 40 | 27 | 14 |
| 2001 | 15 | 36 | 31 | 18 |
| 2000 | 7 | 29 | 30 | 34 |
| 1999 | 4 | 30 | 34 | 32 |
| 1998 | 5 | 33 | 34 | 28 |
| **MATHEMATICS** | | | | |
| **2007** | **41** | **27** | **22** | **9** |
| 2006 | 40 | 27 | 21 | 12 |
| 2005 | 34 | 27 | 24 | 15 |
| 2004 | 29 | 28 | 28 | 15 |
| 2003 | 24 | 27 | 29 | 20 |
| 2002 | 20 | 24 | 31 | 25 |
| 2001 | 18 | 27 | 30 | 25 |
| 2000 | 15 | 18 | 22 | 45 |
| 1999 | 9 | 15 | 23 | 53 |
| 1998 | 7 | 17 | 24 | 52 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

### *5.2.1.2 Percentages by Student Status*

In tables 5.2.1.2.1 through 5.2.1.2.16, the category of "Students with Disabilities" includes **all** of the following students with disabilities:

- those who took the standard MCAS test *with* accommodations
- those who took the standard MCAS test *without* accommodations
- those who participated in MCAS through the MCAS-Alt

**Table 5.2.1.2.1: Statewide MCAS Performance Level Results by Student Status 2004–2007 Grade 3 English Language Arts/Reading Percentage of Students at Each Performance Level[1]**

| Student Status Category | Year | Performance Level | | | |
|---|---|---|---|---|---|
| | | *Above Proficient*[2] | *Proficient* | *Needs Improvement* | *Warning* |
| **GRADE 3 ENGLISH LANGUAGE ARTS/READING** | | | | | |
| **Non-Disabled Students** | | | | | |
| | **2007** | **16** | **50** | **29** | **5** |
| | 2006 | 21 | 44 | 31 | 5 |
| | 2005 | -- | 68 | 28 | 4 |
| | 2004 | -- | 69 | 27 | 4 |
| **Students with Disabilities** | | | | | |
| | **2007** | **3** | **24** | **44** | **29** |
| | 2006 | 5 | 23 | 47 | 25 |
| | 2005 | -- | 32 | 45 | 23 |
| | 2004 | -- | 32 | 45 | 22 |
| **Limited English Proficient (LEP)** | | | | | |
| | **2007** | **2** | **20** | **48** | **30** |
| | 2006 | 3 | 17 | 51 | 29 |
| | 2005 | -- | 23 | 50 | 27 |
| | 2004 | -- | 26 | 50 | 24 |
| **Formerly LEP** | | | | | |
| | **2007** | **8** | **36** | **42** | **13** |
| | 2006 | 12 | 35 | 43 | 10 |
| | 2005 | -- | 39 | 48 | 13 |
| | 2004 | -- | 43 | 45 | 12 |
| **LEP and Formerly LEP** | | | | | |
| | **2007** | **4** | **25** | **46** | **25** |
| | 2006 | 5 | 22 | 49 | 24 |
| | 2005 | -- | 28 | 49 | 23 |
| | 2004 | -- | 32 | 48 | 20 |
| **Low Income** | | | | | |
| | **2007** | **4** | **32** | **46** | **18** |
| | 2006 | 6 | 28 | 48 | 17 |
| | 2005 | -- | 38 | 47 | 15 |
| | 2004 | -- | 40 | 46 | 14 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

2. To comply with NCLB, Massachusetts added the *Above Proficient* performance level for the Grade 3 Reading test in 2006. When comparing grade 3 English Language Arts student performance across years, the total percent of students scoring *Above Proficient* and *Proficient* in 2006 or 2007 can be compared to the percents scoring *Proficient* for Grade 3 Reading in the years 2004–2005.

## Table 5.2.1.2.2:
## Statewide MCAS Performance Level Results by Student Status
## 2006–2007 Grade 3 Mathematics
## Percentage of Students at Each Performance Level[1]

| Student Status Category | Year | Performance Level | | | |
|---|---|---|---|---|---|
| | | *Above Proficient* [2] | *Proficient* | *Needs Improvement* | *Warning* |
| **GRADE 3 MATHEMATICS** | | | | | |
| **Non-Disabled Students** | | | | | |
| | **2007** | **22** | **45** | **23** | **11** |
| | 2006 | 5 | 53 | 31 | 11 |
| **Students with Disabilities** | | | | | |
| | **2007** | **5** | **23** | **30** | **42** |
| | 2006 | 1 | 22 | 36 | 41 |
| **Limited English Proficient (LEP)** | | | | | |
| | **2007** | **5** | **25** | **30** | **40** |
| | 2006 | 1 | 23 | 35 | 42 |
| **Formerly LEP** | | | | | |
| | **2007** | **14** | **34** | **27** | **25** |
| | 2006 | 4 | 42 | 32 | 22 |
| **LEP and Formerly LEP** | | | | | |
| | **2007** | **7** | **28** | **29** | **36** |
| | 2006 | 2 | 28 | 34 | 36 |
| **Low Income** | | | | | |
| | **2007** | **7** | **31** | **31** | **31** |
| | 2006 | 1 | 30 | 38 | 31 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.
2. The *Above Proficient* standard in Mathematics was reset in 2007 to better discriminate student performance in the top reporting category. Therefore, comparisons should **not** be made between the 2006 and 2007 *Above Proficient* percents. However, comparisons may be drawn between 2006 and 2007 using each year's combined percent of students scoring *Proficient* and *Above Proficient*.

## Table 5.2.1.2.3:
## Statewide MCAS 2004–2007 Performance Level Results by Student Status
## Grade 4 English Language Arts
## Percentage of Students at Each Performance Level[1]

| Student Status Category | Year | Performance Level | | | |
|---|---|---|---|---|---|
| | | *Advanced* | *Proficient* | *Needs Improvement* | *Warning* |
| **GRADE 4 ENGLISH LANGUAGE ARTS** | | | | | |
| **Non-Disabled Students** | | | | | |
| | **2007** | **12** | **52** | **31** | **5** |
| | 2006 | 9 | 48 | 37 | 6 |
| | 2005 | 12 | 45 | 38 | 6 |
| | 2004 | 13 | 49 | 32 | 5 |
| **Students with Disabilities** | | | | | |
| | **2007** | **1** | **18** | **47** | **34** |
| | 2006 | 1 | 15 | 48 | 36 |
| | 2005 | 1 | 16 | 51 | 32 |
| | 2004 | 1 | 20 | 49 | 30 |
| **Limited English Proficient (LEP)** | | | | | |
| | **2007** | **1** | **16** | **47** | **36** |
| | 2006 | 1 | 13 | 46 | 40 |
| | 2005 | 1 | 11 | 47 | 41 |
| | 2004 | 1 | 16 | 46 | 36 |
| **Formerly LEP** | | | | | |
| | **2007** | **6** | **38** | **43** | **13** |
| | 2006 | 5 | 34 | 46 | 14 |
| | 2005 | 4 | 28 | 50 | 17 |
| | 2004 | 5 | 30 | 45 | 19 |
| **LEP and Formerly LEP** | | | | | |
| | **2007** | **3** | **24** | **45** | **28** |
| | 2006 | 2 | 20 | 46 | 31 |
| | 2005 | 3 | 20 | 49 | 29 |
| | 2004 | 3 | 22 | 46 | 29 |
| **Low Income** | | | | | |
| | **2007** | **3** | **29** | **48** | **21** |
| | 2006 | 2 | 25 | 49 | 23 |
| | 2005 | 2 | 24 | 53 | 21 |
| | 2004 | 3 | 28 | 49 | 20 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

## Table 5.2.1.2.4:
## Statewide MCAS 2004–2007 Performance Level Results by Student Status
## Grade 4 Mathematics
## Percentage of Students at Each Performance Level[1]

| Student Status Category | Year | Performance Level | | | |
|---|---|---|---|---|---|
| | | *Advanced* | *Proficient* | *Needs Improvement* | *Warning* |
| **GRADE 4 MATHEMATICS** | | | | | |
| **Non-Disabled Students** | | | | | |
| | **2007** | **22** | **33** | **38** | **7** |
| | 2006 | 17 | 28 | 45 | 9 |
| | 2005 | 16 | 30 | 44 | 10 |
| | 2004 | 16 | 32 | 43 | 9 |
| **Students with Disabilities** | | | | | |
| | **2007** | **4** | **13** | **46** | **37** |
| | 2006 | 3 | 12 | 46 | 39 |
| | 2005 | 3 | 11 | 46 | 41 |
| | 2004 | 3 | 12 | 47 | 38 |
| **Limited English Proficient (LEP)** | | | | | |
| | **2007** | **5** | **14** | **46** | **36** |
| | 2006 | 4 | 11 | 45 | 39 |
| | 2005 | 2 | 9 | 44 | 45 |
| | 2004 | 3 | 12 | 45 | 39 |
| **Formerly LEP** | | | | | |
| | **2007** | **14** | **25** | **44** | **17** |
| | 2006 | 13 | 22 | 47 | 19 |
| | 2005 | 8 | 18 | 50 | 23 |
| | 2004 | 9 | 19 | 47 | 26 |
| **LEP and Formerly LEP** | | | | | |
| | **2007** | **8** | **18** | **45** | **29** |
| | 2006 | 7 | 15 | 46 | 32 |
| | 2005 | 5 | 14 | 47 | 34 |
| | 2004 | 6 | 15 | 46 | 33 |
| **Low Income** | | | | | |
| | **2007** | **7** | **20** | **48** | **25** |
| | 2006 | 6 | 15 | 51 | 28 |
| | 2005 | 4 | 15 | 51 | 29 |
| | 2004 | 4 | 17 | 51 | 28 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

## Table 5.2.1.2.5:
## Statewide MCAS Performance Level Results by Student Status
## 2006–2007 Grade 5 English Language Arts
## Percentage of Students at Each Performance Level[1]

| Student Status Category | Year | Performance Level | | | |
|---|---|---|---|---|---|
| | | *Advanced* | *Proficient* | *Needs Improvement* | *Warning* |
| **GRADE 5 ENGLISH LANGUAGE ARTS** | | | | | |
| **Non-Disabled Students** | | | | | |
| | **2007** | **18** | **54** | **25** | **4** |
| | 2006 | 19 | 50 | 28 | 4 |
| **Students with Disabilities** | | | | | |
| | **2007** | **2** | **23** | **43** | **31** |
| | 2006 | 2 | 22 | 47 | 28 |
| **Limited English Proficient (LEP)** | | | | | |
| | **2007** | **1** | **15** | **43** | **41** |
| | 2006 | 1 | 12 | 44 | 43 |
| **Formerly LEP** | | | | | |
| | **2007** | **6** | **39** | **42** | **12** |
| | 2006 | 6 | 33 | 47 | 14 |
| **LEP and Formerly LEP** | | | | | |
| | **2007** | **4** | **26** | **42** | **28** |
| | 2006 | 3 | 22 | 46 | 29 |
| **Low Income** | | | | | |
| | **2007** | **4** | **34** | **43** | **19** |
| | 2006 | 4 | 30 | 47 | 18 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

## Table 5.2.1.2.6:
## Statewide MCAS Performance Level Results by Student Status
## 2006–2007 Grade 5 Mathematics
## Percentage of Students at Each Performance Level[1]

| Student Status Category | Year | Performance Level | | | |
|---|---|---|---|---|---|
| | | *Advanced* | *Proficient* | *Needs Improvement* | *Warning* |
| **GRADE 5 MATHEMATICS** | | | | | |
| **Non-Disabled Students** | | | | | |
| | **2007** | **22** | **37** | **30** | **11** |
| | 2006 | 20 | 30 | 35 | 16 |
| **Students with Disabilities** | | | | | |
| | **2007** | **3** | **14** | **33** | **50** |
| | 2006 | 3 | 11 | 31 | 55 |
| **Limited English Proficient (LEP)** | | | | | |
| | **2007** | **4** | **15** | **31** | **50** |
| | 2006 | 3 | 10 | 28 | 59 |
| **Formerly LEP** | | | | | |
| | **2007** | **13** | **28** | **35** | **24** |
| | 2006 | 10 | 21 | 36 | 32 |
| **LEP and Formerly LEP** | | | | | |
| | **2007** | **8** | **21** | **33** | **38** |
| | 2006 | 7 | 15 | 32 | 46 |
| **Low Income** | | | | | |
| | **2007** | **7** | **22** | **38** | **33** |
| | 2006 | 6 | 16 | 37 | 42 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

## Table 5.2.1.2.7:
## Statewide MCAS 2004–2007 Performance Level Results by Student Status
## Grade 5 Science and Technology/Engineering
## Percentage of Students at Each Performance Level[1]

| Student Status Category | Year | Performance Level | | | |
|---|---|---|---|---|---|
| | | *Advanced* | *Proficient* | *Needs Improvement* | *Warning* |
| **GRADE 5 SCIENCE AND TECHNOLOGY/ENGINEERING** | | | | | |
| **Non-Disabled Students** | | | | | |
| | **2007** | **17** | **41** | **35** | **7** |
| | 2006 | 19 | 36 | 37 | 7 |
| | 2005 | 18 | 38 | 36 | 8 |
| | 2004 | 22 | 37 | 31 | 9 |
| **Students with Disabilities** | | | | | |
| | **2007** | **3** | **18** | **45** | **33** |
| | 2006 | 5 | 18 | 48 | 30 |
| | 2005 | 4 | 18 | 46 | 33 |
| | 2004 | 6 | 20 | 42 | 32 |
| **Limited English Proficient (LEP)** | | | | | |
| | **2007** | **1** | **9** | **42** | **48** |
| | 2006 | 1 | 9 | 43 | 47 |
| | 2005 | 1 | 8 | 38 | 52 |
| | 2004 | 2 | 13 | 36 | 49 |
| **Formerly LEP** | | | | | |
| | **2007** | **4** | **24** | **51** | **21** |
| | 2006 | 5 | 21 | 51 | 23 |
| | 2005 | 5 | 19 | 50 | 26 |
| | 2004 | 4 | 18 | 43 | 34 |
| **LEP and Formerly LEP** | | | | | |
| | **2007** | **3** | **16** | **46** | **36** |
| | 2006 | 3 | 15 | 46 | 36 |
| | 2005 | 3 | 14 | 44 | 39 |
| | 2004 | 3 | 15 | 39 | 43 |
| **Low Income** | | | | | |
| | **2007** | **3** | **21** | **49** | **26** |
| | 2006 | 5 | 20 | 51 | 24 |
| | 2005 | 4 | 20 | 49 | 26 |
| | 2004 | 6 | 21 | 45 | 28 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

**Table 5.2.1.2.8:**
**Statewide MCAS Performance Level Results by Student Status**
**2006–2007 Grade 6 English Language Arts**
**Percentage of Students at Each Performance Level[1]**

| Student Status Category | Year | Performance Level | | | |
|---|---|---|---|---|---|
| | | *Advanced* | *Proficient* | *Needs Improvement* | *Warning* |
| **GRADE 6 ENGLISH LANGUAGE ARTS** | | | | | |
| **Non-Disabled Students** | | | | | |
| | **2007** | **11** | **65** | **21** | **3** |
| | 2006 | 12 | 60 | 24 | 4 |
| **Students with Disabilities** | | | | | |
| | **2007** | **1** | **26** | **45** | **28** |
| | 2006 | 1 | 25 | 46 | 28 |
| **Limited English Proficient (LEP)** | | | | | |
| | **2007** | **0** | **15** | **44** | **41** |
| | 2006 | 1 | 13 | 43 | 43 |
| **Formerly LEP** | | | | | |
| | **2007** | **2** | **42** | **43** | **14** |
| | 2006 | 3 | 38 | 45 | 14 |
| **LEP and Formerly LEP** | | | | | |
| | **2007** | **1** | **26** | **44** | **29** |
| | 2006 | 1 | 23 | 44 | 31 |
| **Low Income** | | | | | |
| | **2007** | **2** | **40** | **41** | **16** |
| | 2006 | 2 | 36 | 45 | 17 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

## Table 5.2.1.2.9:
## Statewide MCAS 2004–2007 Performance Level Results by Student Status
## Grade 6 Mathematics
## Percentage of Students at Each Performance Level[1]

| Student Status Category | Year | Performance Level | | | |
|---|---|---|---|---|---|
| | | *Advanced* | *Proficient* | *Needs Improvement* | *Warning* |
| **GRADE 6 MATHEMATICS** | | | | | |
| **Non-Disabled Students** | | | | | |
| | **2007** | **24** | **37** | **27** | **12** |
| | 2006 | 20 | 33 | 30 | 17 |
| | 2005 | 21 | 33 | 31 | 16 |
| | 2004 | 20 | 29 | 33 | 18 |
| **Students with Disabilities** | | | | | |
| | **2007** | **3** | **13** | **30** | **54** |
| | 2006 | 2 | 11 | 27 | 61 |
| | 2005 | 2 | 11 | 29 | 58 |
| | 2004 | 2 | 8 | 27 | 63 |
| **Limited English Proficient (LEP)** | | | | | |
| | **2007** | **4** | **11** | **25** | **59** |
| | 2006 | 3 | 8 | 23 | 67 |
| | 2005 | 3 | 9 | 24 | 65 |
| | 2004 | 3 | 9 | 24 | 64 |
| **Formerly LEP** | | | | | |
| | **2007** | **10** | **25** | **33** | **33** |
| | 2006 | 9 | 20 | 32 | 39 |
| | 2005 | 7 | 19 | 33 | 41 |
| | 2004 | 6 | 13 | 31 | 50 |
| **LEP and Formerly LEP** | | | | | |
| | **2007** | **6** | **17** | **28** | **48** |
| | 2006 | 5 | 12 | 27 | 56 |
| | 2005 | 5 | 13 | 28 | 54 |
| | 2004 | 4 | 11 | 28 | 57 |
| **Low Income** | | | | | |
| | **2007** | **7** | **22** | **33** | **38** |
| | 2006 | 5 | 17 | 32 | 46 |
| | 2005 | 5 | 18 | 34 | 43 |
| | 2004 | 5 | 15 | 34 | 47 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

## Table 5.2.1.2.10:
## Statewide MCAS 2004–2007 Performance Level Results by Student Status
## Grade 7 English Language Arts
## Percentage of Students at Each Performance Level[1]

| Student Status Category | Year | Performance Level | | | |
|---|---|---|---|---|---|
| | | *Advanced* | *Proficient* | *Needs Improvement* | *Warning* |
| **GRADE 7 ENGLISH LANGUAGE ARTS** | | | | | |
| **Non-Disabled Students** | | | | | |
| | **2007** | **11** | **67** | **19** | **3** |
| | 2006 | 12 | 61 | 22 | 4 |
| | 2005 | 12 | 63 | 22 | 3 |
| | 2004 | 10 | 66 | 21 | 3 |
| **Students with Disabilities** | | | | | |
| | **2007** | **1** | **27** | **43** | **30** |
| | 2006 | 1 | 24 | 43 | 32 |
| | 2005 | 1 | 25 | 48 | 26 |
| | 2004 | 1 | 26 | 46 | 27 |
| **Limited English Proficient (LEP)** | | | | | |
| | **2007** | **1** | **15** | **39** | **45** |
| | 2006 | 0 | 15 | 36 | 48 |
| | 2005 | 1 | 15 | 44 | 40 |
| | 2004 | 1 | 18 | 44 | 38 |
| **Formerly LEP** | | | | | |
| | **2007** | **2** | **46** | **39** | **14** |
| | 2006 | 3 | 38 | 42 | 17 |
| | 2005 | 3 | 36 | 48 | 13 |
| | 2004 | 2 | 37 | 43 | 18 |
| **LEP and Formerly LEP** | | | | | |
| | **2007** | **1** | **27** | **39** | **32** |
| | 2006 | 2 | 24 | 39 | 36 |
| | 2005 | 2 | 25 | 46 | 27 |
| | 2004 | 1 | 27 | 43 | 29 |
| **Low Income** | | | | | |
| | **2007** | **2** | **44** | **37** | **16** |
| | 2006 | 2 | 39 | 39 | 19 |
| | 2005 | 2 | 39 | 44 | 15 |
| | 2004 | 2 | 41 | 41 | 16 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

## Table 5.2.1.2.11:
## Statewide MCAS Performance Level Results by Student Status
## 2006–2007 Grade 7 Mathematics
## Percentage of Students at Each Performance Level[1]

| Student Status Category | Year | Performance Level | | | |
|---|---|---|---|---|---|
| | | *Advanced* | *Proficient* | *Needs Improvement* | *Warning* |
| **GRADE 7 MATHEMATICS** | | | | | |
| **Non-Disabled Students** | | | | | |
| | **2007** | **17** | **36** | **31** | **16** |
| | 2006 | 15 | 32 | 34 | 19 |
| **Students with Disabilities** | | | | | |
| | **2007** | **2** | **10** | **27** | **61** |
| | 2006 | 1 | 8 | 26 | 65 |
| **Limited English Proficient (LEP)** | | | | | |
| | **2007** | **2** | **8** | **21** | **68** |
| | 2006 | 2 | 7 | 22 | 69 |
| **Formerly LEP** | | | | | |
| | **2007** | **7** | **20** | **33** | **40** |
| | 2006 | 6 | 15 | 32 | 46 |
| **LEP and Formerly LEP** | | | | | |
| | **2007** | **4** | **13** | **26** | **56** |
| | 2006 | 4 | 10 | 26 | 60 |
| **Low Income** | | | | | |
| | **2007** | **4** | **18** | **33** | **45** |
| | 2006 | 3 | 14 | 33 | 49 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

## Table 5.2.1.2.12:
## Statewide MCAS Performance Level Results by Student Status
## 2006–2007 Grade 8 English Language Arts
## Percentage of Students at Each Performance Level[1]

| Student Status Category | Year | Performance Level | | | |
|---|---|---|---|---|---|
| | | *Advanced* | *Proficient* | *Needs Improvement* | *Warning* |
| **GRADE 8 ENGLISH LANGUAGE ARTS** | | | | | |
| **Non-Disabled Students** | | | | | |
| | **2007** | **15** | **69** | **14** | **2** |
| | 2006 | 14 | 68 | 14 | 3 |
| **Students with Disabilities** | | | | | |
| | **2007** | **1** | **35** | **39** | **25** |
| | 2006 | 1 | 34 | 39 | 27 |
| **Limited English Proficient (LEP)** | | | | | |
| | **2007** | **0** | **17** | **43** | **40** |
| | 2006 | 0 | 17 | 37 | 45 |
| **Formerly LEP** | | | | | |
| | **2007** | **3** | **47** | **39** | **11** |
| | 2006 | 2 | 47 | 36 | 15 |
| **LEP and Formerly LEP** | | | | | |
| | **2007** | **2** | **27** | **42** | **29** |
| | 2006 | 1 | 28 | 37 | 35 |
| **Low Income** | | | | | |
| | **2007** | **3** | **51** | **32** | **13** |
| | 2006 | 3 | 49 | 33 | 16 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

## Table 5.2.1.2.13:
## Statewide MCAS 2004–2007 Performance Level Results by Student Status
## Grade 8 Mathematics
## Percentage of Students at Each Performance Level[1]

| Student Status Category | Year | Performance Level | | | |
|---|---|---|---|---|---|
| | | *Advanced* | *Proficient* | *Needs Improvement* | *Warning* |
| **GRADE 8 MATHEMATICS** | | | | | |
| **Non-Disabled Students** | | | | | |
| | **2007** | **21** | **32** | **31** | **16** |
| | 2006 | 15 | 32 | 33 | 21 |
| | 2005 | 16 | 30 | 32 | 23 |
| | 2004 | 15 | 30 | 34 | 21 |
| **Students with Disabilities** | | | | | |
| | **2007** | **2** | **8** | **26** | **64** |
| | 2006 | 1 | 7 | 24 | 68 |
| | 2005 | 1 | 6 | 22 | 70 |
| | 2004 | 1 | 6 | 25 | 67 |
| **Limited English Proficient (LEP)** | | | | | |
| | **2007** | **2** | **8** | **21** | **69** |
| | 2006 | 1 | 8 | 18 | 73 |
| | 2005 | 2 | 7 | 16 | 75 |
| | 2004 | 3 | 7 | 22 | 68 |
| **Formerly LEP** | | | | | |
| | **2007** | **7** | **18** | **29** | **46** |
| | 2006 | 5 | 15 | 30 | 50 |
| | 2005 | 5 | 13 | 27 | 55 |
| | 2004 | 8 | 14 | 26 | 52 |
| **LEP and Formerly LEP** | | | | | |
| | **2007** | **4** | **11** | **24** | **61** |
| | 2006 | 3 | 10 | 23 | 65 |
| | 2005 | 3 | 9 | 21 | 66 |
| | 2004 | 5 | 10 | 24 | 61 |
| **Low Income** | | | | | |
| | **2007** | **5** | **16** | **33** | **45** |
| | 2006 | 3 | 14 | 31 | 52 |
| | 2005 | 3 | 14 | 29 | 54 |
| | 2004 | 3 | 13 | 32 | 52 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

## Table 5.2.1.2.14:
## Statewide MCAS 2004–2007 Performance Level Results by Student Status
## Grade 8 Science and Technology/Engineering
## Percentage of Students at Each Performance Level[1]

| Student Status Category | Year | Performance Level | | | |
|---|---|---|---|---|---|
| | | *Advanced* | *Proficient* | *Needs Improvement* | *Warning* |
| **GRADE 8 SCIENCE AND TECHNOLOGY/ENGINEERING** | | | | | |
| **Non-Disabled Students** | | | | | |
| | **2007** | **4** | **34** | **45** | **17** |
| | 2006 | 5 | 32 | 45 | 18 |
| | 2005 | 4 | 34 | 43 | 19 |
| | 2004 | 6 | 32 | 37 | 24 |
| **Students with Disabilities** | | | | | |
| | **2007** | **0** | **7** | **36** | **56** |
| | 2006 | 0 | 7 | 33 | 59 |
| | 2005 | 0 | 7 | 32 | 61 |
| | 2004 | 1 | 7 | 26 | 66 |
| **Limited English Proficient (LEP)** | | | | | |
| | **2007** | **0** | **3** | **20** | **77** |
| | 2006 | 0 | 3 | 20 | 78 |
| | 2005 | 0 | 3 | 20 | 77 |
| | 2004 | 0 | 5 | 18 | 76 |
| **Formerly LEP** | | | | | |
| | **2007** | **1** | **10** | **39** | **51** |
| | 2006 | 0 | 8 | 37 | 54 |
| | 2005 | 1 | 8 | 32 | 59 |
| | 2004 | 1 | 9 | 23 | 66 |
| **LEP and Formerly LEP** | | | | | |
| | **2007** | **0** | **5** | **26** | **68** |
| | 2006 | 0 | 4 | 26 | 70 |
| | 2005 | 1 | 5 | 25 | 69 |
| | 2004 | 1 | 7 | 21 | 71 |
| **Low Income** | | | | | |
| | **2007** | **0** | **11** | **42** | **46** |
| | 2006 | 0 | 9 | 40 | 50 |
| | 2005 | 0 | 10 | 39 | 51 |
| | 2004 | 1 | 10 | 30 | 59 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

## Table 5.2.1.2.15:
## Statewide MCAS 2004–2007 Performance Level Results by Student Status
## Grade 10 English Language Arts
## Percentage of Students at Each Performance Level[1]

| Student Status Category | Year | Performance Level | | | |
|---|---|---|---|---|---|
| | | *Advanced* | *Proficient* | *Needs Improvement* | *Failing* |
| **GRADE 10 ENGLISH LANGUAGE ARTS** | | | | | |
| **Non-Disabled Students** | | | | | |
| | **2007** | **25** | **53** | **19** | **3** |
| | 2006 | 18 | 58 | 20 | 3 |
| | 2005 | 26 | 46 | 22 | 5 |
| | 2004 | 22 | 48 | 24 | 6 |
| **Students with Disabilities** | | | | | |
| | **2007** | **2** | **28** | **47** | **23** |
| | 2006 | 1 | 28 | 45 | 25 |
| | 2005 | 2 | 21 | 42 | 34 |
| | 2004 | 2 | 20 | 43 | 36 |
| **Limited English Proficient (LEP)** | | | | | |
| | **2007** | **1** | **12** | **46** | **42** |
| | 2006 | 1 | 13 | 42 | 45 |
| | 2005 | 1 | 8 | 32 | 59 |
| | 2004 | 1 | 11 | 36 | 52 |
| **Formerly LEP** | | | | | |
| | **2007** | **5** | **34** | **49** | **12** |
| | 2006 | 4 | 39 | 42 | 15 |
| | 2005 | 4 | 25 | 45 | 26 |
| | 2004 | 7 | 25 | 40 | 28 |
| **LEP and Formerly LEP** | | | | | |
| | **2007** | **2** | **19** | **47** | **32** |
| | 2006 | 2 | 23 | 42 | 33 |
| | 2005 | 2 | 15 | 37 | 46 |
| | 2004 | 4 | 17 | 38 | 42 |
| **Low Income** | | | | | |
| | **2007** | **7** | **41** | **40** | **13** |
| | 2006 | 5 | 41 | 39 | 15 |
| | 2005 | 7 | 30 | 39 | 24 |
| | 2004 | 5 | 29 | 41 | 25 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

In table 5.2.1.2.16, the category of "Limited English Proficient (LEP)" includes students who took the Spanish/English version of the grade 10 Mathematics test (this was the only test for which a Spanish/English version was available in 2006 and 2007).

**Table 5.2.1.2.16:**
**Statewide MCAS 2004–2007 Performance Level Results by Student Status**
**Grade 10 Mathematics**
**Percentage of Students at Each Performance Level[1]**

| Student Status Category | Year | Performance Level | | | |
|---|---|---|---|---|---|
| | | *Advanced* | *Proficient* | *Needs Improvement* | *Failing* |
| **GRADE 10 MATHEMATICS** | | | | | |
| **Non-Disabled Students** | | | | | |
| | **2007** | **48** | **28** | **19** | **5** |
| | 2006 | 46 | 28 | 19 | 8 |
| | 2005 | 40 | 28 | 22 | 10 |
| | 2004 | 34 | 30 | 27 | 10 |
| **Students with Disabilities** | | | | | |
| | **2007** | **9** | **22** | **37** | **32** |
| | 2006 | 9 | 21 | 32 | 38 |
| | 2005 | 6 | 19 | 33 | 41 |
| | 2004 | 4 | 17 | 36 | 43 |
| **Limited English Proficient (LEP)** | | | | | |
| | **2007** | **11** | **16** | **34** | **39** |
| | 2006 | 12 | 14 | 27 | 46 |
| | 2005 | 9 | 13 | 29 | 49 |
| | 2004 | 9 | 17 | 33 | 41 |
| **Formerly LEP** | | | | | |
| | **2007** | **24** | **23** | **35** | **19** |
| | 2006 | 23 | 23 | 30 | 24 |
| | 2005 | 18 | 21 | 33 | 28 |
| | 2004 | 23 | 17 | 29 | 32 |
| **LEP and Formerly LEP** | | | | | |
| | **2007** | **16** | **18** | **34** | **32** |
| | 2006 | 17 | 18 | 28 | 37 |
| | 2005 | 13 | 16 | 30 | 41 |
| | 2004 | 15 | 17 | 31 | 37 |
| **Low Income** | | | | | |
| | **2007** | **21** | **26** | **33** | **19** |
| | 2006 | 19 | 25 | 31 | 26 |
| | 2005 | 14 | 21 | 33 | 31 |
| | 2004 | 11 | 21 | 36 | 31 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.

### *5.2.1.3 Percentages by Race/Ethnicity*

**Table 5.2.1.3.1:**
**Statewide MCAS Test Results**
**By Race/Ethnicity**

**African American / Black**
**Percentage of Students at Each Performance Level[1]**

| Grade Level and Content Area | Year | Performance Level | | | | Total Students Included |
|---|---|---|---|---|---|---|
| | | *Advanced/ Above Proficient* | *Proficient* | *Needs Improvement* | *Warning/ Failing* | |
| **GRADE 3** | | | | | | |
| **ENGLISH LANGUAGE ARTS/ READING [2]** | **2007** | **5** | **31** | **47** | **18** | **5,575** |
| | 2006 | 6 | 29 | 49 | 16 | 5,468 |
| | 2005 | - | 37 | 48 | 15 | 5,597 |
| **MATHEMATICS [3]** | **2007** | **6** | **29** | **32** | **33** | **5,578** |
| | 2006 | 1 | 28 | 39 | 33 | 5,468 |
| **GRADE 4** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **3** | **29** | **48** | **21** | **5,427** |
| | 2006 | 2 | 24 | 49 | 24 | 5,563 |
| | 2005 | 3 | 24 | 52 | 22 | 6,015 |
| **MATHEMATICS** | **2007** | **6** | **17** | **50** | **27** | **5,434** |
| | 2006 | 4 | 14 | 52 | 31 | 5,574 |
| | 2005 | 3 | 13 | 51 | 33 | 6,020 |
| **GRADE 5** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **4** | **35** | **43** | **18** | **5,558** |
| | 2006 | 4 | 30 | 48 | 18 | 6,055 |
| **MATHEMATICS** | **2007** | **5** | **20** | **38** | **36** | **5,559** |
| | 2006 | 4 | 14 | 37 | 45 | 6,079 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | **2007** | **2** | **18** | **50** | **30** | **5,559** |
| | 2006 | 3 | 17 | 52 | 28 | 6,076 |
| | 2005 | 3 | 17 | 50 | 29 | 6,000 |
| **GRADE 6** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **3** | **40** | **43** | **15** | **6,109** |
| | 2006 | 3 | 36 | 45 | 17 | 6,112 |
| **MATHEMATICS** | **2007** | **6** | **21** | **32** | **41** | **6,094** |
| | 2006 | 4 | 15 | 32 | 49 | 6,127 |
| | 2005 | 4 | 17 | 33 | 46 | 6,580 |
| **GRADE 7** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **2** | **46** | **36** | **16** | **6,105** |
| | 2006 | 3 | 39 | 40 | 19 | 6,525 |
| | 2005 | 2 | 39 | 45 | 13 | 6,697 |
| **MATHEMATICS** | **2007** | **3** | **17** | **34** | **47** | **6,108** |
| | 2006 | 2 | 12 | 34 | 52 | 6,547 |

**(Table 5.2.1.3.1 continued on next page)**

## Table 5.2.1.3.1 (cont.): Statewide MCAS Test Results By Race/Ethnicity

### African American / Black (cont.) Percentage of Students at Each Performance Level[1]

| Grade Level and Content Area | Year | Performance Level | | | | Total Students Included |
|---|---|---|---|---|---|---|
| | | *Advanced/ Above Proficient* | *Proficient* | *Needs Improvement* | *Warning/ Failing* | |
| **GRADE 8** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **4** | **52** | **32** | **13** | **6,412** |
| | 2006 | 3 | 49 | 33 | 15 | 6,610 |
| **MATHEMATICS** | **2007** | **4** | **15** | **34** | **47** | **6,399** |
| | 2006 | 2 | 13 | 30 | 55 | 6,623 |
| | 2005 | 2 | 12 | 29 | 56 | 6,514 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | **2007** | **0** | **8** | **42** | **50** | **6,398** |
| | 2006 | 0 | 7 | 37 | 56 | 6,616 |
| | 2005 | 0 | 7 | 37 | 55 | 6,505 |
| **GRADE 10** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **6** | **40** | **41** | **12** | **6,056** |
| | 2006 | 5 | 42 | 40 | 14 | 6,004 |
| | 2005 | 6 | 30 | 43 | 21 | 5,541 |
| **MATHEMATICS** | **2007** | **19** | **26** | **35** | **20** | **5,957** |
| | 2006 | 17 | 24 | 33 | 26 | 5,930 |
| | 2005 | 10 | 19 | 37 | 33 | 5,567 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.
2. To comply with NCLB, Massachusetts added the *Above Proficient* performance level for the Grade 3 Reading test in 2006. When comparing grade 3 English Language Arts student performance across years, the total percent of students scoring *Above Proficient* and *Proficient* in 2006 or 2007 can be compared to the percents scoring *Proficient* for Grade 3 Reading in 2005.
3. The *Above Proficient* standard in Mathematics was reset in 2007 to better discriminate student performance in the top reporting category. Therefore, comparisons should **not** be made between the 2006 and 2007 *Above Proficient* percents. However, comparisons may be drawn between 2006 and 2007 using each year's combined percent of students scoring *Proficient* and *Above Proficient*.

## Table 5.2.1.3.2:
## Statewide MCAS Test Results
## By Race/Ethnicity

### Asian
### Percentage of Students at Each Performance Level[1]

| Grade Level and Content Area | Year | Performance Level | | | | Total Students Included |
|---|---|---|---|---|---|---|
| | | *Advanced/ Above Proficient* | *Proficient* | *Needs Improvement* | *Warning/ Failing* | |
| **GRADE 3** | | | | | | |
| **ENGLISH LANGUAGE ARTS/ READING [2]** | **2007** | **20** | **44** | **28** | **8** | **3,457** |
| | 2006 | 21 | 40 | 32 | 7 | 3,344 |
| | 2005 | - | 62 | 31 | 7 | 3,423 |
| **MATHEMATICS [3]** | **2007** | **31** | **39** | **18** | **11** | **3,461** |
| | 2006 | 8 | 55 | 26 | 11 | 3,349 |
| **GRADE 4** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **17** | **46** | **29** | **8** | **3,370** |
| | 2006 | 15 | 43 | 33 | 10 | 3,442 |
| | 2005 | 17 | 40 | 34 | 10 | 3,330 |
| **MATHEMATICS** | **2007** | **32** | **31** | **30** | **7** | **3,391** |
| | 2006 | 28 | 29 | 33 | 10 | 3,451 |
| | 2005 | 24 | 29 | 37 | 10 | 3,342 |
| **GRADE 5** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **23** | **45** | **25** | **7** | **3,437** |
| | 2006 | 22 | 43 | 27 | 8 | 3,353 |
| **MATHEMATICS** | **2007** | **36** | **34** | **21** | **9** | **3,454** |
| | 2006 | 32 | 28 | 26 | 13 | 3,354 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | **2007** | **23** | **36** | **32** | **10** | **3,453** |
| | 2006 | 22 | 33 | 35 | 10 | 3,352 |
| | 2005 | 21 | 33 | 34 | 12 | 3,283 |
| **GRADE 6** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **17** | **55** | **22** | **6** | **3,318** |
| | 2006 | 17 | 52 | 25 | 6 | 3,250 |
| **MATHEMATICS** | **2007** | **40** | **31** | **19** | **10** | **3,339** |
| | 2006 | 32 | 30 | 22 | 15 | 3,253 |
| | 2005 | 33 | 29 | 23 | 15 | 3,084 |
| **GRADE 7** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **17** | **58** | **19** | **6** | **3,335** |
| | 2006 | 16 | 53 | 22 | 8 | 3,119 |
| | 2005 | 18 | 53 | 24 | 6 | 3,219 |
| **MATHEMATICS** | **2007** | **32** | **32** | **22** | **14** | **3,338** |
| | 2006 | 28 | 30 | 26 | 16 | 3,141 |

**(Table 5.2.1.3.2 continued on next page)**

## Table 5.2.1.3.2 (cont.): Statewide MCAS Test Results By Race/Ethnicity

### Asian (cont.) Percentage of Students at Each Performance Level[1]

| Grade Level and Content Area | Year | Performance Level | | | | Total Students Included |
|---|---|---|---|---|---|---|
| | | *Advanced/ Above Proficient* | *Proficient* | *Needs Improvement* | *Warning/ Failing* | |
| **GRADE 8** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **19** | **58** | **17** | **5** | **3,163** |
| | 2006 | 20 | 56 | 18 | 6 | 3,250 |
| **MATHEMATICS** | **2007** | **34** | **31** | **22** | **14** | **3,164** |
| | 2006 | 27 | 32 | 22 | 18 | 3,254 |
| | 2005 | 28 | 29 | 22 | 21 | 3,292 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | **2007** | **7** | **35** | **38** | **20** | **3,162** |
| | 2006 | 8 | 31 | 38 | 23 | 3,253 |
| | 2005 | 8 | 35 | 36 | 21 | 3,292 |
| **GRADE 10** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **31** | **43** | **21** | **5** | **3,297** |
| | 2006 | 23 | 49 | 22 | 6 | 3,115 |
| | 2005 | 28 | 37 | 26 | 9 | 3,115 |
| **MATHEMATICS** | **2007** | **64** | **18** | **13** | **5** | **3,261** |
| | 2006 | 62 | 17 | 14 | 7 | 3,102 |
| | 2005 | 54 | 21 | 17 | 8 | 3,115 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.
2. To comply with NCLB, Massachusetts added the *Above Proficient* performance level for the Grade 3 Reading test in 2006. When comparing grade 3 English Language Arts student performance across years, the total percent of students scoring *Above Proficient* and *Proficient* in 2006 or 2007 can be compared to the percents scoring *Proficient* for Grade 3 Reading in 2005.
3. The *Above Proficient* standard in Mathematics was reset in 2007 to better discriminate student performance in the top reporting category. Therefore, comparisons should **not** be made between the 2006 and 2007 *Above Proficient* percents. However, comparisons may be drawn between 2006 and 2007 using each year's combined percent of students scoring *Proficient* and *Above Proficient*.

## Table 5.2.1.3.3:
## Statewide MCAS Test Results
## By Race/Ethnicity

### Hispanic/Latino
### Percentage of Students at Each Performance Level[1]

| Grade Level and Content Area | Year | Performance Level | | | | Total Students Included |
|---|---|---|---|---|---|---|
| | | *Advanced/ Above Proficient* | *Proficient* | *Needs Improvement* | *Warning/ Failing* | |
| **GRADE 3** | | | | | | |
| **ENGLISH LANGUAGE ARTS/ READING** [2] | **2007** | **4** | **28** | **46** | **22** | **9,636** |
| | 2006 | 6 | 24 | 49 | 21 | 9,220 |
| | 2005 | - | 32 | 49 | 19 | 9,124 |
| **MATHEMATICS** [3] | **2007** | **7** | **28** | **30** | **35** | **9,663** |
| | 2006 | 1 | 26 | 37 | 36 | 9,228 |
| **GRADE 4** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **2** | **26** | **47** | **25** | **9,217** |
| | 2006 | 2 | 22 | 48 | 28 | 9,097 |
| | 2005 | 2 | 21 | 51 | 26 | 9,059 |
| **MATHEMATICS** | **2007** | **6** | **18** | **48** | **28** | **9,247** |
| | 2006 | 5 | 13 | 49 | 32 | 9,134 |
| | 2005 | 3 | 13 | 50 | 33 | 9,086 |
| **GRADE 5** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **4** | **30** | **43** | **23** | **9,204** |
| | 2006 | 4 | 25 | 48 | 23 | 9,123 |
| **MATHEMATICS** | **2007** | **6** | **20** | **36** | **39** | **9,228** |
| | 2006 | 5 | 15 | 34 | 47 | 9,132 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | **2007** | **3** | **17** | **49** | **31** | **9,222** |
| | 2006 | 3 | 17 | 50 | 30 | 9,128 |
| | 2005 | 4 | 17 | 48 | 32 | 9,058 |
| **GRADE 6** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **2** | **36** | **42** | **20** | **9,315** |
| | 2006 | 2 | 31 | 45 | 22 | 9,222 |
| **MATHEMATICS** | **2007** | **6** | **19** | **32** | **44** | **9,350** |
| | 2006 | 4 | 14 | 30 | 52 | 9,254 |
| | 2005 | 4 | 15 | 32 | 49 | 9,339 |
| **GRADE 7** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **2** | **40** | **37** | **21** | **9,407** |
| | 2006 | 2 | 34 | 39 | 24 | 9,416 |
| | 2005 | 2 | 35 | 45 | 18 | 9,573 |
| **MATHEMATICS** | **2007** | **3** | **16** | **31** | **50** | **9,411** |
| | 2006 | 2 | 12 | 31 | 55 | 9,446 |

**(Table 5.2.1.3.3 continued on next page)**

## Table 5.2.1.3.3 (cont.): Statewide MCAS Test Results By Race/Ethnicity

### Hispanic/Latino (cont.) Percentage of Students at Each Performance Level[1]

| Grade Level and Content Area | Year | Performance Level | | | | Total Students Included |
|---|---|---|---|---|---|---|
| | | *Advanced/ Above Proficient* | *Proficient* | *Needs Improvement* | *Warning/ Failing* | |
| **GRADE 8** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **3** | **45** | **35** | **17** | **9,408** |
| | 2006 | 3 | 43 | 34 | 20 | 9,616 |
| **MATHEMATICS** | **2007** | **4** | **14** | **30** | **52** | **9,362** |
| | 2006 | 3 | 12 | 29 | 56 | 9,638 |
| | 2005 | 3 | 12 | 27 | 58 | 9,343 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | **2007** | **0** | **7** | **37** | **55** | **9,338** |
| | 2006 | 0 | 7 | 36 | 56 | 9,623 |
| | 2005 | 1 | 8 | 33 | 58 | 9,327 |
| **GRADE 10** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **6** | **36** | **41** | **16** | **8,511** |
| | 2006 | 4 | 37 | 40 | 19 | 8,120 |
| | 2005 | 6 | 28 | 41 | 25 | 7,293 |
| **MATHEMATICS** | **2007** | **18** | **24** | **34** | **24** | **8,303** |
| | 2006 | 15 | 22 | 31 | 31 | 7,954 |
| | 2005 | 12 | 20 | 34 | 34 | 7,322 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.
2. To comply with NCLB, Massachusetts added the *Above Proficient* performance level for the Grade 3 Reading test in 2006. When comparing grade 3 English Language Arts student performance across years, the total percent of students scoring *Above Proficient* and *Proficient* in 2006 or 2007 can be compared to the percents scoring *Proficient* for Grade 3 Reading in 2005.
3. The *Above Proficient* standard in Mathematics was reset in 2007 to better discriminate student performance in the top reporting category. Therefore, comparisons should **not** be made between the 2006 and 2007 *Above Proficient* percents. However, comparisons may be drawn between 2006 and 2007 using each year's combined percent of students scoring *Proficient* and *Above Proficient*.

## Table 5.2.1.3.4:
## Statewide MCAS Test Results
## By Race/Ethnicity

### Native American
### Percentage of Students at Each Performance Level[1]

| Grade Level and Content Area | Year | Performance Level | | | | Total Students Included |
|---|---|---|---|---|---|---|
| | | *Advanced/ Above Proficient* | *Proficient* | *Needs Improvement* | *Warning/ Failing* | |
| **GRADE 3** | | | | | | |
| **ENGLISH LANGUAGE ARTS/READING [2]** | **2007** | **6** | **40** | **45** | **10** | **204** |
| | 2006 | 9 | 37 | 41 | 12 | 234 |
| | 2005 | - | 55 | 38 | 7 | 215 |
| **MATHEMATICS [3]** | **2007** | **10** | **41** | **29** | **20** | **202** |
| | 2006 | 2 | 37 | 40 | 20 | 235 |
| **GRADE 4** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **4** | **38** | **43** | **16** | **232** |
| | 2006 | 3 | 35 | 48 | 14 | 214 |
| | 2005 | 3 | 28 | 57 | 11 | 231 |
| **MATHEMATICS** | **2007** | **10** | **21** | **50** | **19** | **229** |
| | 2006 | 7 | 20 | 57 | 15 | 215 |
| | 2005 | 7 | 19 | 52 | 22 | 231 |
| **GRADE 5** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **9** | **42** | **40** | **10** | **199** |
| | 2006 | 7 | 38 | 44 | 11 | 230 |
| **MATHEMATICS** | **2007** | **12** | **34** | **30** | **25** | **200** |
| | 2006 | 9 | 22 | 34 | 35 | 230 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | **2007** | **6** | **32** | **45** | **17** | **199** |
| | 2006 | 6 | 28 | 48 | 18 | 230 |
| | 2005 | 7 | 29 | 45 | 18 | 218 |
| **GRADE 6** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **4** | **48** | **37** | **11** | **226** |
| | 2006 | 5 | 42 | 43 | 11 | 215 |
| **MATHEMATICS** | **2007** | **10** | **23** | **34** | **34** | **226** |
| | 2006 | 10 | 20 | 30 | 41 | 219 |
| | 2005 | 9 | 29 | 27 | 35 | 248 |
| **GRADE 7** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **8** | **49** | **32** | **12** | **222** |
| | 2006 | 4 | 50 | 34 | 12 | 242 |
| | 2005 | 5 | 56 | 34 | 5 | 245 |
| **MATHEMATICS** | **2007** | **9** | **20** | **34** | **37** | **223** |
| | 2006 | 4 | 20 | 36 | 40 | 240 |

**(Table 5.2.1.3.4 continued on next page)**

## Table 5.2.1.3.4 (cont.): Statewide MCAS Test Results By Race/Ethnicity

### Native American (cont.) Percentage of Students at Each Performance Level[1]

| Grade Level and Content Area | Year | Performance Level | | | | Total Students Included |
|---|---|---|---|---|---|---|
| | | *Advanced/ Above Proficient* | *Proficient* | *Needs Improvement* | *Warning/ Failing* | |
| **GRADE 8** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **6** | **63** | **24** | **8** | **236** |
| | 2006 | 5 | 60 | 27 | 7 | 242 |
| **MATHEMATICS** | **2007** | **8** | **24** | **37** | **31** | **238** |
| | 2006 | 6 | 21 | 35 | 38 | 245 |
| | 2005 | 6 | 22 | 34 | 38 | 223 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | **2007** | **0** | **20** | **46** | **34** | **238** |
| | 2006 | 2 | 19 | 45 | 34 | 244 |
| | 2005 | 2 | 19 | 47 | 31 | 223 |
| **GRADE 10** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **13** | **49** | **32** | **6** | **187** |
| | 2006 | 8 | 54 | 31 | 8 | 195 |
| | 2005 | 11 | 44 | 33 | 12 | 188 |
| **MATHEMATICS** | **2007** | **32** | **22** | **33** | **13** | **184** |
| | 2006 | 26 | 27 | 31 | 16 | 191 |
| | 2005 | 18 | 29 | 28 | 26 | 188 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.
2. To comply with NCLB, Massachusetts added the *Above Proficient* performance level for the Grade 3 Reading test in 2006. When comparing grade 3 English Language Arts student performance across years, the total percent of students scoring *Above Proficient* and *Proficient* in 2006 or 2007 can be compared to the percents scoring *Proficient* for Grade 3 Reading in 2005.
3. The *Above Proficient* standard in Mathematics was reset in 2007 to better discriminate student performance in the top reporting category. Therefore, comparisons should **not** be made between the 2006 and 2007 *Above Proficient* percents. However, comparisons may be drawn between 2006 and 2007 using each year's combined percent of students scoring *Proficient* and *Above Proficient*.

## Table 5.2.1.3.5:
## Statewide MCAS Test Results
## By Race/Ethnicity

### White
### Percentage of Students at Each Performance Level[1]

| Grade Level and Content Area | Year | Performance Level | | | | Total Students Included |
|---|---|---|---|---|---|---|
| | | *Advanced/ Above Proficient* | *Proficient* | *Needs Improvement* | *Warning/ Failing* | |
| **GRADE 3** | | | | | | |
| **ENGLISH LANGUAGE ARTS/READING [2]** | **2007** | **16** | **50** | **28** | **6** | **50,862** |
| | 2006 | 21 | 45 | 29 | 5 | 51,025 |
| | 2005 | - | 70 | 26 | 4 | 51,880 |
| **MATHEMATICS [3]** | **2007** | **22** | **45** | **22** | **11** | **50,900** |
| | 2006 | 5 | 53 | 31 | 11 | 51,038 |
| **GRADE 4** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **12** | **51** | **30** | **6** | **50,748** |
| | 2006 | 9 | 47 | 37 | 7 | 51,654 |
| | 2005 | 11 | 45 | 37 | 6 | 52,455 |
| **MATHEMATICS** | **2007** | **21** | **33** | **37** | **9** | **50,850** |
| | 2006 | 17 | 28 | 44 | 10 | 51,762 |
| | 2005 | 16 | 30 | 43 | 10 | 52,453 |
| **GRADE 5** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **17** | **53** | **24** | **5** | **51,403** |
| | 2006 | 19 | 50 | 27 | 5 | 52,314 |
| **MATHEMATICS** | **2007** | **21** | **36** | **30** | **13** | **51,504** |
| | 2006 | 19 | 29 | 34 | 17 | 52,388 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | **2007** | **17** | **42** | **34** | **7** | **51,500** |
| | 2006 | 20 | 38 | 36 | 6 | 52,368 |
| | 2005 | 19 | 40 | 35 | 7 | 53,231 |
| **GRADE 6** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **11** | **64** | **21** | **4** | **52,327** |
| | 2006 | 12 | 60 | 23 | 5 | 53,052 |
| **MATHEMATICS** | **2007** | **24** | **36** | **27** | **13** | **52,429** |
| | 2006 | 19 | 33 | 30 | 18 | 53,138 |
| | 2005 | 20 | 33 | 30 | 17 | 54,167 |
| **GRADE 7** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **11** | **65** | **19** | **5** | **53,212** |
| | 2006 | 12 | 60 | 22 | 5 | 53,808 |
| | 2005 | 12 | 63 | 22 | 4 | 55,337 |
| **MATHEMATICS** | **2007** | **17** | **35** | **30** | **18** | **53,212** |
| | 2006 | 14 | 32 | 33 | 20 | 53,906 |

**(Table 5.2.1.3.5 continued on next page)**

## Table 5.2.1.3.5 (cont.): Statewide MCAS Test Results By Race/Ethnicity

### White (cont.) Percentage of Students at Each Performance Level[1]

| Grade Level and Content Area | Year | Performance Level | | | | Total Students Included |
|---|---|---|---|---|---|---|
| | | *Advanced/ Above Proficient* | *Proficient* | *Needs Improvement* | *Warning/ Failing* | |
| **GRADE 8** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **15** | **68** | **14** | **4** | **54,020** |
| | 2006 | 14 | 67 | 14 | 4 | 55,031 |
| **MATHEMATICS** | **2007** | **20** | **32** | **30** | **18** | **53,974** |
| | 2006 | 14 | 32 | 32 | 21 | 55,102 |
| | 2005 | 15 | 30 | 31 | 23 | 56,466 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | **2007** | **3** | **36** | **45** | **15** | **53,950** |
| | 2006 | 5 | 34 | 45 | 16 | 55,084 |
| | 2005 | 4 | 35 | 43 | 17 | 56,322 |
| **GRADE 10** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **25** | **52** | **19** | **3** | **53,322** |
| | 2006 | 18 | 58 | 20 | 4 | 54,827 |
| | 2005 | 27 | 46 | 22 | 5 | 53,918 |
| **MATHEMATICS** | **2007** | **46** | **29** | **19** | **6** | **52,941** |
| | 2006 | 45 | 28 | 19 | 8 | 54,548 |
| | 2005 | 40 | 29 | 22 | 9 | 53,946 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.
2. To comply with NCLB, Massachusetts added the *Above Proficient* performance level for the Grade 3 Reading test in 2006. When comparing grade 3 English Language Arts student performance across years, the total percent of students scoring *Above Proficient* and *Proficient* in 2006 or 2007 can be compared to the percents scoring *Proficient* for Grade 3 Reading in 2005.
3. The *Above Proficient* standard in Mathematics was reset in 2007 to better discriminate student performance in the top reporting category. Therefore, comparisons should **not** be made between the 2006 and 2007 *Above Proficient* percents. However, comparisons may be drawn between 2006 and 2007 using each year's combined percent of students scoring *Proficient* and *Above Proficient*.

## Table 5.2.1.3.6:
## Statewide MCAS Test Results
## By Race/Ethnicity

### Hawaiian / Pacific Islander
### Percentage of Students at Each Performance Level[1]

| Grade Level and Content Area | Year | Performance Level | | | | Total Students Included |
|---|---|---|---|---|---|---|
| | | *Advanced/ Above Proficient* | *Proficient* | *Needs Improvement* | *Warning/ Failing* | |
| **GRADE 3** | | | | | | |
| **ENGLISH LANGUAGE ARTS/READING [2]** | **2007** | **14** | **48** | **32** | **6** | **165** |
| | 2006 | 24 | 33 | 33 | 9 | 54 |
| | 2005 | - | 51 | 37 | 12 | 57 |
| **MATHEMATICS [3]** | **2007** | **25** | **38** | **25** | **13** | **167** |
| | 2006 | 4 | 42 | 38 | 16 | 55 |
| **GRADE 4** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **6** | **51** | **37** | **6** | **163** |
| | 2006 | 5 | 39 | 30 | 26 | 66 |
| | 2005 | 13 | 42 | 39 | 7 | 402 |
| **MATHEMATICS** | **2007** | **18** | **34** | **37** | **11** | **161** |
| | 2006 | 11 | 20 | 44 | 26 | 66 |
| | 2005 | 9 | 24 | 54 | 13 | 403 |
| **GRADE 5** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **8** | **50** | **28** | **15** | **173** |
| | 2006 | 10 | 49 | 35 | 6 | 418 |
| **MATHEMATICS** | **2007** | **18** | **34** | **29** | **18** | **173** |
| | 2006 | 14 | 26 | 42 | 19 | 420 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | **2007** | **7** | **36** | **41** | **16** | **173** |
| | 2006 | 13 | 32 | 45 | 9 | 420 |
| | 2005 | 17 | 38 | 37 | 9 | 399 |
| **GRADE 6** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **6** | **55** | **26** | **13** | **164** |
| | 2006 | 8 | 53 | 33 | 6 | 393 |
| **MATHEMATICS** | **2007** | **16** | **28** | **32** | **24** | **164** |
| | 2006 | 18 | 34 | 28 | 19 | 401 |
| | 2005 | 16 | 34 | 32 | 18 | 405 |
| **GRADE 7** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **11** | **57** | **24** | **8** | **159** |
| | 2006 | 5 | 56 | 30 | 9 | 402 |
| | 2005 | 8 | 59 | 27 | 6 | 428 |
| **MATHEMATICS** | **2007** | **16** | **35** | **25** | **24** | **161** |
| | 2006 | 10 | 32 | 38 | 21 | 412 |

**(Table 5.2.1.3.6 continued on next page)**

## Table 5.2.1.3.6 (cont.): Statewide MCAS Test Results By Race/Ethnicity

### Hawaiian / Pacific Islander (cont.) Percentage of Students at Each Performance Level[1]

| Grade Level and Content Area | Year | Performance Level | | | | Total Students Included |
|---|---|---|---|---|---|---|
| | | *Advanced/ Above Proficient* | *Proficient* | *Needs Improvement* | *Warning/ Failing* | |
| **GRADE 8** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **11** | **74** | **13** | **1** | **141** |
| | 2006 | 12 | 63 | 17 | 8 | 425 |
| **MATHEMATICS** | **2007** | **16** | **32** | **30** | **22** | **141** |
| | 2006 | 12 | 26 | 38 | 24 | 430 |
| | 2005 | 13 | 13 | 27 | 47 | 83 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | **2007** | **1** | **23** | **60** | **17** | **141** |
| | 2006 | 6 | 34 | 44 | 17 | 431 |
| | 2005 | 2 | 25 | 30 | 42 | 83 |
| **GRADE 10** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **19** | **47** | **20** | **14** | **118** |
| | 2006 | 25 | 31 | 33 | 11 | 114 |
| | 2005 | 16 | 38 | 29 | 17 | 100 |
| **MATHEMATICS** | **2007** | **33** | **28** | **23** | **16** | **116** |
| | 2006 | 40 | 21 | 17 | 22 | 112 |
| | 2005 | 25 | 28 | 20 | 27 | 100 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.
2. To comply with NCLB, Massachusetts added the *Above Proficient* performance level for the Grade 3 Reading test in 2006. When comparing grade 3 English Language Arts student performance across years, the total percent of students scoring *Above Proficient* and *Proficient* in 2006 or 2007 can be compared to the percents scoring *Proficient* for Grade 3 Reading in 2005.
3. The *Above Proficient* standard in Mathematics was reset in 2007 to better discriminate student performance in the top reporting category. Therefore, comparisons should **not** be made between the 2006 and 2007 *Above Proficient* percents. However, comparisons may be drawn between 2006 and 2007 using each year's combined percent of students scoring *Proficient* and *Above Proficient*.

## Table 5.2.1.3.7:
## Statewide MCAS Test Results
## By Race/Ethnicity

### Multi-Race (non-Hispanic/Latino)
### Percentage of Students at Each Performance Level[1]

| Grade Level and Content Area | Year | Performance Level | | | | Total Students Included |
|---|---|---|---|---|---|---|
| | | *Advanced/ Above Proficient* | *Proficient* | *Needs Improvement* | *Warning/ Failing* | |
| **GRADE 3** | | | | | | |
| **ENGLISH LANGUAGE ARTS/READING [2]** | **2007** | **13** | **45** | **33** | **9** | **1,349** |
| | 2006 | 20 | 40 | 33 | 7 | 1,234 |
| | 2005 | - | 63 | 32 | 5 | 1,113 |
| **MATHEMATICS [3]** | **2007** | **18** | **39** | **25** | **17** | **1,352** |
| | 2006 | 5 | 48 | 31 | 16 | 1,234 |
| **GRADE 4** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **10** | **46** | **34** | **10** | **1,320** |
| | 2006 | 7 | 41 | 43 | 9 | 1,146 |
| | 2005 | 11 | 37 | 43 | 8 | 1,097 |
| **MATHEMATICS** | **2007** | **20** | **31** | **34** | **15** | **1,323** |
| | 2006 | 14 | 24 | 47 | 15 | 1,150 |
| | 2005 | 15 | 25 | 47 | 13 | 1,099 |
| **GRADE 5** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **14** | **46** | **32** | **8** | **1,196** |
| | 2006 | 16 | 44 | 32 | 8 | 1,130 |
| **MATHEMATICS** | **2007** | **20** | **29** | **32** | **19** | **1,198** |
| | 2006 | 18 | 25 | 35 | 22 | 1,135 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | **2007** | **15** | **34** | **40** | **11** | **1,199** |
| | 2006 | 18 | 31 | 41 | 10 | 1,135 |
| | 2005 | 17 | 34 | 39 | 11 | 989 |
| **GRADE 6** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **12** | **55** | **26** | **7** | **1,271** |
| | 2006 | 11 | 54 | 28 | 6 | 1,025 |
| **MATHEMATICS** | **2007** | **22** | **31** | **27** | **21** | **1,272** |
| | 2006 | 18 | 28 | 31 | 24 | 1,022 |
| | 2005 | 20 | 28 | 29 | 23 | 856 |
| **GRADE 7** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **9** | **61** | **24** | **6** | **1,099** |
| | 2006 | 12 | 53 | 26 | 8 | 888 |
| | 2005 | 12 | 56 | 26 | 6 | 873 |
| **MATHEMATICS** | **2007** | **16** | **27** | **31** | **27** | **1,104** |
| | 2006 | 16 | 24 | 32 | 28 | 890 |

**(Table 5.2.1.3.7 continued on next page)**

## Table 5.2.1.3.7 (cont.): Statewide MCAS Test Results By Race/Ethnicity

### Multi-Race (non-Hispanic/Latino) (cont.) Percentage of Students at Each Performance Level[1]

| Grade Level and Content Area | Year | Performance Level | | | | Total Students Included |
|---|---|---|---|---|---|---|
| | | *Advanced/ Above Proficient* | *Proficient* | *Needs Improvement* | *Warning/ Failing* | |
| **GRADE 8** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **14** | **61** | **19** | **6** | **994** |
| | 2006 | 13 | 63 | 18 | 6 | 899 |
| **MATHEMATICS** | **2007** | **18** | **26** | **28** | **29** | **997** |
| | 2006 | 13 | 27 | 31 | 29 | 903 |
| | 2005 | 14 | 24 | 31 | 31 | 875 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | **2007** | **5** | **27** | **42** | **26** | **995** |
| | 2006 | 4 | 27 | 43 | 25 | 901 |
| | 2005 | 4 | 26 | 43 | 27 | 874 |
| **GRADE 10** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **24** | **46** | **24** | **5** | **900** |
| | 2006 | 13 | 53 | 30 | 5 | 808 |
| | 2005 | 20 | 44 | 28 | 8 | 736 |
| **MATHEMATICS** | **2007** | **39** | **28** | **23** | **10** | **902** |
| | 2006 | 34 | 29 | 25 | 12 | 805 |
| | 2005 | 29 | 26 | 32 | 12 | 736 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.
2. To comply with NCLB, Massachusetts added the *Above Proficient* performance level for the Grade 3 Reading test in 2006. When comparing grade 3 English Language Arts student performance across years, the total percent of students scoring *Above Proficient* and *Proficient* in 2006 or 2007 can be compared to the percents scoring *Proficient* for Grade 3 Reading in 2005.
3. The *Above Proficient* standard in Mathematics was reset in 2007 to better discriminate student performance in the top reporting category. Therefore, comparisons should **not** be made between the 2006 and 2007 *Above Proficient* percents. However, comparisons may be drawn between 2006 and 2007 using each year's combined percent of students scoring *Proficient* and *Above Proficient*.

### *5.2.1.4 Percentages by Gender*

**Table 5.2.1.4.1:**
**Statewide MCAS Test Results**
**By Gender**

**Female**
**Percentage of Students at Each Performance Level[1]**

| Grade Level and Content Area | Year | Performance Level | | | | Total Students Included |
|---|---|---|---|---|---|---|
| | | *Advanced/ Above Proficient* | *Proficient* | *Needs Improvement* | *Warning/ Failing* | |
| **GRADE 3** | | | | | | |
| **ENGLISH LANGUAGE ARTS/READING [2]** | **2007** | **16** | **46** | **30** | **7** | **34,561** |
| | 2006 | 21 | 41 | 32 | 7 | 34,262 |
| | 2005 | - | 65 | 29 | 6 | 34,503 |
| **MATHEMATICS [3]** | **2007** | **18** | **42** | **25** | **16** | **34,581** |
| | 2006 | 4 | 47 | 32 | 16 | 34,298 |
| **GRADE 4** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **14** | **48** | **30** | **8** | **34,267** |
| | 2006 | 11 | 46 | 35 | 9 | 34,409 |
| | 2005 | 13 | 42 | 36 | 8 | 35,061 |
| **MATHEMATICS** | **2007** | **18** | **29** | **40** | **13** | **34,355** |
| | 2006 | 15 | 25 | 45 | 15 | 34,587 |
| | 2005 | 14 | 26 | 45 | 15 | 35,064 |
| **GRADE 5** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **19** | **48** | **26** | **7** | **34,395** |
| | 2006 | 20 | 45 | 28 | 7 | 35,183 |
| **MATHEMATICS** | **2007** | **18** | **32** | **32** | **18** | **34,465** |
| | 2006 | 16 | 26 | 35 | 23 | 35,269 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | **2007** | **14** | **35** | **38** | **12** | **34,455** |
| | 2006 | 16 | 32 | 41 | 11 | 35,254 |
| | 2005 | 15 | 34 | 39 | 12 | 35,066 |
| **GRADE 6** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **13** | **60** | **22** | **5** | **35,203** |
| | 2006 | 13 | 55 | 25 | 6 | 35,338 |
| **MATHEMATICS** | **2007** | **20** | **33** | **28** | **19** | **35,271** |
| | 2006 | 16 | 29 | 30 | 25 | 35,427 |
| | 2005 | 17 | 29 | 31 | 22 | 35,899 |

**(Table 5.2.1.4.1 continued on next page)**

## Table 5.2.1.4.1 (cont.): Statewide MCAS Test Results By Gender

### Female (cont.) Percentage of Students at Each Performance Level[1]

| Grade Level and Content Area | Year | Performance Level | | | | Total Students Included |
|---|---|---|---|---|---|---|
| | | *Advanced/ Above Proficient* | *Proficient* | *Needs Improvement* | *Warning/ Failing* | |
| **GRADE 7** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **13** | **62** | **19** | **5** | **35,437** |
| | 2006 | 14 | 57 | 22 | 7 | 35,740 |
| | 2005 | 14 | 59 | 22 | 5 | 36,868 |
| **MATHEMATICS** | **2007** | **14** | **32** | **32** | **23** | **35,435** |
| | 2006 | 12 | 28 | 34 | 27 | 35,948 |
| **GRADE 8** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **17** | **63** | **15** | **4** | **35,925** |
| | 2006 | 17 | 62 | 16 | 5 | 36,844 |
| **MATHEMATICS** | **2007** | **17** | **29** | **31** | **24** | **35,878** |
| | 2006 | 13 | 28 | 32 | 27 | 36,925 |
| | 2005 | 13 | 27 | 31 | 29 | 37,092 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | **2007** | **2** | **27** | **46** | **25** | **35,874** |
| | 2006 | 4 | 27 | 44 | 25 | 36,910 |
| | 2005 | 3 | 27 | 42 | 28 | 37,028 |
| **GRADE 10** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **28** | **48** | **20** | **4** | **35,610** |
| | 2006 | 20 | 54 | 20 | 5 | 35,948 |
| | 2005 | 28 | 42 | 22 | 8 | 35,008 |
| **MATHEMATICS** | **2007** | **42** | **28** | **22** | **8** | **35,304** |
| | 2006 | 39 | 27 | 22 | 11 | 35,901 |
| | 2005 | 35 | 27 | 25 | 14 | 35,048 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.
2. To comply with NCLB, Massachusetts added the *Above Proficient* performance level for the Grade 3 Reading test in 2006. When comparing grade 3 English Language Arts student performance across years, the total percent of students scoring *Above Proficient* and *Proficient* in 2006 or 2007 can be compared to the percents scoring *Proficient* for Grade 3 Reading in 2005.
3. The *Above Proficient* standard in Mathematics was reset in 2007 to better discriminate student performance in the top reporting category. Therefore, comparisons should **not** be made between the 2006 and 2007 *Above Proficient* percents. However, comparisons may be drawn between 2006 and 2007 using each year's combined percent of students scoring *Proficient* and *Above Proficient*.

## Table 5.2.1.4.2:
## Statewide MCAS Test Results
## By Gender

### Male
### Percentage of Students at Each Performance Level[1]

| Grade Level and Content Area | Year | Performance Level | | | | Total Students Included |
|---|---|---|---|---|---|---|
| | | *Advanced/ Above Proficient* | *Proficient* | *Needs Improvement* | *Warning/ Failing* | |
| **GRADE 3** | | | | | | |
| **ENGLISH LANGUAGE ARTS/READING [2]** | **2007** | **12** | **44** | **33** | **10** | **36,687** |
| | 2006 | 16 | 40 | 35 | 9 | 36,262 |
| | 2005 | - | 60 | 32 | 8 | 36,749 |
| **MATHEMATICS [3]** | **2007** | **20** | **40** | **24** | **16** | **36,742** |
| | 2006 | 4 | 48 | 31 | 16 | 36,329 |
| **GRADE 4** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **7** | **43** | **38** | **12** | **36,210** |
| | 2006 | 5 | 38 | 43 | 14 | 36,509 |
| | 2005 | 6 | 37 | 44 | 13 | 37,415 |
| **MATHEMATICS** | **2007** | **19** | **30** | **39** | **13** | **36,280** |
| | 2006 | 15 | 25 | 45 | 15 | 36,771 |
| | 2005 | 14 | 27 | 44 | 16 | 37,439 |
| **GRADE 5** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **11** | **48** | **31** | **11** | **36,775** |
| | 2006 | 11 | 44 | 34 | 10 | 37,398 |
| **MATHEMATICS** | **2007** | **20** | **33** | **30** | **18** | **36,851** |
| | 2006 | 17 | 26 | 33 | 23 | 37,478 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | **2007** | **14** | **38** | **36** | **12** | **36,850** |
| | 2006 | 17 | 33 | 38 | 11 | 37,466 |
| | 2005 | 16 | 35 | 37 | 12 | 37,631 |
| **GRADE 6** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **6** | **56** | **29** | **9** | **37,527** |
| | 2006 | 7 | 53 | 30 | 10 | 37,884 |
| **MATHEMATICS** | **2007** | **21** | **31** | **27** | **20** | **37,603** |
| | 2006 | 17 | 29 | 29 | 25 | 38,021 |
| | 2005 | 18 | 28 | 30 | 24 | 38,697 |

**(Table 5.2.1.4.2 continued on next page)**

## Table 5.2.1.4.2 (cont.):
## 2005–2007 Statewide MCAS Test Results
## By Gender

### Male (cont.)
### Percentage of Students at Each Performance Level[1]

| Grade Level and Content Area | Year | Performance Level | | | | Total Students Included |
|---|---|---|---|---|---|---|
| | | *Advanced/ Above Proficient* | *Proficient* | *Needs Improvement* | *Warning/ Failing* | |
| **GRADE 7** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **6** | **58** | **27** | **10** | **38,102** |
| | 2006 | 7 | 53 | 29 | 12 | 38,326 |
| | 2005 | 6 | 54 | 31 | 9 | 39,414 |
| **MATHEMATICS** | **2007** | **15** | **30** | **29** | **26** | **38,122** |
| | 2006 | 13 | 27 | 32 | 28 | 38,649 |
| **GRADE 8** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **8** | **63** | **21** | **8** | **38,449** |
| | 2006 | 8 | 62 | 21 | 9 | 39,161 |
| **MATHEMATICS** | **2007** | **17** | **27** | **29** | **26** | **38,397** |
| | 2006 | 12 | 27 | 30 | 30 | 39,303 |
| | 2005 | 13 | 25 | 30 | 32 | 39,706 |
| **SCIENCE AND TECHNOLOGY/ENGINEERING** | **2007** | **3** | **32** | **42** | **23** | **38,348** |
| | 2006 | 4 | 29 | 42 | 26 | 39,288 |
| | 2005 | 4 | 31 | 40 | 25 | 39,637 |
| **GRADE 10** | | | | | | |
| **ENGLISH LANGUAGE ARTS** | **2007** | **16** | **50** | **27** | **7** | **36,781** |
| | 2006 | 11 | 53 | 28 | 8 | 36,812 |
| | 2005 | 18 | 42 | 28 | 12 | 35,616 |
| **MATHEMATICS** | **2007** | **42** | **27** | **21** | **10** | **36,360** |
| | 2006 | 40 | 26 | 20 | 13 | 36,846 |
| | 2005 | 36 | 27 | 22 | 15 | 35,671 |

1. Percentages may not total 100 due to rounding. For the purpose of computing school, district, and state results, students who were absent with or without a medically documented excuse from any subject area MCAS test were not included in performance results but were counted as non-participants for that subject area.
2. To comply with NCLB, Massachusetts added the *Above Proficient* performance level for the Grade 3 Reading test in 2006. When comparing grade 3 English Language Arts student performance across years, the total percent of students scoring *Above Proficient* and *Proficient* in 2006 or 2007 can be compared to the percents scoring *Proficient* for Grade 3 Reading in 2005.
3. The *Above Proficient* standard in Mathematics was reset in 2007 to better discriminate student performance in the top reporting category. Therefore, comparisons should **not** be made between the 2006 and 2007 *Above Proficient* percents. However, comparisons may be drawn between 2006 and 2007 using each year's combined percent of students scoring *Proficient* and *Above Proficient*.

## 5.2.2 MCAS-Alt Performance Level Results

Tables 5.2.2.1 through 5.2.2.8 show MCAS-Alt performance level results for the year 2007 for each grade.

**Table 5.2.2.1: 2007 MCAS-Alt**
**Performance Level Results**
**Grade 3 English Language Arts and Mathematics**

| Performance Level Results | | | | |
|---|---|---|---|---|
| **Performance Level** | **Content Area** | | | |
| | English Language Arts | | Mathematics | |
| | **Number** | **Percent*** | **Number** | **Percent*** |
| Incomplete | 135 | 12.77 | 109 | 10.45 |
| Awareness | 7 | .66 | 19 | 1.82 |
| Emerging | 58 | 5.49 | 45 | 4.31 |
| Progressing | 856 | 80.98 | 869 | 83.32 |
| Needs Improvement | 1 | .09 | 1 | .10 |
| Proficient | 0 | .00 | 0 | .00 |
| Above Proficient | 0 | .00 | 0 | .00 |
| **Total** | **1057** | | **1043** | |

*Percentages may not total 100 due to rounding.

**Table 5.2.2.2: 2007 MCAS-Alt**
**Performance Level Results**
**Grade 4 English Language Arts and Mathematics**

| Performance Level Results | | | | |
|---|---|---|---|---|
| **Performance Level** | **Content Area** | | | |
| | English Language Arts | | Mathematics | |
| | **Number** | **Percent*** | **Number** | **Percent*** |
| Incomplete | 0 | .00 | 96 | 8.09 |
| Awareness | 7 | .62 | 14 | 1.18 |
| Emerging | 113 | 9.98 | 51 | 4.30 |
| Progressing | 915 | 80.83 | 1024 | 86.34 |
| Needs Improvement | 0 | .00 | 1 | .08 |
| Proficient | 0 | .00 | 0 | .00 |
| Advanced | 0 | .00 | 0 | .00 |
| **Total** | **1132** | | **1186** | |

*Percentages may not total 100 due to rounding.

**Table 5.2.2.3: 2007 MCAS-Alt**
**Performance Level Results**
**Grade 5 English Language Arts, Mathematics, and Science and Technology/Engineering**

| Performance Level Results | | | | | | |
|---|---|---|---|---|---|---|
| **Performance Level** | **Content Area** | | | | | |
| | English Language Arts | | Mathematics | | Science and Technology/Engineering | |
| | **Number** | **Percent*** | **Number** | **Percent*** | **Number** | **Percent*** |
| Incomplete | 167 | 14.26 | 173 | 14.13 | 105 | 9.56 |
| Awareness | 10 | .85 | 20 | 1.63 | 5 | .46 |
| Emerging | 56 | 4.78 | 52 | 4.25 | 116 | 10.56 |
| Progressing | 938 | 80.10 | 978 | 79.90 | 872 | 79.42 |
| Needs Improvement | 0 | .00 | 1 | .08 | 0 | .00 |
| Proficient | 0 | .00 | 0 | .00 | 0 | .00 |
| Advanced | 0 | .00 | 0 | .00 | 0 | .00 |
| **Total** | **1171** | | **1224** | | **1098** | |

*Percentages may not total 100 due to rounding.

## Table 5.2.2.4: 2007 MCAS-Alt
## Performance Level Results
## Grade 6 English Language Arts and Mathematics

| Performance Level Results | | | | |
|---|---|---|---|---|
| **Performance Level** | **Content Area** | | | |
| | English Language Arts | | Mathematics | |
| | **Number** | **Percent*** | **Number** | **Percent*** |
| Incomplete | 142 | 13.17 | 196 | 17.35 |
| Awareness | 15 | 1.39 | 20 | 1.77 |
| Emerging | 56 | 5.19 | 53 | 4.69 |
| Progressing | 862 | 79.96 | 858 | 75.93 |
| Needs Improvement | 3 | .28 | 3 | .27 |
| Proficient | 0 | .00 | 0 | .00 |
| Advanced | 0 | .00 | 0 | .00 |
| **Total** | **1078** | | **1130** | |

*Percentages may not total 100 due to rounding.

## Table 5.2.2.5: 2007 MCAS-Alt
## Performance Level Results
## Grade 7 English Language Arts and Mathematics

| Performance Level Results | | | | |
|---|---|---|---|---|
| **Performance Level** | **Content Area** | | | |
| | English Language Arts | | Mathematics | |
| | **Number** | **Percent*** | **Number** | **Percent*** |
| Incomplete | 116 | 11.47 | 174 | 16.11 |
| Awareness | 9 | .89 | 20 | 1.85 |
| Emerging | 123 | 12.17 | 59 | 5.46 |
| Progressing | 761 | 75.27 | 823 | 76.20 |
| Needs Improvement | 2 | .20 | 4 | .37 |
| Proficient | 0 | .00 | 0 | .00 |
| Advanced | 0 | .00 | 0 | .00 |
| **Total** | **1011** | | **1080** | |

*Percentages may not total 100 due to rounding.

## Table 5.2.2.6: 2007 MCAS-Alt
## Performance Level Results
## Grade 8 English Language Arts, Mathematics, and Science and Technology/Engineering

| Performance Level Results | | | | | | |
|---|---|---|---|---|---|---|
| **Performance Level** | **Content Area** | | | | | |
| | English Language Arts | | Mathematics | | Science and Technology/Engineering | |
| | **Number** | **Percent*** | **Number** | **Percent*** | **Number** | **Percent*** |
| Incomplete | 146 | 15.35 | 156 | 15.37 | 112 | 11.70 |
| Awareness | 12 | 1.26 | 6 | .59 | 6 | .63 |
| Emerging | 39 | 4.10 | 43 | 4.24 | 104 | 10.87 |
| Progressing | 751 | 78.97 | 808 | 79.61 | 734 | 76.70 |
| Needs Improvement | 3 | .32 | 2 | .20 | 1 | .10 |
| Proficient | 0 | .00 | 0 | .00 | 0 | .00 |
| Advanced | 0 | .00 | 0 | .00 | 0 | .00 |
| **Total** | **951** | | **1015** | | **957** | |

*Percentages may not total 100 due to rounding.

## Table 5.2.2.7: 2007 MCAS-Alt
## Performance Level Results
## High School (Grades 9/10) Science and Technology/Engineering

| Performance Level Results | | |
|---|---|---|
| **Performance Level** | **Content Area** | |
| | Science and Technology/Engineering | |
| | **Number** | **Percent*** |
| Incomplete | 153 | 21.19 |
| Awareness | 13 | 1.80 |
| Emerging | 93 | 12.88 |
| Progressing | 463 | 64.13 |
| Needs Improvement | 0 | .00 |
| Proficient | 0 | .00 |
| Advanced | 0 | .00 |
| **Total** | **722** | |

*Percentages may not total 100 due to rounding.

## Table 5.2.2.8: 2007 MCAS-Alt
## Performance Level Results
## Grade 10 English Language Arts and Mathematics

| Performance Level Results | | | | |
|---|---|---|---|---|
| **Performance Level** | **Content Area** | | | |
| | English Language Arts | | Mathematics | |
| | **Number** | **Percent*** | **Number** | **Percent*** |
| Incomplete | 91 | 12.18 | 100 | 13.19 |
| Awareness | 11 | 1.47 | 16 | 2.11 |
| Emerging | 125 | 16.73 | 110 | 14.51 |
| Progressing | 519 | 69.48 | 532 | 70.18 |
| Needs Improvement | 1 | .13 | 0 | .00 |
| Proficient | 0 | .00 | 0 | .00 |
| Advanced | 0 | .00 | 0 | .00 |
| **Total** | **747** | | **758** | |

*Percentages may not total 100 due to rounding.

## 5.3 Standard MCAS Test Scaled-Score Distributions

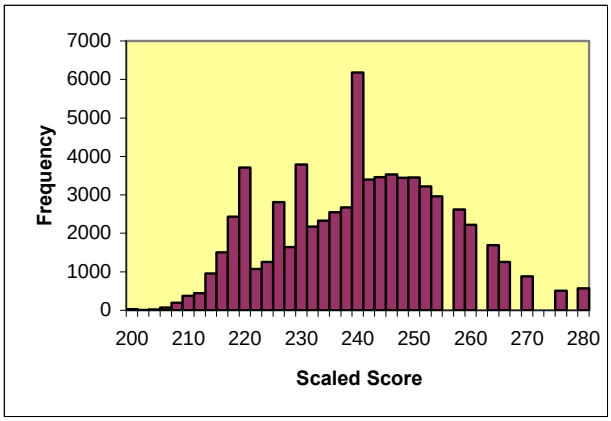
Tables 5.3.1 through 5.3.18 and figures 5.3.A through 5.3.JJ show the 2007 scaled-score distributions for each grade and content area combination. No scaled scores were calculated for grade 3 test results or for test results of first-year LEP students in any grade. Analyses were conducted only on students who attempted all sessions and who were not coded as "not tested."

In some cases, two or more low score points map onto the same scaled score, while in other cases, no raw scores map onto a scaled score. This explains why scaled score distributions contain spikes and gaps that are not evident in raw score distributions.

**Table 5.3.1:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 4 English Language Arts**

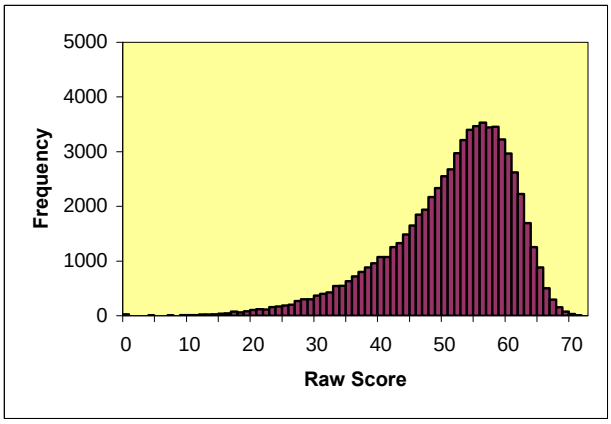
| Score | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 200 | 30 | 0.04 | 0.04 |
| 202 | 7 | 0.01 | 0.05 |
| 204 | 23 | 0.03 | 0.09 |
| 206 | 69 | 0.10 | 0.19 |
| 208 | 192 | 0.28 | 0.46 |
| 210 | 371 | 0.53 | 1.00 |
| 212 | 447 | 0.64 | 1.64 |
| 214 | 961 | 1.38 | 3.02 |
| 216 | 1502 | 2.16 | 5.19 |
| 218 | 2434 | 3.50 | 8.69 |
| 220 | 3709 | 5.34 | 14.03 |
| 222 | 1075 | 1.55 | 15.58 |
| 224 | 1255 | 1.81 | 17.38 |
| 226 | 2811 | 4.05 | 21.43 |
| 228 | 1648 | 2.37 | 23.80 |
| 230 | 3785 | 5.45 | 29.25 |
| 232 | 2172 | 3.13 | 32.38 |
| 234 | 2334 | 3.36 | 35.74 |
| 236 | 2548 | 3.67 | 39.41 |
| 238 | 2674 | 3.85 | 43.26 |
| 240 | 6183 | 8.90 | 52.16 |
| 242 | 3400 | 4.90 | 57.06 |
| 244 | 3464 | 4.99 | 62.04 |
| 246 | 3530 | 5.08 | 67.13 |
| 248 | 3442 | 4.96 | 72.08 |
| 250 | 3453 | 4.97 | 77.05 |
| 252 | 3222 | 4.64 | 81.69 |
| 254 | 2966 | 4.27 | 85.96 |
| 256 | 0 | 0.00 | 85.96 |
| 258 | 2621 | 3.77 | 89.73 |
| 260 | 2224 | 3.20 | 92.94 |
| 262 | 0 | 0.00 | 92.94 |
| 264 | 1695 | 2.44 | 95.38 |
| 266 | 1256 | 1.81 | 97.19 |
| 268 | 0 | 0.00 | 97.19 |
| 270 | 883 | 1.27 | 98.46 |
| 272 | 0 | 0.00 | 98.46 |
| 274 | 0 | 0.00 | 98.46 |
| 276 | 504 | 0.73 | 99.18 |
| 278 | 0 | 0.00 | 99.18 |
| 280 | 568 | 0.82 | 100.00 |

**Figure 5.3.A:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 4 English Language Arts**




| | |
|---|---|
| N | 69,458 |
| Mean | 240.14 |
| Std. Deviation | 14.73 |
| Skewness | 0.10 |
| Kurtosis | -0.40 |

**Figure 5.3.B:**
**2007 MCAS**
**Raw Score Distribution**
**Grade 4 English Language Arts**

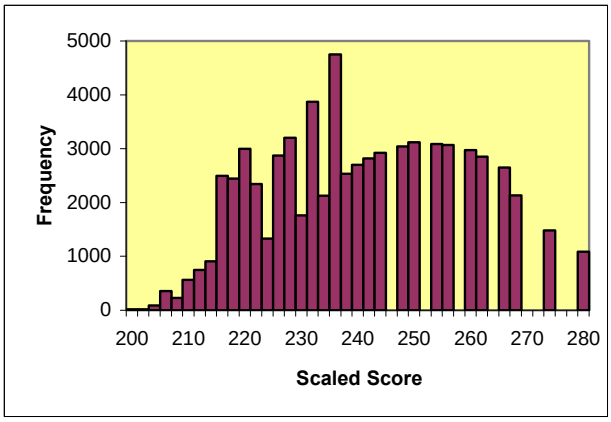



| | |
|---|---|
| N | 69,458 |
| Mean | 51.08 |
| Std. Deviation | 9.68 |
| Skewness | -1.04 |
| Kurtosis | 1.28 |

**Table 5.3.2:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 4 Mathematics**

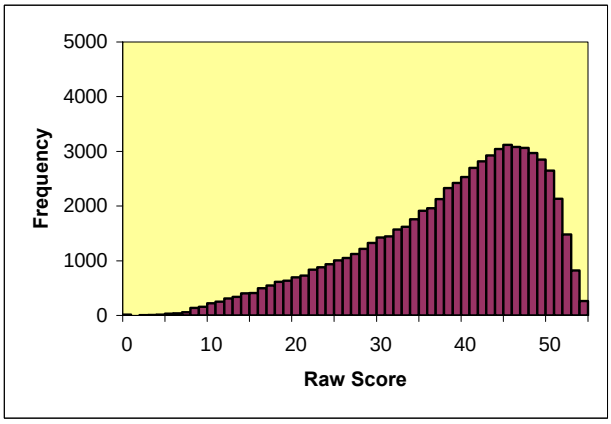
| Score | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 200 | 19 | 0.03 | 0.03 |
| 202 | 14 | 0.02 | 0.05 |
| 204 | 90 | 0.13 | 0.18 |
| 206 | 359 | 0.52 | 0.69 |
| 208 | 226 | 0.32 | 1.02 |
| 210 | 564 | 0.81 | 1.83 |
| 212 | 746 | 1.07 | 2.90 |
| 214 | 910 | 1.31 | 4.21 |
| 216 | 2496 | 3.59 | 7.80 |
| 218 | 2445 | 3.51 | 11.31 |
| 220 | 2995 | 4.30 | 15.61 |
| 222 | 2345 | 3.37 | 18.99 |
| 224 | 1328 | 1.91 | 20.89 |
| 226 | 2873 | 4.13 | 25.02 |
| 228 | 3200 | 4.60 | 29.62 |
| 230 | 1760 | 2.53 | 32.15 |
| 232 | 3871 | 5.56 | 37.72 |
| 234 | 2127 | 3.06 | 40.77 |
| 236 | 4750 | 6.83 | 47.60 |
| 238 | 2535 | 3.64 | 51.24 |
| 240 | 2700 | 3.88 | 55.12 |
| 242 | 2817 | 4.05 | 59.17 |
| 244 | 2925 | 4.20 | 63.38 |
| 246 | 0 | 0.00 | 63.38 |
| 248 | 3042 | 4.37 | 67.75 |
| 250 | 3119 | 4.48 | 72.23 |
| 252 | 0 | 0.00 | 72.23 |
| 254 | 3083 | 4.43 | 76.66 |
| 256 | 3067 | 4.41 | 81.07 |
| 258 | 0 | 0.00 | 81.07 |
| 260 | 2971 | 4.27 | 85.34 |
| 262 | 2849 | 4.09 | 89.44 |
| 264 | 0 | 0.00 | 89.44 |
| 266 | 2648 | 3.81 | 93.24 |
| 268 | 2135 | 3.07 | 96.31 |
| 270 | 0 | 0.00 | 96.31 |
| 272 | 0 | 0.00 | 96.31 |
| 274 | 1481 | 2.13 | 98.44 |
| 276 | 0 | 0.00 | 98.44 |
| 278 | 0 | 0.00 | 98.44 |
| 280 | 1085 | 1.56 | 100.00 |

**Figure 5.3.C:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 4 Mathematics**




| | |
|---|---|
| N | 69,575 |
| Mean | 240.33 |
| Std. Deviation | 17.16 |
| Skewness | 0.24 |
| Kurtosis | -0.78 |

**Figure 5.3.D:**
**2007 MCAS**
**Raw Score Distribution**
**Grade 4 Mathematics**

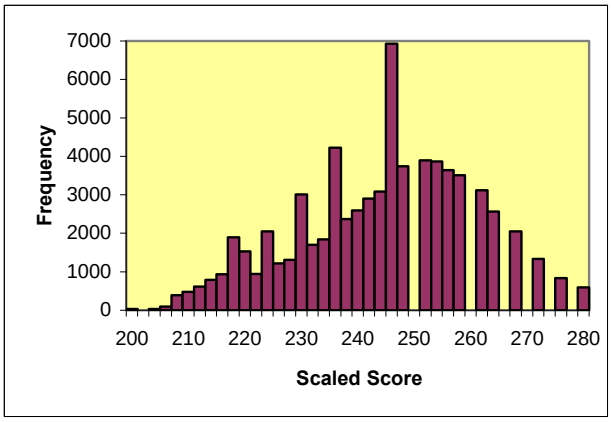



| | |
|---|---|
| N | 69,575 |
| Mean | 37.95 |
| Std. Deviation | 10.37 |
| Skewness | -0.78 |
| Kurtosis | -0.07 |

**Table 5.3.3:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 5 English Language Arts**

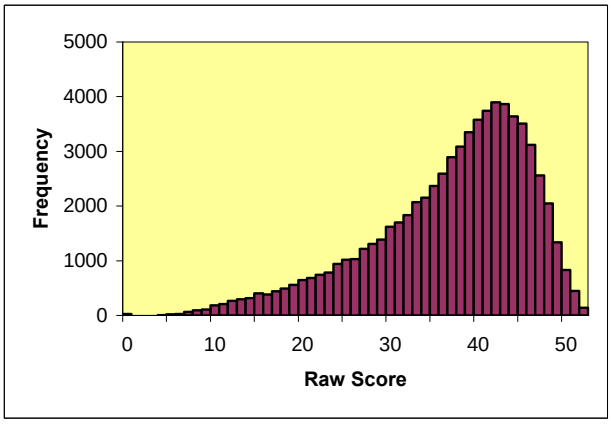
| Score | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 200 | 30 | 0.04 | 0.04 |
| 202 | 2 | 0.00 | 0.05 |
| 204 | 31 | 0.04 | 0.09 |
| 206 | 91 | 0.13 | 0.22 |
| 208 | 391 | 0.56 | 0.78 |
| 210 | 475 | 0.68 | 1.46 |
| 212 | 618 | 0.88 | 2.34 |
| 214 | 786 | 1.12 | 3.46 |
| 216 | 935 | 1.33 | 4.79 |
| 218 | 1891 | 2.70 | 7.49 |
| 220 | 1531 | 2.18 | 9.67 |
| 222 | 944 | 1.35 | 11.02 |
| 224 | 2054 | 2.93 | 13.95 |
| 226 | 1215 | 1.73 | 15.68 |
| 228 | 1310 | 1.87 | 17.55 |
| 230 | 3009 | 4.29 | 21.84 |
| 232 | 1698 | 2.42 | 24.27 |
| 234 | 1838 | 2.62 | 26.89 |
| 236 | 4227 | 6.03 | 32.92 |
| 238 | 2370 | 3.38 | 36.30 |
| 240 | 2595 | 3.70 | 40.00 |
| 242 | 2897 | 4.13 | 44.13 |
| 244 | 3087 | 4.40 | 48.54 |
| 246 | 6929 | 9.88 | 58.42 |
| 248 | 3742 | 5.34 | 63.76 |
| 250 | 0 | 0.00 | 63.76 |
| 252 | 3896 | 5.56 | 69.32 |
| 254 | 3866 | 5.52 | 74.83 |
| 256 | 3641 | 5.19 | 80.03 |
| 258 | 3508 | 5.00 | 85.03 |
| 260 | 0 | 0.00 | 85.03 |
| 262 | 3117 | 4.45 | 89.48 |
| 264 | 2563 | 3.66 | 93.14 |
| 266 | 0 | 0.00 | 93.14 |
| 268 | 2050 | 2.92 | 96.06 |
| 270 | 0 | 0.00 | 96.06 |
| 272 | 1335 | 1.90 | 97.96 |
| 274 | 0 | 0.00 | 97.96 |
| 276 | 835 | 1.19 | 99.16 |
| 278 | 0 | 0.00 | 99.16 |
| 280 | 592 | 0.84 | 100.00 |

**Figure 5.3.E:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 5 English Language Arts**




| | |
|---|---|
| N | 70,099 |
| Mean | 243.88 |
| Std. Deviation | 15.47 |
| Skewness | -0.15 |
| Kurtosis | -0.46 |

**Figure 5.3.F:**
**2007 MCAS**
**Raw Score Distribution**
**Grade 5 English Language Arts**

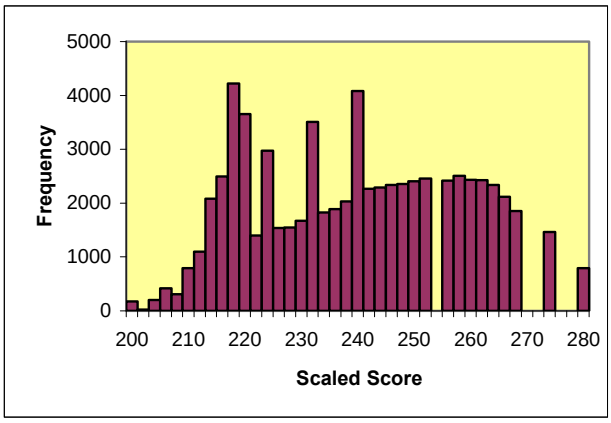



| | |
|---|---|
| N | 70,099 |
| Mean | 36.83 |
| Std. Deviation | 8.98 |
| Skewness | -0.92 |
| Kurtosis | 0.44 |

**Table 5.3.4:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 5 Mathematics**

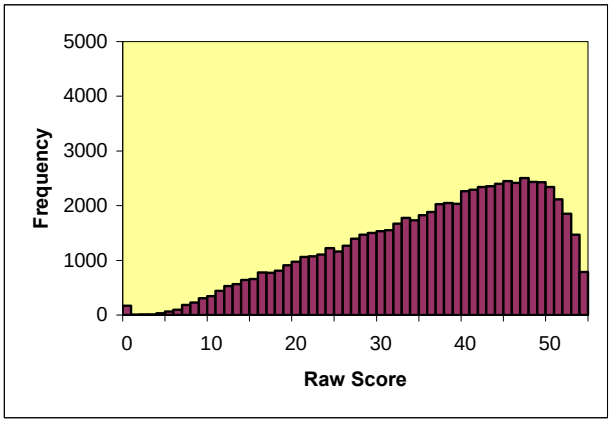
| Score | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 200 | 174 | 0.25 | 0.25 |
| 202 | 21 | 0.03 | 0.28 |
| 204 | 200 | 0.28 | 0.56 |
| 206 | 418 | 0.59 | 1.16 |
| 208 | 308 | 0.44 | 1.59 |
| 210 | 789 | 1.12 | 2.71 |
| 212 | 1099 | 1.56 | 4.28 |
| 214 | 2084 | 2.96 | 7.24 |
| 216 | 2494 | 3.54 | 10.78 |
| 218 | 4223 | 6.00 | 16.78 |
| 220 | 3650 | 5.19 | 21.97 |
| 222 | 1396 | 1.98 | 23.95 |
| 224 | 2973 | 4.22 | 28.17 |
| 226 | 1534 | 2.18 | 30.35 |
| 228 | 1550 | 2.20 | 32.56 |
| 230 | 1670 | 2.37 | 34.93 |
| 232 | 3509 | 4.99 | 39.92 |
| 234 | 1826 | 2.59 | 42.51 |
| 236 | 1888 | 2.68 | 45.19 |
| 238 | 2030 | 2.88 | 48.08 |
| 240 | 4082 | 5.80 | 53.88 |
| 242 | 2266 | 3.22 | 57.10 |
| 244 | 2291 | 3.26 | 60.35 |
| 246 | 2339 | 3.32 | 63.68 |
| 248 | 2358 | 3.35 | 67.03 |
| 250 | 2403 | 3.41 | 70.44 |
| 252 | 2453 | 3.49 | 73.93 |
| 254 | 0 | 0.00 | 73.93 |
| 256 | 2419 | 3.44 | 77.36 |
| 258 | 2505 | 3.56 | 80.92 |
| 260 | 2433 | 3.46 | 84.38 |
| 262 | 2426 | 3.45 | 87.83 |
| 264 | 2340 | 3.32 | 91.15 |
| 266 | 2118 | 3.01 | 94.16 |
| 268 | 1852 | 2.63 | 96.79 |
| 270 | 0 | 0.00 | 96.79 |
| 272 | 0 | 0.00 | 96.79 |
| 274 | 1467 | 2.08 | 98.88 |
| 276 | 0 | 0.00 | 98.88 |
| 278 | 0 | 0.00 | 98.88 |
| 280 | 791 | 1.12 | 100.00 |

**Figure 5.3.G:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 5 Mathematics**




| | |
|---|---|
| N | 70,379 |
| Mean | 239.67 |
| Std. Deviation | 18.14 |
| Skewness | 0.12 |
| Kurtosis | -1.00 |

**Figure 5.3.H:**
**2007 MCAS**
**Raw Score Distribution**
**Grade 5 Mathematics**

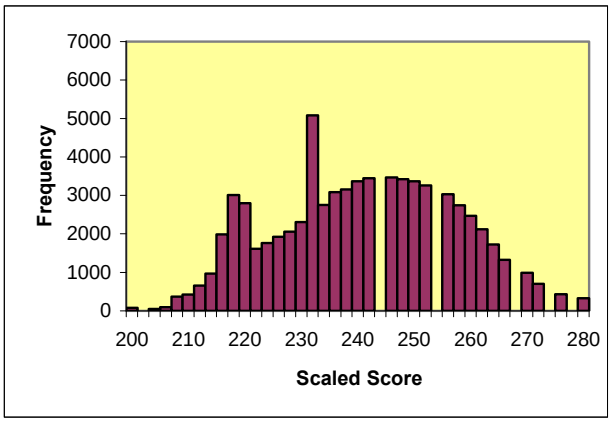



| | |
|---|---|
| N | 70,379 |
| Mean | 36.18 |
| Std. Deviation | 11.72 |
| Skewness | -0.57 |
| Kurtosis | -0.50 |

**Table 5.3.5:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 5 Science & Tech/Engineering**

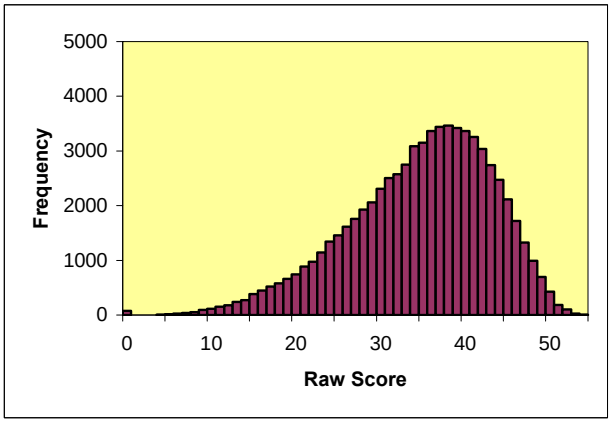
| Score | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 200 | 78 | 0.11 | 0.11 |
| 202 | 3 | 0.00 | 0.12 |
| 204 | 48 | 0.07 | 0.18 |
| 206 | 96 | 0.14 | 0.32 |
| 208 | 367 | 0.52 | 0.84 |
| 210 | 422 | 0.60 | 1.44 |
| 212 | 655 | 0.93 | 2.37 |
| 214 | 969 | 1.38 | 3.75 |
| 216 | 1989 | 2.83 | 6.58 |
| 218 | 3011 | 4.28 | 10.85 |
| 220 | 2799 | 3.98 | 14.83 |
| 222 | 1616 | 2.30 | 17.13 |
| 224 | 1762 | 2.50 | 19.63 |
| 226 | 1929 | 2.74 | 22.37 |
| 228 | 2059 | 2.93 | 25.30 |
| 230 | 2310 | 3.28 | 28.58 |
| 232 | 5082 | 7.22 | 35.81 |
| 234 | 2752 | 3.91 | 39.72 |
| 236 | 3084 | 4.38 | 44.10 |
| 238 | 3154 | 4.48 | 48.58 |
| 240 | 3368 | 4.79 | 53.37 |
| 242 | 3445 | 4.90 | 58.26 |
| 244 | 0 | 0.00 | 58.26 |
| 246 | 3465 | 4.92 | 63.19 |
| 248 | 3422 | 4.86 | 68.05 |
| 250 | 3366 | 4.78 | 72.83 |
| 252 | 3256 | 4.63 | 77.46 |
| 254 | 0 | 0.00 | 77.46 |
| 256 | 3036 | 4.31 | 81.78 |
| 258 | 2743 | 3.90 | 85.67 |
| 260 | 2474 | 3.52 | 89.19 |
| 262 | 2118 | 3.01 | 92.20 |
| 264 | 1720 | 2.44 | 94.64 |
| 266 | 1328 | 1.89 | 96.53 |
| 268 | 0 | 0.00 | 96.53 |
| 270 | 990 | 1.41 | 97.94 |
| 272 | 698 | 0.99 | 98.93 |
| 274 | 0 | 0.00 | 98.93 |
| 276 | 429 | 0.61 | 99.54 |
| 278 | 0 | 0.00 | 99.54 |
| 280 | 324 | 0.46 | 100.00 |

**Figure 5.3.I:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 5 Science & Tech/Engineering**




| | |
|---|---|
| N | 70,367 |
| Mean | 240.34 |
| Std. Deviation | 15.87 |
| Skewness | 0.08 |
| Kurtosis | -0.77 |

**Figure 5.3.J:**
**2007 MCAS**
**Raw Score Distribution**
**Grade 5 Science & Tech/Engineering**

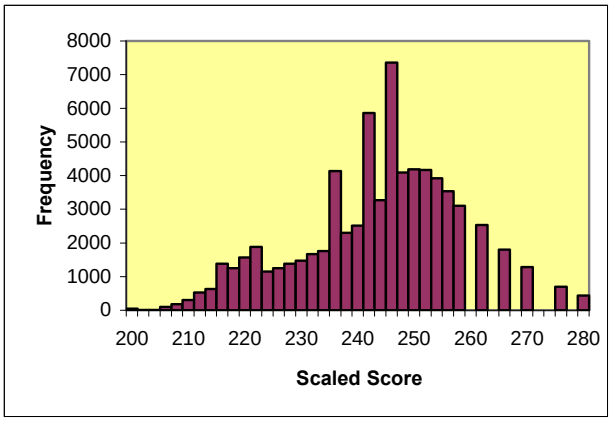



| | |
|---|---|
| N | 70,367 |
| Mean | 34.68 |
| Std. Deviation | 8.47 |
| Skewness | -0.61 |
| Kurtosis | 0.17 |

**Table 5.3.6:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 6 English Language Arts**

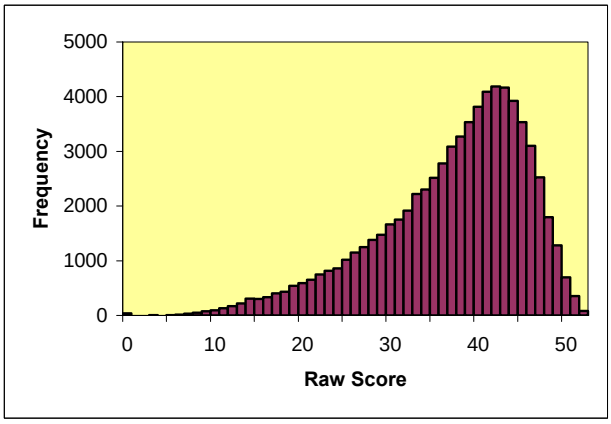
| Score | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 200 | 41 | 0.06 | 0.06 |
| 202 | 6 | 0.01 | 0.07 |
| 204 | 7 | 0.01 | 0.08 |
| 206 | 95 | 0.13 | 0.21 |
| 208 | 174 | 0.24 | 0.45 |
| 210 | 304 | 0.42 | 0.87 |
| 212 | 526 | 0.73 | 1.61 |
| 214 | 636 | 0.89 | 2.49 |
| 216 | 1381 | 1.93 | 4.42 |
| 218 | 1248 | 1.74 | 6.16 |
| 220 | 1572 | 2.19 | 8.35 |
| 222 | 1880 | 2.62 | 10.97 |
| 224 | 1152 | 1.61 | 12.58 |
| 226 | 1250 | 1.74 | 14.32 |
| 228 | 1382 | 1.93 | 16.25 |
| 230 | 1473 | 2.05 | 18.30 |
| 232 | 1665 | 2.32 | 20.62 |
| 234 | 1754 | 2.45 | 23.06 |
| 236 | 4135 | 5.76 | 28.83 |
| 238 | 2300 | 3.21 | 32.04 |
| 240 | 2514 | 3.50 | 35.54 |
| 242 | 5866 | 8.18 | 43.72 |
| 244 | 3273 | 4.56 | 48.28 |
| 246 | 7355 | 10.25 | 58.53 |
| 248 | 4089 | 5.70 | 64.23 |
| 250 | 4188 | 5.84 | 70.07 |
| 252 | 4167 | 5.81 | 75.88 |
| 254 | 3924 | 5.47 | 81.35 |
| 256 | 3535 | 4.93 | 86.28 |
| 258 | 3102 | 4.32 | 90.60 |
| 260 | 0 | 0.00 | 90.60 |
| 262 | 2528 | 3.52 | 94.12 |
| 264 | 0 | 0.00 | 94.12 |
| 266 | 1798 | 2.51 | 96.63 |
| 268 | 0 | 0.00 | 96.63 |
| 270 | 1284 | 1.79 | 98.42 |
| 272 | 0 | 0.00 | 98.42 |
| 274 | 0 | 0.00 | 98.42 |
| 276 | 694 | 0.97 | 99.39 |
| 278 | 0 | 0.00 | 99.39 |
| 280 | 439 | 0.61 | 100.00 |

**Figure 5.3.K:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 6 English Language Arts**




| | |
|---|---|
| N | 71,737 |
| Mean | 243.55 |
| Std. Deviation | 13.89 |
| Skewness | -0.27 |
| Kurtosis | -0.02 |

**Figure 5.3.L:**
**2007 MCAS**
**Raw Score Distribution**
**Grade 6 English Language Arts**

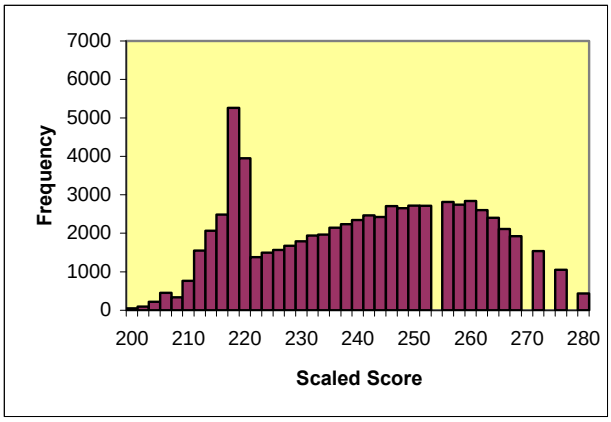



| | |
|---|---|
| N | 71,737 |
| Mean | 37.04 |
| Std. Deviation | 8.48 |
| Skewness | -0.90 |
| Kurtosis | 0.51 |

**Table 5.3.7:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 6 Mathematics**

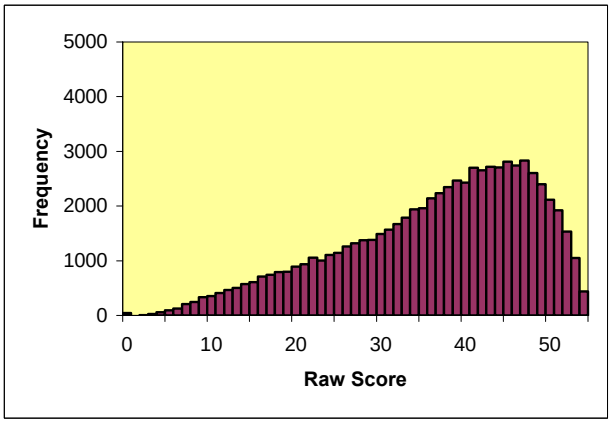
| Score | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 200 | 48 | 0.07 | 0.07 |
| 202 | 96 | 0.13 | 0.20 |
| 204 | 218 | 0.30 | 0.50 |
| 206 | 450 | 0.63 | 1.13 |
| 208 | 337 | 0.47 | 1.60 |
| 210 | 767 | 1.07 | 2.66 |
| 212 | 1548 | 2.15 | 4.82 |
| 214 | 2064 | 2.87 | 7.69 |
| 216 | 2489 | 3.46 | 11.15 |
| 218 | 5258 | 7.31 | 18.46 |
| 220 | 3954 | 5.50 | 23.96 |
| 222 | 1380 | 1.92 | 25.88 |
| 224 | 1493 | 2.08 | 27.96 |
| 226 | 1569 | 2.18 | 30.14 |
| 228 | 1673 | 2.33 | 32.47 |
| 230 | 1789 | 2.49 | 34.96 |
| 232 | 1939 | 2.70 | 37.65 |
| 234 | 1965 | 2.73 | 40.39 |
| 236 | 2143 | 2.98 | 43.37 |
| 238 | 2239 | 3.11 | 46.48 |
| 240 | 2345 | 3.26 | 49.74 |
| 242 | 2465 | 3.43 | 53.17 |
| 244 | 2426 | 3.37 | 56.54 |
| 246 | 2703 | 3.76 | 60.30 |
| 248 | 2654 | 3.69 | 63.99 |
| 250 | 2718 | 3.78 | 67.77 |
| 252 | 2711 | 3.77 | 71.55 |
| 254 | 0 | 0.00 | 71.55 |
| 256 | 2811 | 3.91 | 75.45 |
| 258 | 2743 | 3.82 | 79.27 |
| 260 | 2834 | 3.94 | 83.21 |
| 262 | 2603 | 3.62 | 86.83 |
| 264 | 2402 | 3.34 | 90.17 |
| 266 | 2116 | 2.94 | 93.12 |
| 268 | 1922 | 2.67 | 95.79 |
| 270 | 0 | 0.00 | 95.79 |
| 272 | 1536 | 2.14 | 97.92 |
| 274 | 0 | 0.00 | 97.92 |
| 276 | 1054 | 1.47 | 99.39 |
| 278 | 0 | 0.00 | 99.39 |
| 280 | 438 | 0.61 | 100.00 |

**Figure 5.3.M:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 6 Mathematics**




| | |
|---|---|
| N | 71,900 |
| Mean | 240.39 |
| Std. Deviation | 18.63 |
| Skewness | 0.03 |
| Kurtosis | -1.12 |

**Figure 5.3.N:**
**2007 MCAS**
**Raw Score Distribution**
**Grade 6 Mathematics**

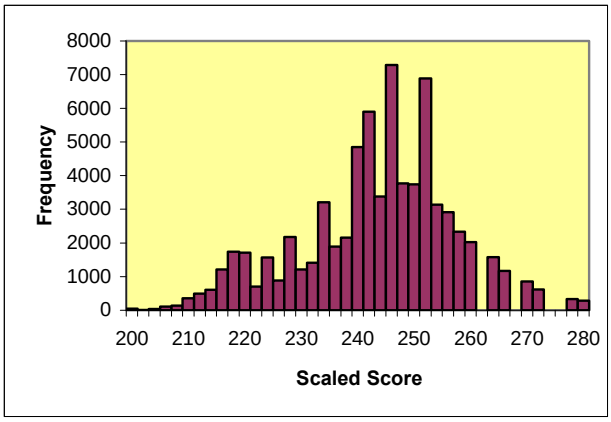



| | |
|---|---|
| N | 71,900 |
| Mean | 36.42 |
| Std. Deviation | 11.24 |
| Skewness | -0.66 |
| Kurtosis | -0.32 |

**Table 5.3.8:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 7 English Language Arts**

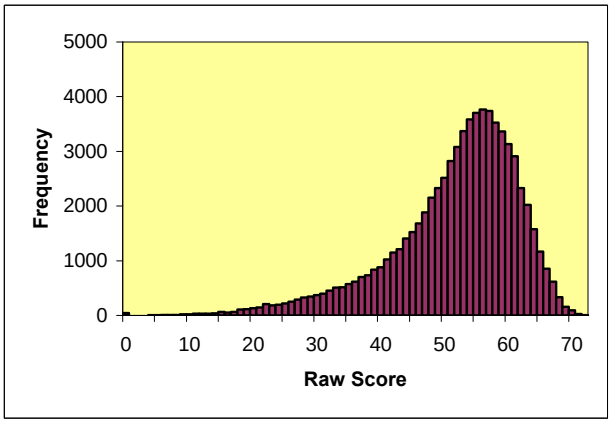
| Score | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 200 | 47 | 0.06 | 0.06 |
| 202 | 10 | 0.01 | 0.08 |
| 204 | 33 | 0.05 | 0.12 |
| 206 | 109 | 0.15 | 0.27 |
| 208 | 135 | 0.19 | 0.46 |
| 210 | 353 | 0.49 | 0.95 |
| 212 | 490 | 0.67 | 1.62 |
| 214 | 607 | 0.84 | 2.45 |
| 216 | 1214 | 1.67 | 4.12 |
| 218 | 1736 | 2.39 | 6.51 |
| 220 | 1713 | 2.36 | 8.87 |
| 222 | 701 | 0.96 | 9.83 |
| 224 | 1572 | 2.16 | 12.00 |
| 226 | 884 | 1.22 | 13.21 |
| 228 | 2175 | 2.99 | 16.20 |
| 230 | 1212 | 1.67 | 17.87 |
| 232 | 1410 | 1.94 | 19.81 |
| 234 | 3207 | 4.41 | 24.22 |
| 236 | 1886 | 2.59 | 26.82 |
| 238 | 2155 | 2.96 | 29.78 |
| 240 | 4844 | 6.66 | 36.45 |
| 242 | 5902 | 8.12 | 44.57 |
| 244 | 3374 | 4.64 | 49.21 |
| 246 | 7289 | 10.03 | 59.24 |
| 248 | 3766 | 5.18 | 64.42 |
| 250 | 3739 | 5.14 | 69.56 |
| 252 | 6888 | 9.48 | 79.04 |
| 254 | 3137 | 4.32 | 83.35 |
| 256 | 2911 | 4.00 | 87.36 |
| 258 | 2332 | 3.21 | 90.56 |
| 260 | 2023 | 2.78 | 93.35 |
| 262 | 0 | 0.00 | 93.35 |
| 264 | 1579 | 2.17 | 95.52 |
| 266 | 1167 | 1.61 | 97.12 |
| 268 | 0 | 0.00 | 97.12 |
| 270 | 857 | 1.18 | 98.30 |
| 272 | 617 | 0.85 | 99.15 |
| 274 | 0 | 0.00 | 99.15 |
| 276 | 0 | 0.00 | 99.15 |
| 278 | 332 | 0.46 | 99.61 |
| 280 | 284 | 0.39 | 100.00 |

**Figure 5.3.O:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 7 English Language Arts**




| | |
|---|---|
| N | 72,690 |
| Mean | 243.38 |
| Std. Deviation | 13.52 |
| Skewness | -0.33 |
| Kurtosis | 0.08 |

**Figure 5.3.P:**
**2007 MCAS**
**Raw Score Distribution**
**Grade 7 English Language Arts**

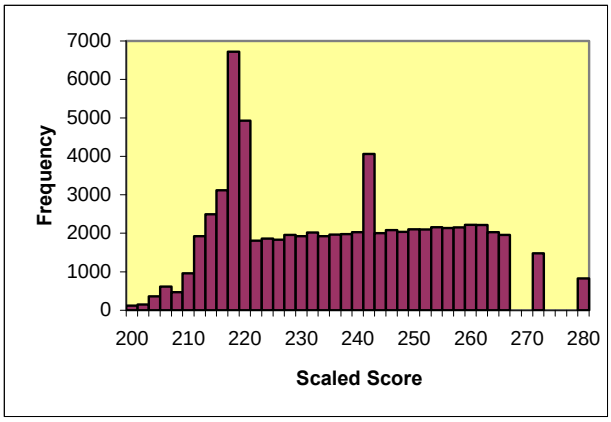



| | |
|---|---|
| N | 72,690 |
| Mean | 51.58 |
| Std. Deviation | 10.12 |
| Skewness | -1.17 |
| Kurtosis | 1.71 |

**Table 5.3.9:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 7 Mathematics**

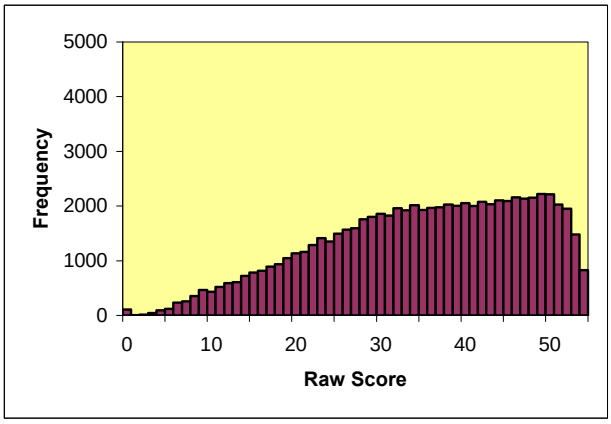
| Score | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 200 | 117 | 0.16 | 0.16 |
| 202 | 152 | 0.21 | 0.37 |
| 204 | 358 | 0.49 | 0.86 |
| 206 | 615 | 0.85 | 1.71 |
| 208 | 464 | 0.64 | 2.35 |
| 210 | 957 | 1.32 | 3.66 |
| 212 | 1924 | 2.65 | 6.31 |
| 214 | 2492 | 3.43 | 9.74 |
| 216 | 3118 | 4.29 | 14.03 |
| 218 | 6720 | 9.24 | 23.27 |
| 220 | 4927 | 6.78 | 30.05 |
| 222 | 1805 | 2.48 | 32.53 |
| 224 | 1860 | 2.56 | 35.09 |
| 226 | 1828 | 2.51 | 37.61 |
| 228 | 1960 | 2.70 | 40.30 |
| 230 | 1923 | 2.65 | 42.95 |
| 232 | 2020 | 2.78 | 45.73 |
| 234 | 1929 | 2.65 | 48.38 |
| 236 | 1966 | 2.70 | 51.08 |
| 238 | 1980 | 2.72 | 53.81 |
| 240 | 2026 | 2.79 | 56.59 |
| 242 | 4063 | 5.59 | 62.18 |
| 244 | 2002 | 2.75 | 64.94 |
| 246 | 2080 | 2.86 | 67.80 |
| 248 | 2032 | 2.80 | 70.59 |
| 250 | 2106 | 2.90 | 73.49 |
| 252 | 2093 | 2.88 | 76.37 |
| 254 | 2159 | 2.97 | 79.34 |
| 256 | 2138 | 2.94 | 82.28 |
| 258 | 2155 | 2.96 | 85.25 |
| 260 | 2223 | 3.06 | 88.30 |
| 262 | 2213 | 3.04 | 91.35 |
| 264 | 2029 | 2.79 | 94.14 |
| 266 | 1954 | 2.69 | 96.83 |
| 268 | 0 | 0.00 | 96.83 |
| 270 | 0 | 0.00 | 96.83 |
| 272 | 1479 | 2.03 | 98.86 |
| 274 | 0 | 0.00 | 98.86 |
| 276 | 0 | 0.00 | 98.86 |
| 278 | 0 | 0.00 | 98.86 |
| 280 | 827 | 1.14 | 100.00 |

**Figure 5.3.Q:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 7 Mathematics**




| | |
|---|---|
| N | 72,694 |
| Mean | 236.83 |
| Std. Deviation | 18.27 |
| Skewness | 0.24 |
| Kurtosis | -1.03 |

**Figure 5.3.R:**
**2007 MCAS**
**Raw Score Distribution**
**Grade 7 Mathematics**

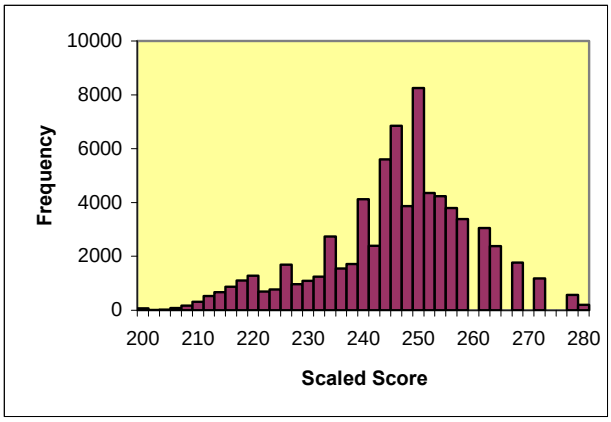



| | |
|---|---|
| N | 72,694 |
| Mean | 34.91 |
| Std. Deviation | 12.04 |
| Skewness | -0.42 |
| Kurtosis | -0.66 |

**Table 5.3.10:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 8 English Language Arts**

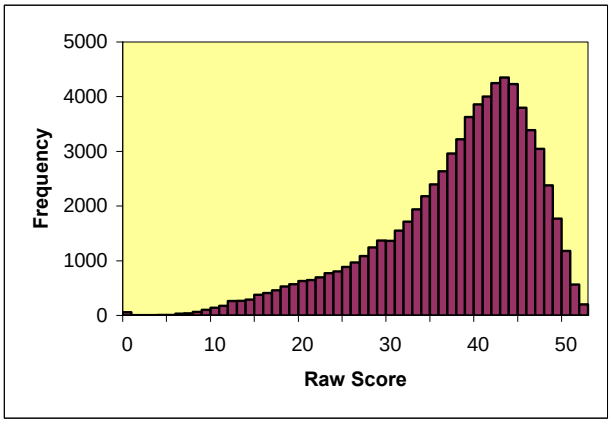
| Score | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 200 | 67 | 0.09 | 0.09 |
| 202 | 8 | 0.01 | 0.10 |
| 204 | 19 | 0.03 | 0.13 |
| 206 | 73 | 0.10 | 0.23 |
| 208 | 167 | 0.23 | 0.45 |
| 210 | 315 | 0.43 | 0.88 |
| 212 | 528 | 0.72 | 1.60 |
| 214 | 670 | 0.91 | 2.51 |
| 216 | 871 | 1.18 | 3.69 |
| 218 | 1101 | 1.50 | 5.19 |
| 220 | 1276 | 1.73 | 6.93 |
| 222 | 695 | 0.94 | 7.87 |
| 224 | 772 | 1.05 | 8.92 |
| 226 | 1693 | 2.30 | 11.22 |
| 228 | 973 | 1.32 | 12.54 |
| 230 | 1088 | 1.48 | 14.02 |
| 232 | 1247 | 1.70 | 15.72 |
| 234 | 2736 | 3.72 | 19.44 |
| 236 | 1551 | 2.11 | 21.55 |
| 238 | 1715 | 2.33 | 23.88 |
| 240 | 4119 | 5.60 | 29.48 |
| 242 | 2397 | 3.26 | 32.74 |
| 244 | 5600 | 7.61 | 40.35 |
| 246 | 6853 | 9.32 | 49.67 |
| 248 | 3861 | 5.25 | 54.91 |
| 250 | 8251 | 11.22 | 66.13 |
| 252 | 4353 | 5.92 | 72.05 |
| 254 | 4230 | 5.75 | 77.80 |
| 256 | 3802 | 5.17 | 82.97 |
| 258 | 3387 | 4.60 | 87.57 |
| 260 | 0 | 0.00 | 87.57 |
| 262 | 3046 | 4.14 | 91.71 |
| 264 | 2378 | 3.23 | 94.95 |
| 266 | 0 | 0.00 | 94.95 |
| 268 | 1773 | 2.41 | 97.36 |
| 270 | 0 | 0.00 | 97.36 |
| 272 | 1177 | 1.60 | 98.96 |
| 274 | 0 | 0.00 | 98.96 |
| 276 | 0 | 0.00 | 98.96 |
| 278 | 565 | 0.77 | 99.72 |
| 280 | 203 | 0.28 | 100.00 |

**Figure 5.3.S:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 8 English Language Arts**




| | |
|---|---|
| N | 73,560 |
| Mean | 245.78 |
| Std. Deviation | 13.49 |
| Skewness | -0.49 |
| Kurtosis | 0.34 |

**Figure 5.3.T:**
**2007 MCAS**
**Raw Score Distribution**
**Grade 8 English Language Arts**

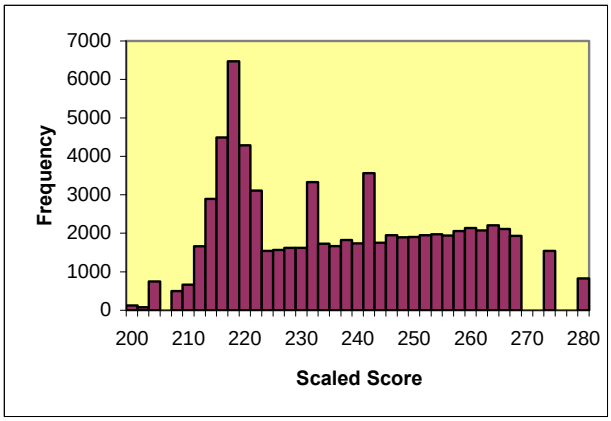



| | |
|---|---|
| N | 73,560 |
| Mean | 37.53 |
| Std. Deviation | 8.87 |
| Skewness | -1.01 |
| Kurtosis | 0.73 |

**Table 5.3.11:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 8 Mathematics**

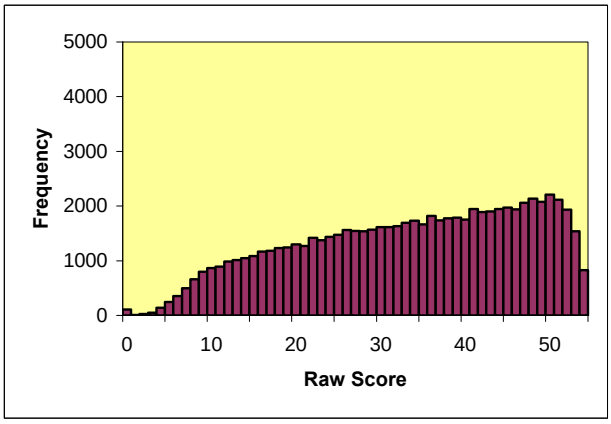
| Score | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 200 | 124 | 0.17 | 0.17 |
| 202 | 76 | 0.10 | 0.27 |
| 204 | 745 | 1.01 | 1.29 |
| 206 | 0 | 0.00 | 1.29 |
| 208 | 499 | 0.68 | 1.97 |
| 210 | 661 | 0.90 | 2.87 |
| 212 | 1662 | 2.26 | 5.13 |
| 214 | 2891 | 3.94 | 9.06 |
| 216 | 4490 | 6.11 | 15.17 |
| 218 | 6472 | 8.81 | 23.98 |
| 220 | 4285 | 5.83 | 29.82 |
| 222 | 3111 | 4.23 | 34.05 |
| 224 | 1543 | 2.10 | 36.15 |
| 226 | 1566 | 2.13 | 38.28 |
| 228 | 1618 | 2.20 | 40.49 |
| 230 | 1618 | 2.20 | 42.69 |
| 232 | 3326 | 4.53 | 47.22 |
| 234 | 1734 | 2.36 | 49.58 |
| 236 | 1666 | 2.27 | 51.84 |
| 238 | 1822 | 2.48 | 54.32 |
| 240 | 1739 | 2.37 | 56.69 |
| 242 | 3564 | 4.85 | 61.54 |
| 244 | 1755 | 2.39 | 63.93 |
| 246 | 1947 | 2.65 | 66.58 |
| 248 | 1893 | 2.58 | 69.16 |
| 250 | 1904 | 2.59 | 71.75 |
| 252 | 1946 | 2.65 | 74.40 |
| 254 | 1972 | 2.68 | 77.08 |
| 256 | 1939 | 2.64 | 79.72 |
| 258 | 2061 | 2.81 | 82.53 |
| 260 | 2136 | 2.91 | 85.43 |
| 262 | 2076 | 2.83 | 88.26 |
| 264 | 2208 | 3.01 | 91.27 |
| 266 | 2114 | 2.88 | 94.14 |
| 268 | 1935 | 2.63 | 96.78 |
| 270 | 0 | 0.00 | 96.78 |
| 272 | 0 | 0.00 | 96.78 |
| 274 | 1540 | 2.10 | 98.87 |
| 276 | 0 | 0.00 | 98.87 |
| 278 | 0 | 0.00 | 98.87 |
| 280 | 828 | 1.13 | 100.00 |

**Figure 5.3.U:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 8 Mathematics**




| | |
|---|---|
| N | 73,466 |
| Mean | 237.30 |
| Std. Deviation | 18.95 |
| Skewness | 0.28 |
| Kurtosis | -1.09 |

**Figure 5.3.V:**
**2007 MCAS**
**Raw Score Distribution**
**Grade 8 Mathematics**

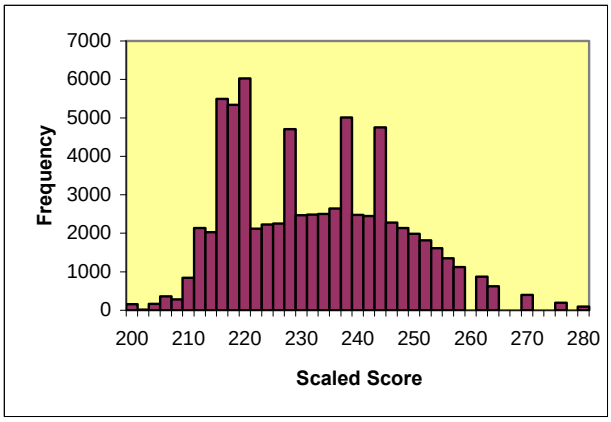



| | |
|---|---|
| N | 73,466 |
| Mean | 33.34 |
| Std. Deviation | 13.16 |
| Skewness | -0.31 |
| Kurtosis | -0.96 |

**Table 5.3.12:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 8 Science & Tech/Engineering**

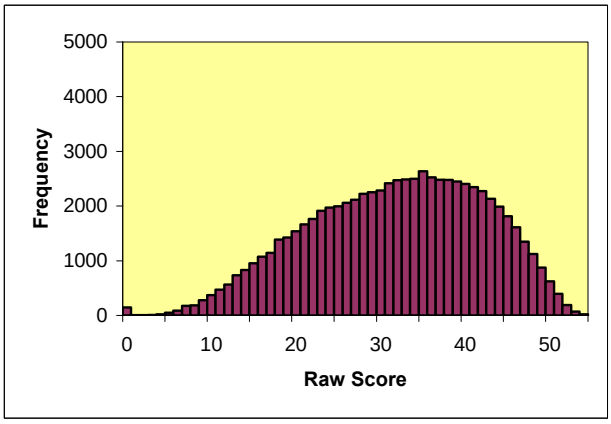
| Score | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 200 | 153 | 0.21 | 0.21 |
| 202 | 15 | 0.02 | 0.23 |
| 204 | 164 | 0.22 | 0.45 |
| 206 | 362 | 0.49 | 0.95 |
| 208 | 281 | 0.38 | 1.33 |
| 210 | 845 | 1.15 | 2.48 |
| 212 | 2134 | 2.91 | 5.39 |
| 214 | 2028 | 2.76 | 8.15 |
| 216 | 5497 | 7.49 | 15.63 |
| 218 | 5343 | 7.28 | 22.91 |
| 220 | 6028 | 8.21 | 31.12 |
| 222 | 2117 | 2.88 | 34.00 |
| 224 | 2228 | 3.03 | 37.04 |
| 226 | 2256 | 3.07 | 40.11 |
| 228 | 4707 | 6.41 | 46.52 |
| 230 | 2471 | 3.37 | 49.89 |
| 232 | 2488 | 3.39 | 53.28 |
| 234 | 2499 | 3.40 | 56.68 |
| 236 | 2639 | 3.59 | 60.27 |
| 238 | 5012 | 6.83 | 67.10 |
| 240 | 2477 | 3.37 | 70.47 |
| 242 | 2450 | 3.34 | 73.81 |
| 244 | 4758 | 6.48 | 80.29 |
| 246 | 2276 | 3.10 | 83.39 |
| 248 | 2133 | 2.91 | 86.30 |
| 250 | 1988 | 2.71 | 89.00 |
| 252 | 1814 | 2.47 | 91.47 |
| 254 | 1610 | 2.19 | 93.67 |
| 256 | 1346 | 1.83 | 95.50 |
| 258 | 1123 | 1.53 | 97.03 |
| 260 | 0 | 0.00 | 97.03 |
| 262 | 875 | 1.19 | 98.22 |
| 264 | 624 | 0.85 | 99.07 |
| 266 | 0 | 0.00 | 99.07 |
| 268 | 0 | 0.00 | 99.07 |
| 270 | 396 | 0.54 | 99.61 |
| 272 | 0 | 0.00 | 99.61 |
| 274 | 0 | 0.00 | 99.61 |
| 276 | 191 | 0.26 | 99.87 |
| 278 | 0 | 0.00 | 99.87 |
| 280 | 95 | 0.13 | 100.00 |

**Figure 5.3.W:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 8 Science & Tech/Engineering**




| | |
|---|---|
| N | 73,423 |
| Mean | 232.29 |
| Std. Deviation | 14.32 |
| Skewness | 0.37 |
| Kurtosis | -0.56 |

**Figure 5.3.X:**
**2007 MCAS**
**Raw Score Distribution**
**Grade 8 Science & Tech/Engineering**

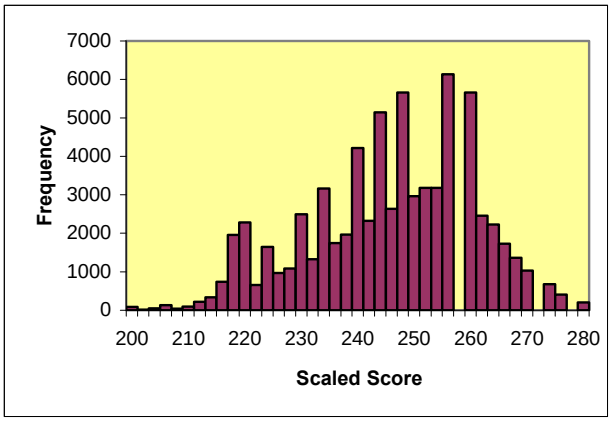



| | |
|---|---|
| N | 73,423 |
| Mean | 31.80 |
| Std. Deviation | 10.23 |
| Skewness | -0.28 |
| Kurtosis | -0.60 |

**Table 5.3.13:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 10 English Language Arts**

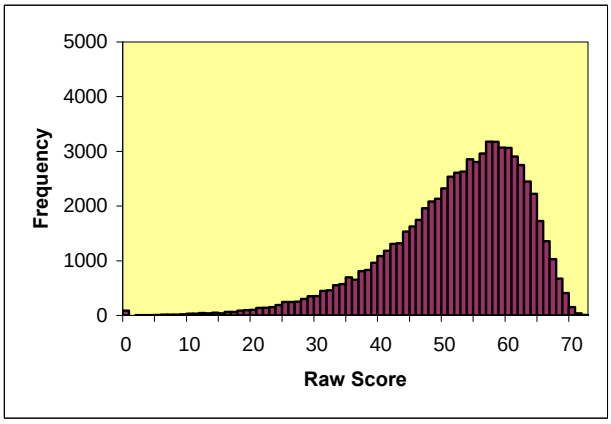
| Score | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 200 | 89 | 0.12 | 0.12 |
| 202 | 18 | 0.02 | 0.15 |
| 204 | 46 | 0.06 | 0.21 |
| 206 | 135 | 0.19 | 0.40 |
| 208 | 38 | 0.05 | 0.45 |
| 210 | 91 | 0.13 | 0.58 |
| 212 | 215 | 0.30 | 0.88 |
| 214 | 338 | 0.47 | 1.34 |
| 216 | 737 | 1.02 | 2.36 |
| 218 | 1955 | 2.71 | 5.07 |
| 220 | 2286 | 3.17 | 8.24 |
| 222 | 652 | 0.90 | 9.14 |
| 224 | 1647 | 2.28 | 11.43 |
| 226 | 965 | 1.34 | 12.76 |
| 228 | 1083 | 1.50 | 14.26 |
| 230 | 2498 | 3.46 | 17.72 |
| 232 | 1323 | 1.83 | 19.56 |
| 234 | 3163 | 4.38 | 23.94 |
| 236 | 1748 | 2.42 | 26.36 |
| 238 | 1962 | 2.72 | 29.08 |
| 240 | 4214 | 5.84 | 34.92 |
| 242 | 2325 | 3.22 | 38.14 |
| 244 | 5146 | 7.13 | 45.27 |
| 246 | 2634 | 3.65 | 48.92 |
| 248 | 5662 | 7.84 | 56.76 |
| 250 | 2962 | 4.10 | 60.87 |
| 252 | 3182 | 4.41 | 65.27 |
| 254 | 3177 | 4.40 | 69.68 |
| 256 | 6138 | 8.50 | 78.18 |
| 258 | 0 | 0.00 | 78.18 |
| 260 | 5661 | 7.84 | 86.02 |
| 262 | 2453 | 3.40 | 89.42 |
| 264 | 2226 | 3.08 | 92.51 |
| 266 | 1728 | 2.39 | 94.90 |
| 268 | 1362 | 1.89 | 96.79 |
| 270 | 1028 | 1.42 | 98.21 |
| 272 | 0 | 0.00 | 98.21 |
| 274 | 676 | 0.94 | 99.15 |
| 276 | 409 | 0.57 | 99.71 |
| 278 | 0 | 0.00 | 99.71 |
| 280 | 206 | 0.29 | 100.00 |

**Figure 5.3.Y:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 10 English Language Arts**




| | |
|---|---|
| N | 72,178 |
| Mean | 245.70 |
| Std. Deviation | 14.58 |
| Skewness | -0.35 |
| Kurtosis | -0.42 |

**Figure 5.3.Z:**
**2007 MCAS**
**Raw Score Distribution**
**Grade 10 English Language Arts**

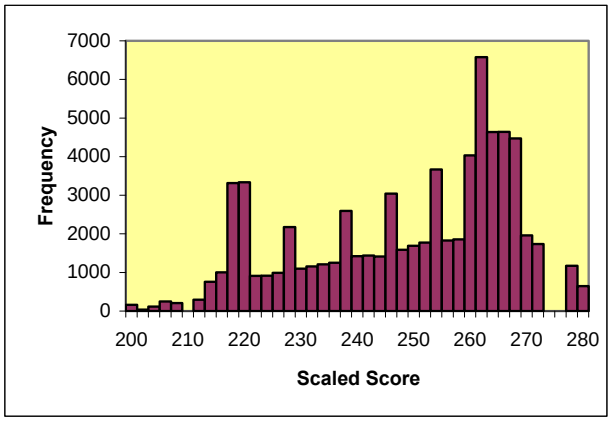



| | |
|---|---|
| N | 72,178 |
| Mean | 51.82 |
| Std. Deviation | 10.71 |
| Skewness | -1.03 |
| Kurtosis | 1.37 |

**Table 5.3.14:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 10 Mathematics**

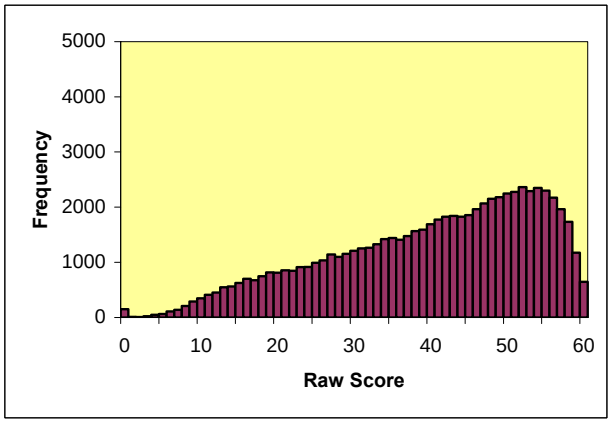
| Score | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 200 | 163 | 0.23 | 0.23 |
| 202 | 34 | 0.05 | 0.28 |
| 204 | 114 | 0.16 | 0.44 |
| 206 | 249 | 0.35 | 0.78 |
| 208 | 206 | 0.29 | 1.07 |
| 210 | 0 | 0.00 | 1.07 |
| 212 | 291 | 0.41 | 1.48 |
| 214 | 759 | 1.06 | 2.55 |
| 216 | 1003 | 1.41 | 3.95 |
| 218 | 3316 | 4.65 | 8.60 |
| 220 | 3333 | 4.67 | 13.27 |
| 222 | 913 | 1.28 | 14.55 |
| 224 | 914 | 1.28 | 15.83 |
| 226 | 990 | 1.39 | 17.22 |
| 228 | 2176 | 3.05 | 20.27 |
| 230 | 1097 | 1.54 | 21.80 |
| 232 | 1154 | 1.62 | 23.42 |
| 234 | 1209 | 1.69 | 25.12 |
| 236 | 1251 | 1.75 | 26.87 |
| 238 | 2592 | 3.63 | 30.50 |
| 240 | 1422 | 1.99 | 32.49 |
| 242 | 1439 | 2.02 | 34.51 |
| 244 | 1410 | 1.98 | 36.49 |
| 246 | 3041 | 4.26 | 40.75 |
| 248 | 1590 | 2.23 | 42.98 |
| 250 | 1690 | 2.37 | 45.35 |
| 252 | 1774 | 2.49 | 47.83 |
| 254 | 3668 | 5.14 | 52.97 |
| 256 | 1827 | 2.56 | 55.53 |
| 258 | 1856 | 2.60 | 58.13 |
| 260 | 4029 | 5.65 | 63.78 |
| 262 | 6576 | 9.22 | 73.00 |
| 264 | 4638 | 6.50 | 79.50 |
| 266 | 4641 | 6.50 | 86.00 |
| 268 | 4474 | 6.27 | 92.27 |
| 270 | 1963 | 2.75 | 95.02 |
| 272 | 1733 | 2.43 | 97.45 |
| 274 | 0 | 0.00 | 97.45 |
| 276 | 0 | 0.00 | 97.45 |
| 278 | 1172 | 1.64 | 99.09 |
| 280 | 646 | 0.91 | 100.00 |

**Figure 5.3.AA:**
**2007 MCAS**
**Scaled Score Distribution**
**Grade 10 Mathematics**




| | |
|---|---|
| N | 71,353 |
| Mean | 248.85 |
| Std. Deviation | 18.24 |
| Skewness | -0.53 |
| Kurtosis | -0.87 |

**Figure 5.3.BB:**
**2007 MCAS**
**Raw Score Distribution**
**Grade 10 Mathematics**

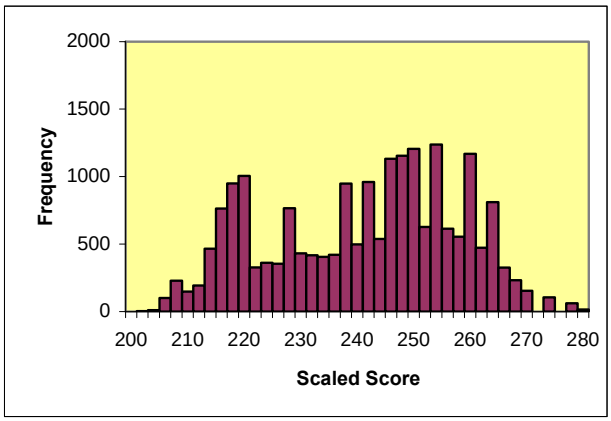



| | |
|---|---|
| N | 71,353 |
| Mean | 39.93 |
| Std. Deviation | 13.43 |
| Skewness | -0.57 |
| Kurtosis | -0.57 |

**Table 5.3.15:**
**2007 MCAS**
**Scaled Score Distribution**
**HS Biology**

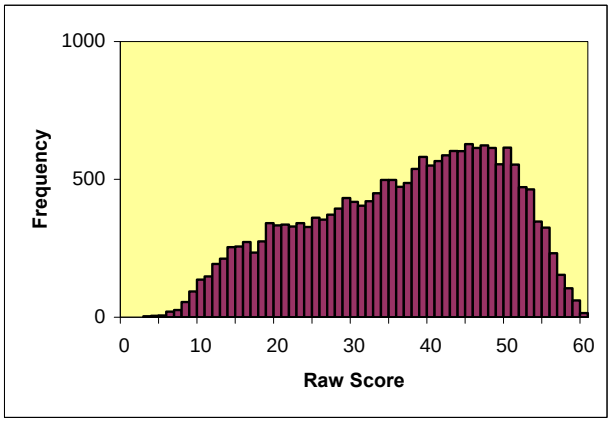
| Score | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 200 | 0 | 0.00 | 0.00 |
| 202 | 3 | 0.01 | 0.01 |
| 204 | 11 | 0.05 | 0.07 |
| 206 | 101 | 0.50 | 0.57 |
| 208 | 229 | 1.14 | 1.71 |
| 210 | 148 | 0.73 | 2.44 |
| 212 | 193 | 0.96 | 3.40 |
| 214 | 466 | 2.31 | 5.71 |
| 216 | 763 | 3.78 | 9.49 |
| 218 | 949 | 4.71 | 14.20 |
| 220 | 1006 | 4.99 | 19.19 |
| 222 | 327 | 1.62 | 20.81 |
| 224 | 361 | 1.79 | 22.60 |
| 226 | 354 | 1.76 | 24.35 |
| 228 | 766 | 3.80 | 28.15 |
| 230 | 432 | 2.14 | 30.29 |
| 232 | 418 | 2.07 | 32.37 |
| 234 | 405 | 2.01 | 34.37 |
| 236 | 421 | 2.09 | 36.46 |
| 238 | 948 | 4.70 | 41.16 |
| 240 | 498 | 2.47 | 43.63 |
| 242 | 960 | 4.76 | 48.39 |
| 244 | 538 | 2.67 | 51.06 |
| 246 | 1132 | 5.61 | 56.67 |
| 248 | 1154 | 5.72 | 62.40 |
| 250 | 1205 | 5.98 | 68.37 |
| 252 | 628 | 3.11 | 71.49 |
| 254 | 1237 | 6.13 | 77.62 |
| 256 | 614 | 3.04 | 80.67 |
| 258 | 555 | 2.75 | 83.42 |
| 260 | 1169 | 5.80 | 89.21 |
| 262 | 472 | 2.34 | 91.56 |
| 264 | 811 | 4.02 | 95.58 |
| 266 | 325 | 1.61 | 97.19 |
| 268 | 232 | 1.15 | 98.34 |
| 270 | 154 | 0.76 | 99.10 |
| 272 | 0 | 0.00 | 99.10 |
| 274 | 105 | 0.52 | 99.62 |
| 276 | 0 | 0.00 | 99.62 |
| 278 | 61 | 0.30 | 99.93 |
| 280 | 15 | 0.07 | 100.00 |

**Figure 5.3.CC:**
**2007 MCAS**
**Scaled Score Distribution**
**HS Biology**




| | |
|---|---|
| N | 20,166 |
| Mean | 241.19 |
| Std. Deviation | 16.62 |
| Skewness | -0.24 |
| Kurtosis | -0.98 |

**Figure 5.3.DD:**
**2007 MCAS**
**Raw Score Distribution**
**HS Biology**

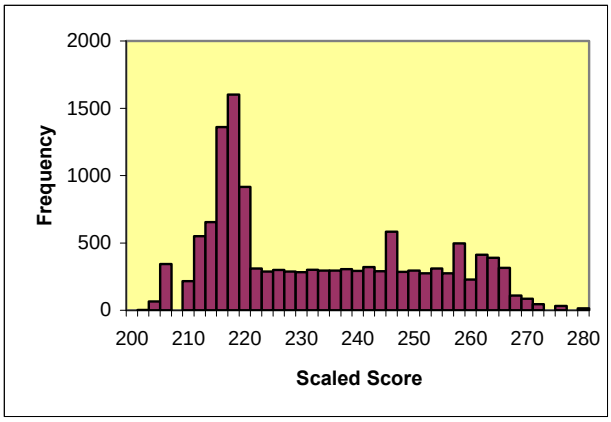



| | |
|---|---|
| N | 20,166 |
| Mean | 36.36 |
| Std. Deviation | 12.56 |
| Skewness | -0.36 |
| Kurtosis | -0.84 |

**Table 5.3.16:**
**2007 MCAS**
**Scaled Score Distribution**
**HS Chemistry**

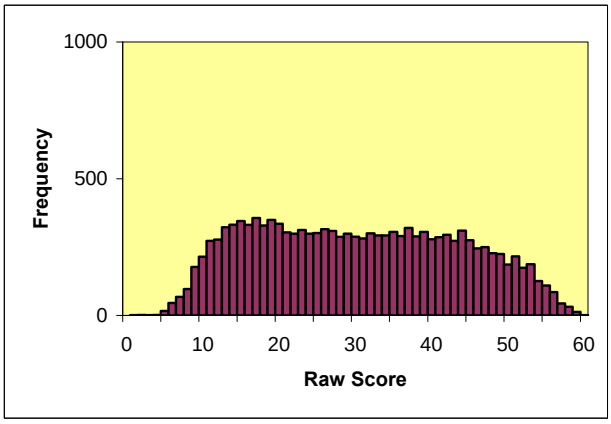
| Score | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 200 | 1 | 0.01 | 0.01 |
| 202 | 3 | 0.02 | 0.03 |
| 204 | 64 | 0.48 | 0.51 |
| 206 | 342 | 2.55 | 3.06 |
| 208 | 0 | 0.00 | 3.06 |
| 210 | 215 | 1.60 | 4.66 |
| 212 | 550 | 4.10 | 8.76 |
| 214 | 654 | 4.88 | 13.64 |
| 216 | 1361 | 10.15 | 23.79 |
| 218 | 1601 | 11.94 | 35.73 |
| 220 | 916 | 6.83 | 42.56 |
| 222 | 309 | 2.30 | 44.86 |
| 224 | 287 | 2.14 | 47.00 |
| 226 | 299 | 2.23 | 49.23 |
| 228 | 288 | 2.15 | 51.38 |
| 230 | 282 | 2.10 | 53.48 |
| 232 | 300 | 2.24 | 55.72 |
| 234 | 293 | 2.18 | 57.90 |
| 236 | 293 | 2.18 | 60.09 |
| 238 | 306 | 2.28 | 62.37 |
| 240 | 291 | 2.17 | 64.54 |
| 242 | 320 | 2.39 | 66.93 |
| 244 | 289 | 2.16 | 69.08 |
| 246 | 584 | 4.35 | 73.44 |
| 248 | 286 | 2.13 | 75.57 |
| 250 | 295 | 2.20 | 77.77 |
| 252 | 273 | 2.04 | 79.81 |
| 254 | 310 | 2.31 | 82.12 |
| 256 | 275 | 2.05 | 84.17 |
| 258 | 496 | 3.70 | 87.87 |
| 260 | 228 | 1.70 | 89.57 |
| 262 | 411 | 3.06 | 92.63 |
| 264 | 390 | 2.91 | 95.54 |
| 266 | 313 | 2.33 | 97.87 |
| 268 | 110 | 0.82 | 98.70 |
| 270 | 85 | 0.63 | 99.33 |
| 272 | 44 | 0.33 | 99.66 |
| 274 | 0 | 0.00 | 99.66 |
| 276 | 32 | 0.24 | 99.90 |
| 278 | 0 | 0.00 | 99.90 |
| 280 | 14 | 0.10 | 100.00 |

**Figure 5.3.EE:**
**2007 MCAS**
**Scaled Score Distribution**
**HS Chemistry**




| | |
|---|---|
| N | 13,410 |
| Mean | 232.96 |
| Std. Deviation | 18.43 |
| Skewness | 0.46 |
| Kurtosis | -1.13 |

**Figure 5.3.FF:**
**2007 MCAS**
**Raw Score Distribution**
**HS Chemistry**

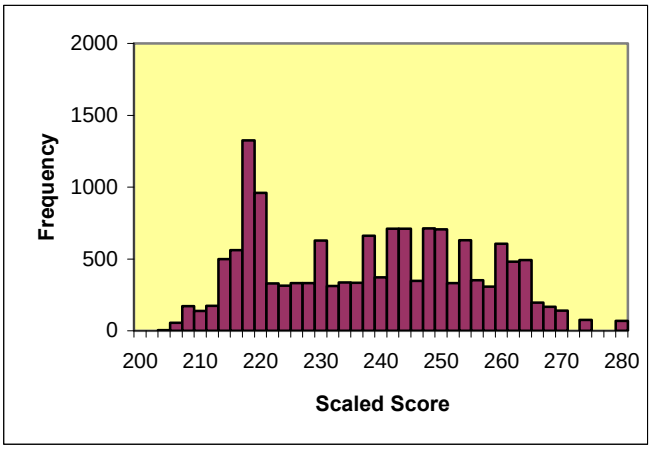



| | |
|---|---|
| N | 13,410 |
| Mean | 30.36 |
| Std. Deviation | 13.20 |
| Skewness | 0.12 |
| Kurtosis | -1.07 |

**Table 5.3.17:**
**2007 MCAS**
**Scaled Score Distribution**
**HS Introductory Physics**

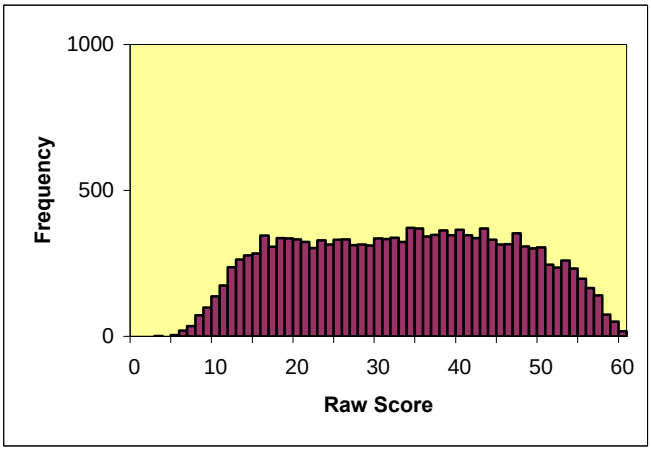
| Score | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 200 | 0 | 0.00 | 0.00 |
| 202 | 1 | 0.01 | 0.01 |
| 204 | 4 | 0.03 | 0.03 |
| 206 | 55 | 0.37 | 0.40 |
| 208 | 171 | 1.15 | 1.55 |
| 210 | 137 | 0.92 | 2.47 |
| 212 | 174 | 1.17 | 3.64 |
| 214 | 500 | 3.36 | 7.01 |
| 216 | 561 | 3.77 | 10.78 |
| 218 | 1325 | 8.91 | 19.69 |
| 220 | 959 | 6.45 | 26.13 |
| 222 | 329 | 2.21 | 28.35 |
| 224 | 315 | 2.12 | 30.46 |
| 226 | 331 | 2.23 | 32.69 |
| 228 | 332 | 2.23 | 34.92 |
| 230 | 628 | 4.22 | 39.14 |
| 232 | 311 | 2.09 | 41.24 |
| 234 | 336 | 2.26 | 43.49 |
| 236 | 333 | 2.24 | 45.73 |
| 238 | 662 | 4.45 | 50.18 |
| 240 | 372 | 2.50 | 52.69 |
| 242 | 711 | 4.78 | 57.47 |
| 244 | 711 | 4.78 | 62.25 |
| 246 | 347 | 2.33 | 64.58 |
| 248 | 712 | 4.79 | 69.37 |
| 250 | 706 | 4.75 | 74.11 |
| 252 | 331 | 2.23 | 76.34 |
| 254 | 631 | 4.24 | 80.58 |
| 256 | 353 | 2.37 | 82.96 |
| 258 | 308 | 2.07 | 85.03 |
| 260 | 606 | 4.07 | 89.10 |
| 262 | 482 | 3.24 | 92.34 |
| 264 | 493 | 3.31 | 95.66 |
| 266 | 197 | 1.32 | 96.98 |
| 268 | 166 | 1.12 | 98.10 |
| 270 | 140 | 0.94 | 99.04 |
| 272 | 0 | 0.00 | 99.04 |
| 274 | 75 | 0.50 | 99.54 |
| 276 | 0 | 0.00 | 99.54 |
| 278 | 0 | 0.00 | 99.54 |
| 280 | 68 | 0.46 | 100.00 |

**Figure 5.3.GG:**
**2007 MCAS**
**Scaled Score Distribution**
**HS Introductory Physics**




| | |
|---|---|
| N | 14,873 |
| Mean | 238.16 |
| Std. Deviation | 17.18 |
| Skewness | 0.09 |
| Kurtosis | -1.11 |

**Figure 5.3.HH:**
**2007 MCAS**
**Raw Score Distribution**
**HS Introductory Physics**

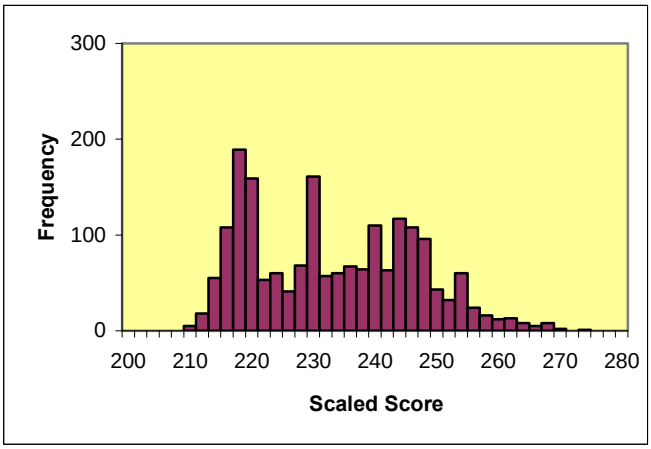



| | |
|---|---|
| N | 14,873 |
| Mean | 33.10 |
| Std. Deviation | 13.21 |
| Skewness | -0.01 |
| Kurtosis | -1.06 |

**Table 5.3.18:**
**2007 MCAS**
**Scaled Score Distribution**
**HS Tech/Engineering**

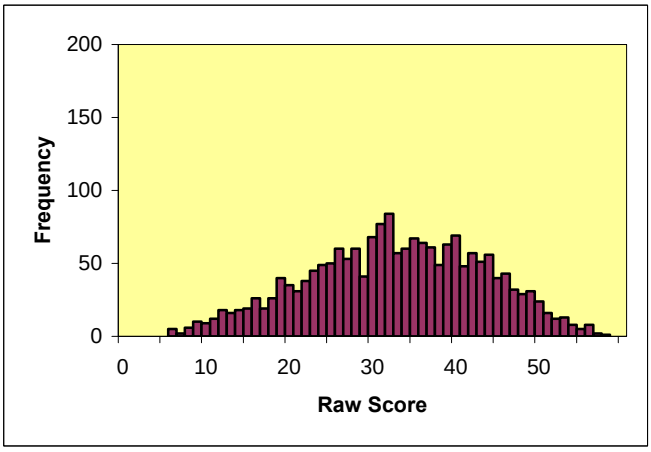
| Score | Frequency | Percentage | Cumulative Percentage |
|---|---|---|---|
| 200 | 0 | 0.00 | 0.00 |
| 202 | 0 | 0.00 | 0.00 |
| 204 | 0 | 0.00 | 0.00 |
| 206 | 0 | 0.00 | 0.00 |
| 208 | 0 | 0.00 | 0.00 |
| 210 | 5 | 0.27 | 0.27 |
| 212 | 18 | 0.96 | 1.22 |
| 214 | 55 | 2.92 | 4.14 |
| 216 | 108 | 5.74 | 9.88 |
| 218 | 189 | 10.04 | 19.92 |
| 220 | 159 | 8.44 | 28.36 |
| 222 | 53 | 2.81 | 31.17 |
| 224 | 60 | 3.19 | 34.36 |
| 226 | 41 | 2.18 | 36.54 |
| 228 | 68 | 3.61 | 40.15 |
| 230 | 161 | 8.55 | 48.70 |
| 232 | 57 | 3.03 | 51.73 |
| 234 | 60 | 3.19 | 54.91 |
| 236 | 67 | 3.56 | 58.47 |
| 238 | 64 | 3.40 | 61.87 |
| 240 | 110 | 5.84 | 67.71 |
| 242 | 63 | 3.35 | 71.06 |
| 244 | 117 | 6.21 | 77.27 |
| 246 | 108 | 5.74 | 83.01 |
| 248 | 96 | 5.10 | 88.10 |
| 250 | 43 | 2.28 | 90.39 |
| 252 | 32 | 1.70 | 92.09 |
| 254 | 60 | 3.19 | 95.27 |
| 256 | 24 | 1.27 | 96.55 |
| 258 | 16 | 0.85 | 97.40 |
| 260 | 12 | 0.64 | 98.04 |
| 262 | 13 | 0.69 | 98.73 |
| 264 | 8 | 0.42 | 99.15 |
| 266 | 5 | 0.27 | 99.42 |
| 268 | 8 | 0.42 | 99.84 |
| 270 | 2 | 0.11 | 99.95 |
| 272 | 0 | 0.00 | 99.95 |
| 274 | 1 | 0.05 | 100.00 |
| 276 | 0 | 0.00 | 100.00 |
| 278 | 0 | 0.00 | 100.00 |
| 280 | 0 | 0.00 | 100.00 |

**Figure 5.3.II:**
**2007 MCAS**
**Scaled Score Distribution**
**HS Tech/Engineering**




| | |
|---|---|
| N | 1,883 |
| Mean | 233.29 |
| Std. Deviation | 13.33 |
| Skewness | 0.29 |
| Kurtosis | -0.89 |

**Figure 5.3.JJ:**
**2007 MCAS**
**Raw Score Distribution**
**HS Tech/Engineering**




| | |
|---|---|
| N | 1,883 |
| Mean | 32.78 |
| Std. Deviation | 10.52 |
| Skewness | -0.16 |
| Kurtosis | -0.54 |

## 5.4 MCAS-Alt Scoring Dimension Results

Tables 5.4.1.1 through 5.4.5.9 include 2007 results for the MCAS-Alt in each of the following scoring dimensions:

- Level of Complexity (section 5.4.1)
- Demonstration of Skills and Concepts (section 5.4.2)
- Independence (section 5.4.3)
- Self-Evaluation (section 5.4.4)
- Generalized Performanced (section 5.4.5)

For information on the determination of score in each dimension, see section 4.2.

### 5.4.1 Level of Complexity

In 2007, 94 percent of all portfolio strands received a Level of Complexity score of 3, signifying that the student was addressing learning standards below grade-level expectations. A small number (2.96 percent) of students accessed the learning standards through "access skills" and received a score of 2. A total of 1.59 percent of students received a score of 4 or 5, signifying that the student was addressing learning standards at or above grade-level expectations.

The tables in section 5.4.1 show the distribution of Level of Complexity scores on the 2007 MCAS-Alt for all strands and content areas, by grade.

Table 5.4.1.8 shows scores at each score point for all grades and content areas combined. Tables 5.4.1.9 and 5.4.1.10 show the 2007 statewide MCAS-Alt Composite Level of Complexity score distributions by content area and for combined content areas, respectively

**Table 5.4.1.1: 2007 MCAS-Alt**
**Statewide Score Distribution for Level of Complexity by Strand, Grade 3**

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts*** Lang = Language Read = Literature (Reading) Comp = Composition (Writing) | | | ***Mathematics*** NmbSn = Number Sense and Operations Pattrns = Patterns, Relations, and Algebra Geom = Geometry Meas = Measurement Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering*** Earth = Earth Science Life = Life Science Phys = Physical Sciences Tch/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* |
| 1 | 2 | 0 | | 0 | 0 | | | | | | | |
| 2 | 27 | 45 | | 31 | 31 | | | | | | | |
| 3 | 986 | 980 | | 992 | 971 | | | | | | | |
| 4 | 17 | 13 | | 21 | 18 | | | | | | | |
| 5 | 2 | 2 | | 1 | 1 | | | | | | | |

## Table 5.4.1.2: 2007 MCAS-Alt
## Statewide Score Distribution for Level of Complexity by Strand, Grade 4

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts***<br>Lang = Language<br>Read = Literature (Reading)<br>Comp = Composition (Writing) | | | ***Mathematics***<br>NmbSn = Number Sense and Operations<br>Pattrns = Patterns, Relations, and Algebra<br>Geom = Geometry<br>Meas = Measurement<br>Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering***<br>Earth = Earth Science<br>Life = Life Science<br>Phys = Physical Sciences<br>Tch/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* |
| 1 | 1 | 0 | 0 | 0 | | | | 0 | | | | |
| 2 | 23 | 39 | 32 | 31 | | | | 27 | | | | |
| 3 | 1053 | 1058 | 1071 | 1121 | | | | 1102 | | | | |
| 4 | 16 | 18 | 16 | 35 | | | | 30 | | | | |
| 5 | 0 | 0 | 0 | 1 | | | | 1 | | | | |

## Table 5.4.1.3: 2007 MCAS-Alt
## Statewide Score Distribution for Level of Complexity by Strand, Grade 5

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts***<br>Lang = Language<br>Read = Literature (Reading)<br>Comp = Composition (Writing) | | | ***Mathematics***<br>NmbSn = Number Sense and Operations<br>Pattrns = Patterns, Relations, and Algebra<br>Geom = Geometry<br>Meas = Measurement<br>Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering***<br>Earth = Earth Science<br>Life = Life Science<br>Phys = Physical Sciences<br>Tch/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* |
| 1 | 2 | 2 | | 2 | | | 3 | | 1 | 1 | 0 | 0 |
| 2 | 28 | 42 | | 33 | | | 32 | | 30 | 29 | 23 | 17 |
| 3 | 1059 | 1088 | | 1144 | | | 1105 | | 964 | 977 | 836 | 317 |
| 4 | 34 | 31 | | 45 | | | 48 | | 16 | 17 | 13 | 5 |
| 5 | 0 | 0 | | 1 | | | 4 | | 1 | 0 | 0 | 0 |

## Table 5.4.1.4: 2007 MCAS-Alt
## Statewide Score Distribution for Level of Complexity by Strand, Grade 6

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts***<br>Lang = Language<br>Read = Literature (Reading)<br>Comp = Composition (Writing) | | | ***Mathematics***<br>NmbSn = Number Sense and Operations<br>Pattrns = Patterns, Relations, and Algebra<br>Geom = Geometry<br>Meas = Measurement<br>Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering***<br>Earth = Earth Science<br>Life = Life Science<br>Phys = Physical Sciences<br>Tch/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* |
| 1 | 0 | 0 | | 0 | 1 | | | | | | | |
| 2 | 27 | 43 | | 31 | 30 | | | | | | | |
| 3 | 983 | 1000 | | 1049 | 1013 | | | | | | | |
| 4 | 31 | 25 | | 41 | 40 | | | | | | | |
| 5 | 4 | 7 | | 7 | 5 | | | | | | | |

## Table 5.4.1.5: 2007 MCAS-Alt
## Statewide Score Distribution for Level of Complexity by Strand, Grade 7

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts***<br>Lang = Language<br>Read = Literature (Reading)<br>Comp = Composition (Writing) | | | ***Mathematics***<br>NmbSn = Number Sense and Operations<br>Pattrns = Patterns, Relations, and Algebra<br>Geom = Geometry<br>Meas = Measurement<br>Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering***<br>Earth = Earth Science<br>Life = Life Science<br>Phys = Physical Sciences<br>Tch/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* |
| 1 | 0 | 0 | 0 | 0 | | | | 0 | | | | |
| 2 | 30 | 33 | 32 | 28 | | | | 35 | | | | |
| 3 | 938 | 946 | 927 | 1011 | | | | 974 | | | | |
| 4 | 17 | 17 | 17 | 33 | | | | 38 | | | | |
| 5 | 3 | 3 | 3 | 7 | | | | 4 | | | | |

## Table 5.4.1.6: 2007 MCAS-Alt
## Statewide Score Distribution for Level of Complexity by Strand, Grade 8

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts***<br>Lang = Language<br>Read = Literature (Reading)<br>Comp = Composition (Writing) | | | ***Mathematics***<br>NmbSn = Number Sense and Operations<br>Pattrns = Patterns, Relations, and Algebra<br>Geom = Geometry<br>Meas = Measurement<br>Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering***<br>Earth = Earth Science<br>Life = Life Science<br>Phys = Physical Sciences<br>Tch/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* |
| 1 | 0 | 0 | | 0 | | 0 | | | 0 | 0 | 0 | 0 |
| 2 | 19 | 27 | | 14 | | 16 | | | 12 | 19 | 17 | 18 |
| 3 | 895 | 894 | | 967 | | 945 | | | 837 | 834 | 608 | 417 |
| 4 | 14 | 16 | | 31 | | 34 | | | 9 | 14 | 15 | 7 |
| 5 | 5 | 4 | | 2 | | 2 | | | 6 | 4 | 2 | 0 |

## Table 5.4.1.7: 2007 MCAS-Alt
## Statewide Score Distribution for Level of Complexity by Strand, Grades 10 and High School (9/10)

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts (grade 10 only)***<br>Lang = Language<br>Read = Literature (Reading)<br>Comp = Composition (Writing) | | | ***Mathematics (grade 10 only)***<br>NmbSn = Number Sense and Operations<br>Pattrn = Patterns, Relations, and Algebra<br>Geom = Geometry<br>Meas = Measurement<br>Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering (grades 9/10 end-of-course tests)***<br>Bio = Biology<br>Chem = Chemistry<br>Phys = Introductory Physics<br>T/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrn* | *Geom* | *Meas* | *Data* | *Bio* | *Chem* | *Phys* | *T/E* |
| 1 | 0 | 0 | 2 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 0 |
| 2 | 31 | 38 | 28 | 26 | 17 | 23 | 9 | 10 | 29 | 27 | 25 | 0 |
| 3 | 747 | 757 | 767 | 635 | 484 | 367 | 445 | 413 | 678 | 624 | 599 | 6 |
| 4 | 6 | 18 | 16 | 14 | 26 | 21 | 22 | 13 | 14 | 12 | 11 | 5 |
| 5 | 23 | 10 | 16 | 22 | 11 | 17 | 15 | 16 | 1 | 2 | 1 | 0 |

## Table 5.4.1.8: 2007 MCAS-Alt
## Statewide Score Distribution for Level of Complexity by Strand for All Grades

| | Content Area | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts*** | | | ***Mathematics*** | | | | | ***Science and Technology/Engineering*** | | | | | | | |
| | | | | | | | | | **Grades 5 and 8** | | | | **Grades 9/10** | | | |
| | Lang = Language<br>Read = Literature (Reading)<br>Comp = Composition (Writing) | | | NmbSn = Number Sense and Operations<br>Pattrn = Patterns, Relations, and Algebra<br>Geom = Geometry<br>Meas = Measurement<br>Data = Data Analysis, Statistics, and Probability | | | | | Earth = Earth Science<br>Life = Life Science<br>Phys = Physical Sciences<br>Tch/E = Technology/Engineering | | | | Bio = Biology<br>Chem = Chemistry<br>Phys = Introductory Physics<br>T/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* | *Bio* | *Chem* | *Phys* | *T/E* |
| 1 | 5 | 2 | 2 | 3 | 1 | 2 | 3 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 1 | 0 |
| 2 | 181 | 262 | 88 | 192 | 77 | 36 | 39 | 70 | 42 | 48 | 40 | 35 | 29 | 27 | 25 | 0 |
| 3 | 6598 | 6660 | 2699 | 6861 | 2431 | 1275 | 1508 | 2445 | 1801 | 1811 | 1444 | 734 | 678 | 624 | 599 | 6 |
| 4 | 133 | 127 | 41 | 214 | 68 | 44 | 57 | 74 | 25 | 31 | 28 | 12 | 14 | 12 | 11 | 5 |
| 5 | 18 | 17 | 5 | 21 | 7 | 2 | 5 | 6 | 7 | 4 | 2 | 0 | 1 | 2 | 1 | 0 |

### Table 5.4.1.9: 2007 MCAS-Alt Statewide Score Distribution for Composite Level of Complexity by Content Area, All Tested Grades

*ALT = portfolios for students with significant cognitive disabilities*
*GL = portfolios measured against grade-level learning standards*
*MOD = portfolios measured against modified learning standards*
*MIS = not determined due to missing data*

| Score Point | Content Area | | | |
|---|---|---|---|---|
| | English Language Arts | Mathematics | Science and Technology/ Engineering | |
| | | | *Grades 5 & 8* | *High School* |
| ALT | 6638 | 6942 | 1912 | 617 |
| GL | 104 | 183 | 13 | 11 |
| MOD | 67 | 86 | 45 | 9 |
| MIS | 338 | 225 | 85 | 85 |

### Table 5.4.1.10: 2007 MCAS-Alt Statewide Score Distribution for Composite Level of Complexity, All Content Areas Combined

*ALT = portfolios for students with significant cognitive disabilities*
*GL = portfolios measured against grade-level learning standards*
*MOD = portfolios measured against modified learning standards*
*MIS = not determined due to missing data*

| Score Point | Grade Level | |
|---|---|---|
| | Grades 3–8 and 10 | High School (Grades 9/10) End-of-Course Science and Technology Tests |
| ALT | 15492 | 617 |
| GL | 300 | 11 |
| MOD | 198 | 9 |
| MIS | 648 | 85 |

## 5.4.2 Demonstration of Skills and Concepts

The tables in section 5.4.2 show the 2007 statewide distribution of all MCAS-Alt scores for Demonstration of Skills and Concepts in all portfolio strands, by grade. Table 5.4.2.8 shows the statewide score distribution by strand for all grades combined.

**Table 5.4.2.1: 2007 MCAS-Alt**
**Statewide Score Distribution for Demonstration of Skills and Concepts**
**by Strand, Grade 3**

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts*** Lang = Language Read = Literature (Reading) Comp = Composition (Writing) | | | ***Mathematics*** NmbSn = Number Sense and Operations Pattrns = Patterns, Relations, and Algebra Geom = Geometry Meas = Measurement Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering*** Earth = Earth Science Life = Life Science Phys = Physical Sciences Tch/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* |
| M | 76 | 56 | | 60 | 62 | | | | | | | |
| 1 | 1 | 0 | | 4 | 2 | | | | | | | |
| 2 | 4 | 8 | | 15 | 11 | | | | | | | |
| 3 | 53 | 65 | | 63 | 68 | | | | | | | |
| 4 | 900 | 911 | | 903 | 878 | | | | | | | |

**Table 5.4.2.2: 2007 MCAS-Alt**
**Statewide Score Distribution for Demonstration of Skills and Concepts**
**by Strand, Grade 4**

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts*** Lang = Language Read = Literature (Reading) Comp = Composition (Writing) | | | ***Mathematics*** NmbSn = Number Sense and Operations Pattrns = Patterns, Relations, and Algebra Geom = Geometry Meas = Measurement Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering*** Earth = Earth Science Life = Life Science Phys = Physical Sciences Tch/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* |
| M | 73 | 56 | 53 | 48 | | | | 52 | | | | |
| 1 | 4 | 5 | 7 | 4 | | | | 4 | | | | |
| 2 | 4 | 5 | 10 | 7 | | | | 6 | | | | |
| 3 | 62 | 93 | 109 | 75 | | | | 70 | | | | |
| 4 | 950 | 956 | 940 | 1054 | | | | 1028 | | | | |

## Table 5.4.2.3: 2007 MCAS-Alt
## Statewide Score Distribution for Demonstration of Skills and Concepts by Strand, Grade 5

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts*** Lang = Language Read = Literature (Reading) Comp = Composition (Writing) | | | ***Mathematics*** NmbSn = Number Sense and Operations Pattrns = Patterns, Relations, and Algebra Geom = Geometry Meas = Measurement Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering*** Earth = Earth Science Life = Life Science Phys = Physical Sciences Tch/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* |
| M | 85 | 73 | | 87 | | | 104 | | 85 | 90 | 67 | 22 |
| 1 | 0 | 0 | | 3 | | | 0 | | 1 | 0 | 0 | 0 |
| 2 | 7 | 7 | | 9 | | | 6 | | 5 | 7 | 5 | 0 |
| 3 | 77 | 98 | | 94 | | | 79 | | 86 | 53 | 73 | 24 |
| 4 | 954 | 985 | | 1032 | | | 1003 | | 835 | 874 | 727 | 293 |

## Table 5.4.2.4: 2007 MCAS-Alt
## Statewide Score Distribution for Demonstration of Skills and Concepts by Strand, Grade 6

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts*** Lang = Language Read = Literature (Reading) Comp = Composition (Writing) | | | ***Mathematics*** NmbSn = Number Sense and Operations Pattrns = Patterns, Relations, and Algebra Geom = Geometry Meas = Measurement Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering*** Earth = Earth Science Life = Life Science Phys = Physical Sciences Tch/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* |
| M | 77 | 64 | | 105 | 98 | | | | | | | |
| 1 | 0 | 1 | | 0 | 1 | | | | | | | |
| 2 | 9 | 11 | | 18 | 10 | | | | | | | |
| 3 | 78 | 94 | | 79 | 69 | | | | | | | |
| 4 | 881 | 905 | | 926 | 911 | | | | | | | |

## Table 5.4.2.5: 2007 MCAS-Alt
## Statewide Score Distribution for Demonstration of Skills and Concepts by Strand, Grade 7

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts*** Lang = Language Read = Literature (Reading) Comp = Composition (Writing) | | | ***Mathematics*** NmbSn = Number Sense and Operations Pattrns = Patterns, Relations, and Algebra Geom = Geometry Meas = Measurement Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering*** Earth = Earth Science Life = Life Science Phys = Physical Sciences Tch/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* |
| M | 82 | 72 | 78 | 106 | | | | 81 | | | | |
| 1 | 1 | 1 | 1 | 3 | | | | 4 | | | | |
| 2 | 11 | 9 | 13 | 11 | | | | 10 | | | | |
| 3 | 62 | 91 | 67 | 85 | | | | 67 | | | | |
| 4 | 832 | 826 | 820 | 874 | | | | 889 | | | | |

## Table 5.4.2.6: 2007 MCAS-Alt
## Statewide Score Distribution for Demonstration of Skills and Concepts by Strand, Grade 8

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts***<br>Lang = Language<br>Read = Literature (Reading)<br>Comp = Composition (Writing) | | | ***Mathematics***<br>NmbSn = Number Sense and Operations<br>Pattrns = Patterns, Relations, and Algebra<br>Geom = Geometry<br>Meas = Measurement<br>Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering***<br>Earth = Earth Science<br>Life = Life Science<br>Phys = Physical Sciences<br>Tch/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* |
| M | 84 | 73 | | 100 | | 82 | | | 84 | 97 | 57 | 45 |
| 1 | 1 | 1 | | 1 | | 1 | | | 0 | 1 | 1 | 0 |
| 2 | 5 | 12 | | 10 | | 9 | | | 6 | 6 | 5 | 4 |
| 3 | 56 | 76 | | 77 | | 66 | | | 51 | 57 | 43 | 25 |
| 4 | 787 | 779 | | 826 | | 839 | | | 723 | 710 | 536 | 368 |

## Table 5.4.2.7: 2007 MCAS-Alt
## Statewide Score Distribution for Demonstration of Skills and Concepts by Strand, Grades 10 and High School (9/10)

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts (grade 10 only)*** Lang = Language; Read = Literature (Reading); Comp = Composition (Writing) | | | ***Mathematics (grade 10 only)*** NmbSn = Number Sense and Operations; Pattrn = Patterns, Relations, and Algebra; Geom = Geometry; Meas = Measurement; Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering (grades 9/10 end-of-course tests)*** Bio = Biology; Chem = Chemistry; Phys = Introductory Physics; T/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrn* | *Geom* | *Meas* | *Data* | *Bio* | *Chem* | *Phys* | *T/E* |
| M | 81 | 75 | 94 | 90 | 72 | 51 | 67 | 32 | 103 | 88 | 82 | 0 |
| 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 |
| 2 | 13 | 16 | 16 | 15 | 9 | 14 | 12 | 8 | 13 | 9 | 12 | 0 |
| 3 | 70 | 99 | 82 | 70 | 58 | 53 | 46 | 24 | 61 | 51 | 47 | 0 |
| 4 | 643 | 633 | 636 | 522 | 399 | 311 | 366 | 388 | 546 | 516 | 495 | 11 |

## Table 5.4.2.8: 2007 MCAS-Alt
## Statewide Score Distribution for Demonstration of Skills and Concepts by Strand for All Grades

| | Content Area | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts*** | | | ***Mathematics*** | | | | | ***Science and Technology/Engineering*** | | | | | | | |
| | | | | | | | | | **Grades 5 and 8** | | | | **Grades 9/10** | | | |
| | Lang = Language; Read = Literature (Reading); Comp = Composition (Writing) | | | NmbSn = Number Sense and Operations; Pattrn = Patterns, Relations, and Algebra; Geom = Geometry; Meas = Measurement; Data = Data Analysis, Statistics, and Probability | | | | | Earth = Earth Science; Life = Life Science; Phys = Physical Sciences; Tch/E = Technology/Engineering | | | | Bio = Biology; Chem = Chemistry; Phys = Introductory Physics; T/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* | *Bio* | *Chem* | *Phys* | *T/E* |
| M | 552 | 461 | 216 | 584 | 225 | 126 | 164 | 163 | 169 | 187 | 124 | 67 | 103 | 88 | 82 | 0 |
| 1 | 7 | 8 | 9 | 16 | 3 | 2 | 0 | 8 | 1 | 1 | 1 | 0 | 0 | 1 | 1 | 0 |
| 2 | 51 | 63 | 34 | 82 | 28 | 20 | 14 | 21 | 11 | 13 | 10 | 4 | 13 | 9 | 12 | 0 |
| 3 | 452 | 607 | 249 | 536 | 188 | 115 | 118 | 156 | 137 | 110 | 116 | 49 | 61 | 51 | 47 | 0 |
| 4 | 5873 | 5929 | 2327 | 6073 | 2140 | 1096 | 1316 | 2247 | 1558 | 1584 | 1263 | 661 | 546 | 516 | 495 | 11 |

## 5.4.3 Independence

The tables in section 5.4.3 show the 2007 statewide distribution of MCAS-Alt scores for Independence in all strands and grades. Table 5.4.3.8 shows the statewide score distribution by strand for all tested grades combined.

**Table 5.4.3.1: 2007 MCAS-Alt**
**Statewide Score Distribution for Independence by Strand, Grade 3**

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts*** Lang = Language Read = Literature (Reading) Comp = Composition (Writing) | | | ***Mathematics*** NmbSn = Number Sense and Operations Pattrns = Patterns, Relations, and Algebra Geom = Geometry Meas = Measurement Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering*** Earth = Earth Science Life = Life Science Phys = Physical Sciences Tch/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* |
| M | 76 | 56 | | 60 | 62 | | | | | | | |
| 1 | 2 | 3 | | 4 | 6 | | | | | | | |
| 2 | 18 | 19 | | 20 | 16 | | | | | | | |
| 3 | 97 | 95 | | 107 | 99 | | | | | | | |
| 4 | 841 | 867 | | 854 | 838 | | | | | | | |

**Table 5.4.3.2: 2007 MCAS-Alt**
**Statewide Score Distribution for Independence by Strand, Grade 4**

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts*** Lang = Language Read = Literature (Reading) Comp = Composition (Writing) | | | ***Mathematics*** NmbSn = Number Sense and Operations Pattrns = Patterns, Relations, and Algebra Geom = Geometry Meas = Measurement Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering*** Earth = Earth Science Life = Life Science Phys = Physical Sciences Tch/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* |
| M | 73 | 56 | 53 | 48 | | | | 52 | | | | |
| 1 | 5 | 6 | 2 | 9 | | | | 6 | | | | |
| 2 | 11 | 15 | 39 | 10 | | | | 24 | | | | |
| 3 | 101 | 122 | 145 | 122 | | | | 123 | | | | |
| 4 | 903 | 916 | 880 | 999 | | | | 955 | | | | |

**Table 5.4.3.3: 2007 MCAS-Alt**
**Statewide Score Distribution for Independence by Strand, Grade 5**

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts*** Lang = Language Read = Literature (Reading) Comp = Composition (Writing) | | | ***Mathematics*** NmbSn = Number Sense and Operations Pattrns = Patterns, Relations, and Algebra Geom = Geometry Meas = Measurement Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering*** Earth = Earth Science Life = Life Science Phys = Physical Sciences Tch/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* |
| M | 85 | 73 | | 87 | | | 104 | | 85 | 90 | 67 | 22 |
| 1 | 3 | 3 | | 8 | | | 9 | | 5 | 5 | 6 | 2 |
| 2 | 17 | 23 | | 23 | | | 18 | | 16 | 19 | 16 | 6 |
| 3 | 98 | 136 | | 139 | | | 143 | | 119 | 93 | 96 | 39 |
| 4 | 920 | 928 | | 968 | | | 918 | | 787 | 817 | 687 | 270 |

## Table 5.4.3.4: 2007 MCAS-Alt
## Statewide Score Distribution for Independence by Strand, Grade 6

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts***<br>Lang = Language<br>Read = Literature (Reading)<br>Comp = Composition (Writing) | | | ***Mathematics***<br>NmbSn = Number Sense and Operations<br>Pattrns = Patterns, Relations, and Algebra<br>Geom = Geometry<br>Meas = Measurement<br>Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering***<br>Earth = Earth Science<br>Life = Life Science<br>Phys = Physical Sciences<br>Tch/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* |
| M | 77 | 64 | | 105 | 99 | | | | | | | |
| 1 | 6 | 6 | | 11 | 7 | | | | | | | |
| 2 | 20 | 22 | | 26 | 23 | | | | | | | |
| 3 | 99 | 139 | | 110 | 101 | | | | | | | |
| 4 | 843 | 844 | | 876 | 859 | | | | | | | |

## Table 5.4.3.5: 2007 MCAS-Alt
## Statewide Score Distribution for Independence by Strand, Grade 7

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts***<br>Lang = Language<br>Read = Literature (Reading)<br>Comp = Composition (Writing) | | | ***Mathematics***<br>NmbSn = Number Sense and Operations<br>Pattrns = Patterns, Relations, and Algebra<br>Geom = Geometry<br>Meas = Measurement<br>Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering***<br>Earth = Earth Science<br>Life = Life Science<br>Phys = Physical Sciences<br>Tch/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* |
| M | 82 | 72 | 78 | 106 | | | | 81 | | | | |
| 1 | 5 | 4 | 7 | 10 | | | | 9 | | | | |
| 2 | 22 | 25 | 23 | 18 | | | | 24 | | | | |
| 3 | 97 | 119 | 126 | 108 | | | | 119 | | | | |
| 4 | 782 | 779 | 745 | 837 | | | | 818 | | | | |

## Table 5.4.3.6: 2007 MCAS-Alt
## Statewide Score Distribution for Independence by Strand, Grade 8

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts***<br>Lang = Language<br>Read = Literature (Reading)<br>Comp = Composition (Writing) | | | ***Mathematics***<br>NmbSn = Number Sense and Operations<br>Pattrns = Patterns, Relations, and Algebra<br>Geom = Geometry<br>Meas = Measurement<br>Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering***<br>Earth = Earth Science<br>Life = Life Science<br>Phys = Physical Sciences<br>Tch/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* |
| M | 84 | 73 | | 100 | | 82 | | | 84 | 96 | 57 | 45 |
| 1 | 2 | 4 | | 4 | | 6 | | | 3 | 2 | 4 | 1 |
| 2 | 23 | 20 | | 12 | | 14 | | | 14 | 25 | 9 | 9 |
| 3 | 86 | 118 | | 95 | | 94 | | | 88 | 96 | 71 | 41 |
| 4 | 738 | 726 | | 803 | | 801 | | | 675 | 652 | 501 | 346 |

## Table 5.4.3.7: 2007 MCAS-Alt
## Statewide Score Distribution for Independence by Strand, Grades 10 and High School (9/10)

| | Content Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts (grade 10 only)*** Lang = Language; Read = Literature (Reading); Comp = Composition (Writing) | | | ***Mathematics (grade 10 only)*** NmbSn = Number Sense and Operations; Pattrn = Patterns, Relations, and Algebra; Geom = Geometry; Meas = Measurement; Data = Data Analysis, Statistics, and Probability | | | | | ***Science and Technology/Engineering (grades 9/10 end-of-course tests)*** Bio = Biology; Chem = Chemistry; Phys = Introductory Physics; T/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrn* | *Geom* | *Meas* | *Data* | *Bio* | *Chem* | *Phys* | *T/E* |
| M | 80 | 75 | 94 | 90 | 72 | 51 | 67 | 32 | 102 | 88 | 82 | 0 |
| 1 | 9 | 6 | 11 | 8 | 7 | 8 | 5 | 8 | 9 | 5 | 5 | 0 |
| 2 | 25 | 41 | 45 | 22 | 29 | 21 | 18 | 10 | 17 | 36 | 31 | 0 |
| 3 | 102 | 113 | 123 | 80 | 73 | 45 | 63 | 66 | 96 | 90 | 87 | 1 |
| 4 | 591 | 588 | 556 | 498 | 357 | 305 | 338 | 336 | 499 | 446 | 432 | 10 |

## Table 5.4.3.8: 2007 MCAS-Alt
## Statewide Score Distribution for Independence by Strand for All Tested Grades Combined

| | Content Area | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | ***English Language Arts*** | | | ***Mathematics*** | | | | | ***Science and Technology/Engineering*** | | | | | | | |
| | | | | | | | | | **Grades 5 and 8** | | | | **Grades 9/10** | | | |
| | Lang = Language; Read = Literature (Reading); Comp = Composition (Writing) | | | NmbSn = Number Sense and Operations; Pattrn = Patterns, Relations, and Algebra; Geom = Geometry; Meas = Measurement; Data = Data Analysis, Statistics, and Probability | | | | | Earth = Earth Science; Life = Life Science; Phys = Physical Sciences; Tch/E = Technology/Engineering | | | | Bio = Biology; Chem = Chemistry; Phys = Introductory Physics; T/E = Technology/Engineering | | | |
| **Score Point** | *Lang* | *Read* | *Comp* | *NmbSn* | *Pattrns* | *Geom* | *Meas* | *Data* | *Earth* | *Life* | *Phys* | *Tch/E* | *Bio* | *Chem* | *Phys* | *T/E* |
| M | 31 | 31 | 19 | 54 | 20 | 12 | 12 | 21 | 8 | 7 | 10 | 3 | 9 | 5 | 5 | 0 |
| 1 | 136 | 163 | 103 | 131 | 67 | 32 | 32 | 54 | 30 | 44 | 25 | 15 | 17 | 36 | 31 | 0 |
| 2 | 673 | 830 | 386 | 757 | 271 | 135 | 198 | 303 | 207 | 189 | 167 | 80 | 96 | 90 | 87 | 1 |
| 3 | 5544 | 5583 | 2111 | 5765 | 2000 | 1054 | 1206 | 2054 | 1462 | 1469 | 1188 | 616 | 499 | 446 | 432 | 10 |
| 4 | 551 | 461 | 216 | 584 | 226 | 126 | 164 | 163 | 169 | 186 | 124 | 67 | 102 | 88 | 82 | 0 |

## 5.4.4 Self-Evaluation

The tables in section 5.4.4 show the 2007 statewide MCAS-Alt score distribution for Self-Evaluation in each content area and grade tested. Table 5.4.4.8 shows the statewide score distribution for all tested grades combined. Table 5.4.4.9 shows the 2007 statewide MCAS-Alt Self-Evaluation score distributions for combined content areas.

**Table 5.4.4.1: 2007 MCAS-Alt Statewide Score Distribution for Self-Evaluation by Content Area, Grade 3**

| Score Point | Content Area | |
|---|---|---|
| | English Language Arts | Mathematics |
| M | 13 | 15 |
| 1 | 49 | 26 |
| 2 | 22 | 21 |
| 3 | 13 | 23 |
| 4 | 960 | 958 |

**Table 5.4.4.2: 2007 MCAS-Alt Statewide Score Distribution for Self-Evaluation by Content Area, Grade 4**

| Score Point | Content Area | |
|---|---|---|
| | English Language Arts | Mathematics |
| M | 16 | 16 |
| 1 | 13 | 39 |
| 2 | 65 | 19 |
| 3 | 54 | 29 |
| 4 | 984 | 1083 |

**Table 5.4.4.3: 2007 MCAS-Alt Statewide Score Distribution for Self-Evaluation by Content Area, Grade 5**

| Score Point | Content Area | | |
|---|---|---|---|
| | English Language Arts | Mathematics | Science and Technology/ Engineering |
| M | 23 | 22 | 24 |
| 1 | 70 | 46 | 13 |
| 2 | 25 | 29 | 36 |
| 3 | 26 | 24 | 65 |
| 4 | 1027 | 1103 | 960 |

### Table 5.4.4.4: 2007 MCAS-Alt
### Statewide Score Distribution for Self-Evaluation by Content Area, Grade 6

| Score Point | Content Area | |
|---|---|---|
| | English Language Arts | Mathematics |
| M | 17 | 14 |
| 1 | 49 | 58 |
| 2 | 25 | 20 |
| 3 | 18 | 18 |
| 4 | 969 | 1020 |

### Table 5.4.4.5: 2007 MCAS-Alt
### Statewide Score Distribution for Self-Evaluation by Content Area, Grade 7

| Score Point | Content Area | |
|---|---|---|
| | English Language Arts | Mathematics |
| M | 15 | 15 |
| 1 | 12 | 43 |
| 2 | 64 | 23 |
| 3 | 61 | 35 |
| 4 | 859 | 964 |

### Table 5.4.4.6: 2007 MCAS-Alt
### Statewide Score Distribution for Self-Evaluation by Content Area, Grade 8

| Score Point | Content Area | | |
|---|---|---|---|
| | English Language Arts | Mathematics | Science and Technology/ Engineering |
| M | 15 | 16 | 18 |
| 1 | 36 | 35 | 22 |
| 2 | 7 | 13 | 41 |
| 3 | 24 | 24 | 46 |
| 4 | 869 | 927 | 830 |

### Table 5.4.4.7: 2007 MCAS-Alt
### Statewide Score Distribution for Self-Evaluation by Content Area, Grades 10 and High School (9/10)

| Score Point | Content Area | | |
|---|---|---|---|
| | English Language Arts (grade 10 only) | Mathematics (grade 10 only) | Science and Technology/ Engineering (grades 9/10) |
| M | 16 | 13 | 17 |
| 1 | 15 | 13 | 57 |
| 2 | 37 | 28 | 33 |
| 3 | 37 | 48 | 49 |
| 4 | 642 | 656 | 566 |

**Table 5.4.4.8: 2007 MCAS-Alt**
**Statewide Score Distribution for Self-Evaluation**
**by Content Area for All Tested Grades**

| Score Point | Content Area | | | |
|---|---|---|---|---|
| | English Language Arts | Mathematics | Science and Technology/ Engineering | |
| | | | *Grades 5 & 8* | *High School* |
| M | 115 | 111 | 42 | 17 |
| 1 | 244 | 260 | 35 | 57 |
| 2 | 245 | 153 | 77 | 33 |
| 3 | 233 | 201 | 111 | 49 |
| 4 | 6310 | 6711 | 1790 | 566 |

**Table 5.4.4.9: 2007 MCAS-Alt**
**Statewide Score Distribution for Self-Evaluation,**
**All Content Areas Combined**

| Score Point | Grade Level | |
|---|---|---|
| | Grades 3–8 and 10 | High School (Grades 9/10) End-of-Course Science and Technology Tests |
| M | 268 | 17 |
| 1 | 539 | 57 |
| 2 | 475 | 33 |
| 3 | 545 | 49 |
| 4 | 14811 | 566 |

## 5.4.5 Generalized Performance

The tables in section 5.4.5 show the 2007 statewide MCAS-Alt score distributions for Generalized Performance, disaggregated by content area. Table 5.4.5.8 shows the statewide score distribution by content area. Table 5.4.5.9 shows the statewide score distribution for all tested grades combined.

**Table 5.4.5.1: 2007 MCAS-Alt Statewide Score Distribution**
**for Generalized Performance by Content Area, Grade 3**

| Score Point | Content Area | | | |
|---|---|---|---|---|
| | ***English Language Arts*** | | ***Mathematics*** | |
| | *Number* | *Percent* | *Number* | *Percent* |
| 1 | 72 | 6.81 | 72 | 6.90 |
| 2 | 130 | 12.30 | 75 | 7.19 |
| 3 | 293 | 27.72 | 346 | 33.17 |
| 4 | 562 | 53.17 | 550 | 52.73 |

**Table 5.4.5.2: 2007 MCAS-Alt Statewide Score Distribution for Generalized Performance by Content Area, Grade 4**

| Score Point | Content Area | | | |
|---|---|---|---|---|
| | *English Language Arts* | | *Mathematics* | |
| | *Number* | *Percent* | *Number* | *Percent* |
| 1 | 49 | 4.33 | 55 | 4.64 |
| 2 | 250 | 22.08 | 133 | 11.21 |
| 3 | 340 | 30.04 | 339 | 28.58 |
| 4 | 493 | 43.55 | 659 | 55.56 |

**Table 5.4.5.3: 2007 MCAS-Alt Statewide Score Distribution for Generalized Performance by Content Area, Grade 5**

| Score Point | Content Area | | | | | |
|---|---|---|---|---|---|---|
| | *English Language Arts* | | *Mathematics* | | *Science and Technology/Engineering* | |
| | *Number* | *Percent* | *Number* | *Percent* | *Number* | *Percent* |
| 1 | 67 | 5.72 | 63 | 5.15 | 28 | 2.55 |
| 2 | 154 | 13.15 | 152 | 12.42 | 134 | 12.20 |
| 3 | 333 | 28.44 | 358 | 29.25 | 277 | 25.23 |
| 4 | 617 | 52.69 | 651 | 53.19 | 659 | 60.02 |

**Table 5.4.5.4: 2007 MCAS-Alt Statewide Score Distribution for Generalized Performance by Content Area, Grade 6**

| Score Point | Content Area | | | |
|---|---|---|---|---|
| | *English Language Arts* | | *Mathematics* | |
| | *Number* | *Percent* | *Number* | *Percent* |
| 1 | 62 | 5.75 | 57 | 5.04 |
| 2 | 137 | 12.71 | 147 | 13.01 |
| 3 | 319 | 29.59 | 350 | 30.97 |
| 4 | 560 | 51.95 | 576 | 50.97 |

**Table 5.4.5.5: 2007 MCAS-Alt Statewide Score Distribution for Generalized Performance by Content Area, Grade 7**

| Score Point | Content Area | | | |
|---|---|---|---|---|
| | *English Language Arts* | | *Mathematics* | |
| | *Number* | *Percent* | *Number* | *Percent* |
| 1 | 34 | 3.36 | 41 | 3.80 |
| 2 | 212 | 20.97 | 128 | 11.85 |
| 3 | 305 | 30.17 | 285 | 26.39 |
| 4 | 460 | 45.50 | 626 | 57.96 |

### Table 5.4.5.6: 2007 MCAS-Alt Statewide Score Distribution for Generalized Performance by Content Area, Grade 8

| Score Point | Content Area | | | | | |
|---|---|---|---|---|---|---|
| | *English Language Arts* | | *Mathematics* | | *Science and Technology/Engineering* | |
| | *Number* | *Percent* | *Number* | *Percent* | *Number* | *Percent* |
| 1 | 50 | 5.26 | 37 | 3.65 | 22 | 2.30 |
| 2 | 106 | 11.15 | 114 | 11.23 | 106 | 11.08 |
| 3 | 272 | 28.60 | 285 | 28.08 | 207 | 21.63 |
| 4 | 523 | 54.99 | 579 | 57.04 | 622 | 64.99 |

### Table 5.4.5.7: 2007 MCAS-Alt Statewide Score Distribution for Generalized Performance by Content Area, Grades 10 and High School (9/10)

| Score Point | Content Area | | | | | |
|---|---|---|---|---|---|---|
| | *English Language Arts (grade 10 only)* | | *Mathematics (grade 10 only)* | | *Science and Technology/Engineering (grades 9/10)* | |
| | *Number* | *Percent* | *Number* | *Percent* | *Number* | *Percent* |
| 1 | 59 | 7.90 | 49 | 6.46 | 50 | 6.93 |
| 2 | 191 | 25.57 | 157 | 20.71 | 135 | 18.70 |
| 3 | 262 | 35.07 | 325 | 42.88 | 203 | 28.12 |
| 4 | 235 | 31.46 | 227 | 29.95 | 334 | 46.26 |

### Table 5.4.5.8: 2007 MCAS-Alt Statewide Score Distribution for Generalized Performance by Content Area for All Tested Grades

| Score Point | Content Area | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | English Language Arts | | Mathematics | | Science and Technology/Engineering | | | |
| | | | | | *Grades 5 and 8* | | *High School* | |
| | *Number* | *Percent* | *Number* | *Percent* | *Number* | *Percent* | *Number* | *Percent* |
| 1 | 393 | 5.50 | 374 | 5.03 | 50 | 2.43 | 50 | 6.93 |
| 2 | 1180 | 16.51 | 906 | 12.18 | 240 | 11.68 | 135 | 18.70 |
| 3 | 2124 | 29.72 | 2288 | 30.77 | 484 | 23.55 | 203 | 28.12 |
| 4 | 3450 | 48.27 | 3868 | 52.02 | 1281 | 62.34 | 334 | 46.26 |

### Table 5.4.5.9: 2007 MCAS-Alt Statewide Score Distribution for Generalized Performance, All Tested Content Areas Combined

| Score Point | Grade Level | | | |
|---|---|---|---|---|
| | Grades 3–8 and 10 | | High School (Grades 9/10) End-of-Course Science and Technology/Engineering | |
| | *Number* | *Percent* | *Number* | *Percent* |
| 1 | 817 | 4.91 | 50 | 6.93 |
| 2 | 2326 | 13.98 | 135 | 18.70 |
| 3 | 4896 | 29.43 | 203 | 28.12 |
| 4 | 8599 | 51.68 | 334 | 46.26 |

## 5.5 MCAS-Alt Participation Data

MCAS-Alt student portfolios were measured against either *alternate achievement standards, modified achievement standards,* or *grade-level achievement standards,* based on the following criteria:

- the level of complexity of the evidence in the portfolio
- whether it was determined that the student was working at or near grade-level expectations, somewhat below grade-level expectations, or well below grade-level expectations (pursuant to U.S. Department of Education Title 1 regulations; also see section 4.2.1.2.A)

Tables 5.5.1 through 5.5.7 show statewide participation data for the 2007 MCAS-Alt disaggregated by method of measurement (i.e., the numbers and percentages of MCAS-Alts measured on grade-level standards and on alternate achievement standards).

**Table 5.5.1: 2007 MCAS-Alt Participation Results**
**Grade 3 English Language Arts and Mathematics**

| 2007 MCAS-Alt Participation | | | | |
|---|---|---|---|---|
| **Assessment format and Achievement Standard Measured** | **Content Area** | | | |
| | English Language Arts | | Mathematics | |
| | **Number** | **Percent*** | **Number** | **Percent*** |
| Standard MCAS test, measured on grade-level achievement standards | 70254 | 98.52 | 70280 | 98.54 |
| MCAS-Alt, measured on grade-level achievement standards | 11 | .02 | 16 | .02 |
| MCAS-Alt, measured on modified achievement standards | 10 | .01 | 7 | .01 |
| MCAS-Alt, measured on alternate achievement standards | 995 | 1.40 | 997 | 1.40 |
| MCAS-Alt, achievement standards level not determined | 41 | .06 | 23 | .03 |
| **Total** | **71311** | | **71323** | |

*Percentages may not total 100 due to rounding.

**Table 5.5.2: 2007 MCAS-Alt Participation Results**
**Grade 4 English Language Arts and Mathematics**

| 2007 MCAS-Alt Participation | | | | |
|---|---|---|---|---|
| **Assessment format and Achievement Standard Measured** | **Content Area** | | | |
| | English Language Arts | | Mathematics | |
| | **Number** | **Percent*** | **Number** | **Percent*** |
| Standard MCAS test, measured on Grade-level achievement standards | 69385 | 98.39 | 69459 | 98.32 |
| MCAS-Alt, measured on Grade-level achievement standards | 9 | .01 | 29 | .04 |
| MCAS-Alt, measured on Modified achievement standards | 14 | .02 | 7 | .01 |
| MCAS-Alt, measured on Alternate achievement standards | 1046 | 1.48 | 1123 | 1.59 |
| MCAS-Alt, achievement standards level not determined | 63 | .09 | 27 | .04 |
| **Total** | **70517** | | **70645** | |

*Percentages may not total 100 due to rounding.

## Table 5.5.3: 2007 MCAS-Alt Participation Results
## Grade 5 English Language Arts, Mathematics, and Science and Technology/Engineering

| 2007 MCAS-Alt Participation | | | | | | |
|---|---|---|---|---|---|---|
| **Assessment format and Achievement Standard Measured** | **Content Area** | | | | | |
| | English Language Arts | | Mathematics | | Science and Technology/Engineering | |
| | **Number** | **Percent*** | **Number** | **Percent*** | **Number** | **Percent*** |
| Standard MCAS test, measured on Grade-level achievement standards | 70149 | 98.36 | 70128 | 98.28 | 70240 | 98.46 |
| MCAS-Alt, measured on Grade-level achievement standards | 25 | .04 | 39 | .05 | 6 | .01 |
| MCAS-Alt, measured on Modified achievement standards | 16 | .02 | 19 | .03 | 22 | .03 |
| MCAS-Alt, measured on alternate achievement standards | 1073 | 1.50 | 1132 | 1.59 | 1032 | 1.45 |
| MCAS-Alt, achievement standards level not determined | 57 | .08 | 34 | .05 | 38 | .05 |
| **Total** | **71320** | | **71352** | | **71338** | |

*Percentages may not total 100 due to rounding.

## Table 5.5.4: 2007 MCAS-Alt Participation Results
## Grade 6 English Language Arts and Mathematics

| 2007 MCAS-Alt Participation | | | | |
|---|---|---|---|---|
| **Assessment format and Achievement Standard Measured** | **Content Area** | | | |
| | English Language Arts | | Mathematics | |
| | **Number** | **Percent*** | **Number** | **Percent*** |
| Standard MCAS test, measured on grade-level achievement standards | 71809 | 98.52 | 71759 | 98.45 |
| MCAS-Alt, measured on grade-level achievement standards | 26 | .04 | 35 | .05 |
| MCAS-Alt, measured on modified achievement standards | 9 | .01 | 15 | .02 |
| MCAS-Alt, measured on alternate achievement standards | 1003 | 1.38 | 1031 | 1.41 |
| MCAS-Alt, achievement standards level not determined | 40 | .05 | 49 | .07 |
| **Total** | **72887** | | **72889** | |

*Percentages may not total 100 due to rounding.

## Table 5.5.5: 2007 MCAS-Alt Participation Results
## Grade 7 English Language Arts and Mathematics

| 2007 MCAS-Alt Participation | | | | |
|---|---|---|---|---|
| **Assessment format and Achievement Standard Measured** | **Content Area** | | | |
| | English Language Arts | | Mathematics | |
| | **Number** | **Percent*** | **Number** | **Percent*** |
| Standard MCAS test, measured on grade-level achievement standards | 72566 | 98.63 | 72512 | 98.53 |
| MCAS-Alt, measured on grade-level achievement standards | 13 | .02 | 32 | .04 |
| MCAS-Alt, measured on modified achievement standards | 9 | .01 | 9 | .01 |
| MCAS-Alt, measured on alternate achievement standards | 925 | 1.26 | 1001 | 1.36 |
| MCAS-Alt, achievement standards level not determined | 64 | .09 | 38 | .05 |
| **Total** | **73577** | | **73592** | |

*Percentages may not total 100 due to rounding.

## Table 5.5.6: 2007 MCAS-Alt Participation Results
## Grade 8 English Language Arts, Mathematics, and Science and Technology/Engineering

| 2007 MCAS-Alt Participation | | | | | | |
|---|---|---|---|---|---|---|
| **Assessment format and Achievement Standard Measured** | **Content Area** | | | | | |
| | English Language Arts | | Mathematics | | Science and Technology/Engineering | |
| | **Number** | **Percent*** | **Number** | **Percent*** | **Number** | **Percent*** |
| Standard MCAS test, measured on grade-level achievement standards | 73482 | 98.72 | 73304 | 98.63 | 73300 | 98.71 |
| MCAS-Alt, measured on grade-level achievement standards | 14 | .02 | 22 | .03 | 7 | .01 |
| MCAS-Alt, measured on modified achievement standards | 5 | .01 | 21 | .03 | 23 | .03 |
| MCAS-Alt, measured on alternate achievement standards | 901 | 1.21 | 948 | 1.28 | 880 | 1.19 |
| MCAS-Alt, achievement standards level not determined | 31 | .04 | 24 | .03 | 47 | .06 |
| **Total** | **74433** | | **74319** | | **74257** | |

*Percentages may not total 100 due to rounding.

## Table 5.5.7: 2007 MCAS-Alt Participation Results
## Grade 10 English Language Arts and Mathematics; and Grades 9/10 Science and Technology/Engineering

| 2007 MCAS-Alt Participation | | | | | | |
|---|---|---|---|---|---|---|
| **Assessment format and Achievement Standard Measured** | **Content Area** | | | | | |
| | English Language Arts (grade 10 only) | | Mathematics (grade 10 only) | | Science and Technology/Engineering (grades 9/10) | |
| | **Number** | **Percent*** | **Number** | **Percent*** | **Number** | **Percent*** |
| Standard MCAS test, measured on grade-level achievement standards | 71724 | 98.97 | 70934 | 98.94 | 101087 | 99.29 |
| MCAS-Alt, measured on grade-level achievement standards | 6 | .01 | 10 | .01 | 11 | .01 |
| MCAS-Alt, measured on modified achievement standards | 4 | .01 | 8 | .01 | 9 | .01 |
| MCAS-Alt, measured on alternate achievement standards | 695 | .96 | 710 | .99 | 617 | .61 |
| MCAS-Alt, achievement standards level not determined | 42 | .06 | 30 | .04 | 85 | .08 |
| **Total** | **72471** | | **71692** | | **101809** | |

*Percentages may not total 100 due to rounding.

## 5.6 MCAS Spring 2007 Reports of Test Results

The following reports provided spring 2007 MCAS test results:

- Parent/Guardian Report. Each Parent/Guardian Report provided results for one student. Two copies of the student's report were sent to the student's school, one to be placed in the student's school record (along with a label for the student's file) and one to be distributed to the student's parent or guardian along with an interpretive guide (*Guide to the 2007 MCAS for Parents/Guardians*). The Parent/Guardian Report was translated into 9 different languages (Cape Verdean, Simplified Chinese, Traditional Chinese, Haitian Creole, Khmer, Portuguese, Russian, Spanish, and Vietnamese), based on the state's demographics. Sample reports in English for both the standard tests and for the MCAS-Alt are provided in Appendix I.

- School Report. Each School Report provided results for one tested grade and content area for the school receiving the report, for the school district, and for the state. This report was provided to schools online via a secure website. Schools that tested more than one content area and/or grade received a separate report for each grade and content area tested. An interpretive guide for the report (Guide to Interpreting the Spring 2007MCAS Reports for Schools and Districts) was available to schools on the Department's website (www.doe.mass.edu/mcas). A sample report is provided in Appendix J.

- District Report. Each District Report provided combined results for one tested grade and content area for all schools in the district as well as for all schools statewide. This report was provided online via a secure website. The format of the District Report was the same as that of the School Report. Districts received a separate report for each grade and content area tested in the district. An interpretive guide for the report (*Guide to Interpreting the Spring 2007 MCAS Reports for Schools and Districts*) was available to districts on the Department's website (www.doe.mass.edu/mcas). For a sample report, see the School Report provided in Appendix J.

- Test Item Analysis Reports. Samples of both reports described below are provided in Appendix K.

  - School Test Item Analysis Roster. This report provided results for each student in a school in one grade and content area test, showing points scored for each constructed-response item, as well as the student's correct or incorrect choice for each multiple-choice item.

  - District Test Item Analysis Report Summary. This report provided overall performance for all students in one grade at the district level and at the state level for each item of a content area test. Each report showed average scores and percentages across the district and state for each correct/incorrect multiple-choice

answer and for each score point on constructed-response items on the test. **Each district receives a separate *Test Item Analysis Report Summary* for each content area and grade tested in the district.**

- School Test Item Analysis Report Summary. This report provided overall performance for all students in one grade at the school, district, and state levels for each item of a content area test. Each report showed average scores and percentages across the school, district, and state for each correct/incorrect multiple-choice answer and for each score point on constructed-response items on the test. **Each school receives a separate *Test Item Analysis Report Summary* for each content area and grade tested in the school.**

- Statewide Report. This report was made available to the public and reported via the Department's website at www.doe.mass.edu/mcas/results.html.

# 6. STATISTICAL AND PSYCHOMETRIC SUMMARIES

## 6.1 Item Analyses

As noted in Brown (1983), "A test is only as good as the items it contains." A complete evaluation of a test's quality must include an evaluation of each question. Both the *Standards for Educational and Psychological Testing* and the *Code of Fair Testing Practices in Education* include standards for identifying quality questions. Questions should assess only knowledge or skills that are identified as part of the domain being measured and should avoid assessing irrelevant factors. They should also be unambiguous and free of grammatical errors, potentially insensitive content or language, and other confounding characteristics. Further, questions must not unfairly disadvantage test takers from particular racial, ethnic, or gender groups.

Both qualitative and quantitative analyses are conducted to ensure that MCAS questions meet these standards. Previous sections in this report have outlined the qualitative checks on question quality. Three categories of statistical evaluations are performed to ensure that MCAS questions meet these standards:

- difficulty indices
- item-test correlation
- subgroup differences in item performance (differential item functioning)

The results of these evaluations for the 2007 MCAS administration are presented below.

### 6.1.1 Difficulty Indices

All common and equating items were evaluated in terms of difficulty and relationship to overall score according to standard classical test theory practice. Difficulty was measured by averaging the proportion of points received across all students who received the item.

Multiple-choice and short-answer items (i.e., dichotomous items) were scored correct or incorrect; for these items, the difficulty index was simply the proportion of students who answered correctly.

Open-response items and ELA Compositions (i.e., polytomous items) received scores within ranges specific to the item type.

- Open-response items were scored 0–4.
- ELA Compositions were scored by two different scorers, each of whom assigned a separate score for each ELA Composition scoring dimension:
  - one score for Standard English Conventions (1–4 points)
  - one score for Topic Development (1–6 points)

The two scorers' scores were combined (summed) for each dimension, resulting in a final Standard English Conventions score in the range 2–8 and a final Topic Development score in the range 2–12.

By computing difficulty as the average *proportion* of points received, the indices for dichotomous items and polytomous items were effectively placed on the same scale (i.e., 0.00 to 1.00).

Although this index is traditionally referred to as a measure of difficulty (as it is here), it is properly interpreted as an easiness index, because larger values indicate easier items. An index of 1.00 indicates that every student received full credit for the item; such items provide little information about differences in student ability, but do indicate knowledge or skills that have been mastered by most students. Similarly, an index of 0.00 indicates that no student received credit for the item; such items provide little information about differences in student ability, but may indicate knowledge or skills that have not yet been mastered by most students.

In general, to provide best measurement, difficulty indices should range from near-chance performance (i.e., 0.25 for four-option, multiple-choice items; essentially 0.00 for open-response items) to 0.90. Indices outside this range indicate items that were either too difficult or too easy for the target population. Nonetheless, on a standards-referenced assessment such as MCAS, it may be appropriate to include some items with very low or very high item difficulty values to ensure sufficient content coverage.

### 6.1.2 Item-Test Correlation

Within classical test theory, item-test correlation is referred to as an item's *discrimination*, because it indicates the extent to which successful performance on the item discriminates between high and low scores on the full test. For MCAS open-response items, the item-test correlation used as the discrimination index was the *Pearson product-moment* correlation; for MCAS dichotomous items, the *point-biserial* correlation. The theoretical range of these statistics is –1.0 to +1.0, with a typical range from 0.2 to 0.6.

The discrimination index can be interpreted as a measure of construct consistency, because the strength of correlation measures how closely an item assesses the same knowledge and skills assessed by other items that contribute to the criterion total score. For the 2007 MCAS administration, the criterion score for each item was the total score for all items.

### 6.1.3 Summary of Item Analysis Results

Summary statistics of the difficulty and discrimination indices for each item are provided in tables 6.1.3.1 through 6.1.3.7. In general, the 2007 MCAS item difficulty and discrimination indices were within acceptable and expected ranges.

It should be noted that comparison of indices across grade levels is complicated, because the indices are population-dependent. To be able to make direct comparisons, either the items or

students must be common across groups. Since this was not the case for MCAS administrations, it cannot be determined whether any differences in performance across grade levels were due to differences in student ability, differences in item difficulty, or both. However, difficulty indices tended to decrease as grade level increased, i.e., average item scores were lower at higher grades.

Also, comparing difficulty indices of multiple-choice and constructed-response items (for the MCAS administration: short-answer items, open-response items, or ELA Composition writing prompts) is inappropriate because multiple-choice items can be answered correctly by guessing. Difficulty indices for multiple-choice items tend to be higher than difficulty indices for short-answer items, open-response items, or ELA Composition writing prompts (i.e., students perform better on multiple-choice items than they do on other item types). Similarly, when compared to multiple-choice items, the larger range of allowable scores for constructed-response items would tend, all else being equal, to yield discrimination indices that are larger than those for multiple-choice items (due to the effect on correlations of score variability). Note: In tables 6.1.3.1 through 6.1.3.7, the numbers in "( )" denote standard deviation values.

**Table 6.1.3.1: MCAS 2007**
**Average Difficulty and Discrimination of Different Item Types**
**Grades 3 through 8 and Grade 10 English Language Arts**

| | | Item Type | | |
|---|---|---|---|---|
| **Grade Level** | **Statistics** | *All* | *Multiple-Choice* | *Open-Response and Writing Prompt* |
| 3 | Difficulty | 0.78 ( 0.10) | 0.79 ( 0.09) | 0.58 ( 0.10) |
| | Discrimination | 0.45 ( 0.07) | 0.44 ( 0.06) | 0.54 ( 0.08) |
| | Number of Items | 78 | 72 | 6 |
| 4 | Difficulty | 0.76 ( 0.13) | 0.79 ( 0.09) | 0.51 ( 0.04) |
| | Discrimination | 0.43 ( 0.08) | 0.41 ( 0.07) | 0.54 ( 0.06) |
| | Number of Items | 82 | 72 | 10 |
| 5 | Difficulty | 0.74 ( 0.10) | 0.77 ( 0.08) | 0.55 ( 0.05) |
| | Discrimination | 0.43 ( 0.08) | 0.4 0 ( 0.06) | 0.58 ( 0.05) |
| | Number of Items | 82 | 72 | 10 |
| 6 | Difficulty | 0.73 ( 0.13) | 0.75 ( 0.11) | 0.55 ( 0.05) |
| | Discrimination | 0.42 ( 0.09) | 0.40 ( 0.07) | 0.58 ( 0.05) |
| | Number of Items | 82 | 72 | 10 |
| 7 | Difficulty | 0.75 ( 0.13) | 0.78 ( 0.11) | 0.53 ( 0.05) |
| | Discrimination | 0.44 ( 0.10) | 0.41 ( 0.08) | 0.62 ( 0.03) |
| | Number of Items | 82 | 72 | 10 |
| 8 | Difficulty | 0.75 ( 0.10) | 0.77 ( 0.09) | 0.59 ( 0.05) |
| | Discrimination | 0.44 ( 0.10) | 0.42 ( 0.07) | 0.63 ( 0.04) |
| | Number of Items | 82 | 72 | 10 |
| 10 | Difficulty | 0.72 ( 0.11) | 0.74 ( 0.10) | 0.59 ( 0.05) |
| | Discrimination | 0.39 ( 0.10) | 0.36 ( 0.07) | 0.57 ( 0.05) |
| | Number of Items | 152 | 132 | 20 |

**Table 6.1.3.2: MCAS 2007**
**Average Difficulty and Discrimination of Different Item Types**
**Grades 3 through 8 and Grade 10 Mathematics**

| Grade Level | Statistics | Item Type | | |
|---|---|---|---|---|
| | | *All* | *Multiple-Choice* | *Short-Answer and Open-Response* |
| 3 | Difficulty | 0.77 ( 0.12) | 0.78 ( 0.12) | 0.73 ( 0.09) |
| | Discrimination | 0.43 ( 0.08) | 0.42 ( 0.07) | 0.45 ( 0.09) |
| | Number of Items | 70 | 50 | 20 |
| 4 | Difficulty | 0.70 ( 0.12) | 0.71 ( 0.12) | 0.66 ( 0.13) |
| | Discrimination | 0.43 ( 0.09) | 0.40 ( 0.07) | 0.50 ( 0.09) |
| | Number of Items | 78 | 58 | 20 |
| 5 | Difficulty | 0.70 ( 0.11) | 0.72 ( 0.10) | 0.61 ( 0.12) |
| | Discrimination | 0.46 ( 0.10) | 0.43 ( 0.08) | 0.54 ( 0.11) |
| | Number of Items | 78 | 58 | 20 |
| 6 | Difficulty | 0.70 ( 0.13) | 0.73 ( 0.10) | 0.61 ( 0.17) |
| | Discrimination | 0.48 ( 0.10) | 0.46 ( 0.07) | 0.53 ( 0.13) |
| | Number of Items | 78 | 58 | 20 |
| 7 | Difficulty | 0.66 ( 0.12) | 0.67 ( 0.12) | 0.64 ( 0.13) |
| | Discrimination | 0.49 ( 0.10) | 0.45 ( 0.07) | 0.60 ( 0.11) |
| | Number of Items | 78 | 58 | 20 |
| 8 | Difficulty | 0.62 ( 0.14) | 0.64 ( 0.13) | 0.56 ( 0.14) |
| | Discrimination | 0.49 ( 0.11) | 0.45 ( 0.08) | 0.61 ( 0.10) |
| | Number of Items | 78 | 58 | 20 |
| 10 | Difficulty | 0.56 ( 0.15) | 0.57 ( 0.15) | 0.54 ( 0.15) |
| | Discrimination | 0.43 ( 0.13) | 0.38 ( 0.08) | 0.59 ( 0.13) |
| | Number of Items | 126 | 96 | 30 |

**Table 6.1.3.3: MCAS 2007**
**Average Difficulty and Discrimination of Different Item Types**
**Grades 5 and 8 Science and Technology/Engineering**

| Grade Level | Statistics | Item Type | | |
|---|---|---|---|---|
| | | *All* | *Multiple-Choice* | *Open-Response* |
| 5 | Difficulty | 0.71 ( 0.14) | 0.74 ( 0.12) | 0.52 ( 0.09) |
| | Discrimination | 0.35 ( 0.09) | 0.33 ( 0.07) | 0.49 ( 0.06) |
| | Number of Items | 78 | 68 | 10 |
| 8 | Difficulty | 0.63 ( 0.13) | 0.65 ( 0.13) | 0.49 ( 0.07) |
| | Discrimination | 0.40 ( 0.11) | 0.37 ( 0.08) | 0.62 ( 0.06) |
| | Number of Items | 78 | 68 | 10 |

**Table 6.1.3.4: MCAS 2007**
**Average Difficulty and Discrimination of Different Item Types**
**High School Biology**

| Grade Level | Statistics | Item Type | | |
|---|---|---|---|---|
| | | *All* | *Multiple-Choice* | *Open-Response* |
| High School | Difficulty | 0.57 ( 0.15) | 0.59 ( 0.14) | 0.42 ( 0.11) |
| | Discrimination | 0.43 ( 0.11) | 0.40 ( 0.08) | 0.66 ( 0.06) |
| | Number of Items | 90 | 80 | 10 |

**Table 6.1.3.5: MCAS 2007**
**Average Difficulty and Discrimination of Different Item Types**
**High School Chemistry**

| Grade Level | Statistics | Item Type | | |
|---|---|---|---|---|
| | | *All* | *Multiple-Choice* | *Open-Response* |
| High School | Difficulty | 0.55 ( 0.15) | 0.57 ( 0.14) | 0.40 ( 0.10) |
| | Discrimination | 0.43 ( 0.11) | 0.40 ( 0.08) | 0.67 ( 0.06) |
| | Number of Items | 90 | 80 | 10 |

**Table 6.1.3.6: MCAS 2007**
**Average Difficulty and Discrimination of Different Item Types**
**High School Introductory Physics**

| Grade Level | Statistics | Item Type | | |
|---|---|---|---|---|
| | | *All* | *Multiple-Choice* | *Open-Response* |
| High School | Difficulty | 0.58 ( 0.13) | 0.60 ( 0.13) | 0.48 ( 0.06) |
| | Discrimination | 0.44 ( 0.11) | 0.41 ( 0.09) | 0.65 ( 0.05) |
| | Number of Items | 90 | 80 | 10 |

**Table 6.1.3.7: MCAS 2007**
**Average Difficulty and Discrimination of Different Item Types**
**High School Technology/Engineering**

| Grade Level | Statistics | Item Type | | |
|---|---|---|---|---|
| | | *All* | *Multiple-Choice* | *Open-Response* |
| High School | Difficulty | 0.58 ( 0.12) | 0.59 ( 0.11) | 0.48 ( 0.12) |
| | Discrimination | 0.34 ( 0.11) | 0.32 ( 0.09) | 0.58 ( 0.04) |
| | Number of Items | 67 | 61 | 6 |

### 6.1.4 Differential Item Functioning (DIF)

The *Code of Fair Testing Practices in Education* explicitly states that subgroup differences in performance should be examined when sample sizes permit, and actions should be taken to make certain that differences in performance are due to construct-relevant, rather than irrelevant, factors. The *Standards for Educational and Psychological Testing* includes similar guidelines.

The standardization differential item functioning (DIF) procedure (Dorans and Kulick, 1986) is designed to identify items for which subgroups of interest perform differently, beyond the impact of differences in overall achievement. The DIF procedure determines the difference in item performance for groups of students matched for achievement on the total test in the following ways:

- by calculating average item performance for students at every total score
- by calculating an overall average
- by weighting the total score distribution so it is the same for the two groups

When differential performance between two groups occurs on an item (i.e., a DIF index in the "low" or "high" categories, explained below), it may or may not be indicative of item bias. Course-taking patterns; group differences in interests; and differences in opportunity to learn, such as a difference in school curricula, can lead to a differential performance between subgroups. Both the *Code of Fair Testing Practices in Education* and the *Standards for Educational and Psychological Testing* assert that test items must be free from construct-irrelevant sources of differential difficulty. However, if subgroup differences in performance are related solely to construct-relevant factors, the item should be considered for inclusion on a test.

For the 2007 MCAS tests, three subgroups were evaluated for DIF:

- male/female
- White/African American
- White/Hispanic

Other race/ethnicity groups (e.g., Asians) were not analyzed using DIF procedures, because limited sample sizes would have inflated type I error rates.

Computed DIF indices theoretically range from –1.00 to 1.00 for multiple-choice items; those for constructed-response items (short-answer, open-response, and ELA Composition writing prompts) are adjusted to the same scale. Dorans and Holland (1993) suggest that index values between –0.05 and 0.05, dubbed Type A, should be considered "negligible." Most MCAS items fell within this range. The authors further suggest that items with values between –0.10 and –0.05 and between 0.05 and 0.10, or Type B, could be considered "low" DIF, but should be inspected to ensure that no possible effect is overlooked. Finally, they recommend that items with values outside the [–0.10, 0.10] range, or Type C, should be considered "high" DIF and be carefully examined. Each 2007 MCAS test item was categorized according to these guidelines provided by Dorans and Holland (1993).

- **Tables 6.1.4.1.1 to 6.1.4.1.15** show the number of items classified into each DIF category by test form and item type (i.e., multiple-choice or open-response—in English Language Arts, open-response includes ELA Composition writing prompts at grades 4, 7, and 10; in Mathematics, open-response includes short-answer items at all grades).
  - For male versus female subgroups, only 6 forms contained 2 items categorized as Type C/high DIF (e.g., High School Chemistry, form 11); 1 form had 3 high DIF items (common items on Introductory Physics).
  - For White versus African American subgroups, only 5 forms had 2 items with high DIF; 3 forms had more than 2 items with high DIF (grade 10 ELA forms 13 and 38; High School Technology/Engineering common form).
  - For White versus Hispanic subgroups, only 4 forms had 2 items with high DIF; 5 forms had more than 2 items with high DIF (grade 10 ELA forms 2, 14, 25, 26, and 38).

- **Tables 6.1.4.2.1 through 6.1.4.2.9** show the number of items, by item type, in each of the three DIF categories that favor males or females. Considering only common items (on which individual student scores are based):
  - One common item was categorized as having high DIF on 5 tests (grade 7 ELA, grade 8 Mathematics and Science, grade 10 ELA, and High School Chemistry).
  - Two common items had high DIF on the High School Technology/Engineering test.
  - Three common items had high DIF on the High School Introductory Physics test.

### *6.1.4.1 DIF Analysis by Test Form*

**Table 6.1.4.1.1: MCAS 2007**
**DIF Analysis by Form**
**Grade 3 English Language Arts**
*A = negligible DIF, B = low DIF, C = high DIF*

| | | Male/Female DIF Class | | | | | | | | | White/African American DIF Class | | | | | | | | | White/Hispanic DIF Class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | All | | | MC | | | OR | | | All | | | MC | | | OR | | | All | | | MC | | | OR | | |
| Grade Level | Form Number | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* |
| 3 | Common | 41 | 1 | 0 | 39 | 1 | 0 | 2 | 0 | 0 | 39 | 3 | 0 | 37 | 3 | 0 | 2 | 0 | 0 | 38 | 4 | 0 | 36 | 4 | 0 | 2 | 0 | 0 |
| | 01 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 7 | 2 | 0 | 6 | 2 | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 |
| | 02 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 6 | 3 | 0 | 5 | 3 | 0 | 1 | 0 | 0 |
| | 13 | 8 | 1 | 0 | 7 | 1 | 0 | 1 | 0 | 0 | 3 | 5 | 1 | 2 | 5 | 1 | 1 | 0 | 0 | 5 | 3 | 1 | 4 | 3 | 1 | 1 | 0 | 0 |
| | 14 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 8 | 0 | 1 | 7 | 0 | 1 | 1 | 0 | 0 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 |

## Table 6.1.4.1.2: MCAS 2007
## DIF Analysis by Form
## English Language Arts
## Grades 4–8 and 10

*A = negligible DIF, B = low DIF, C = high DIF*

| | | Male/Female DIF Class | | | | | | | | | White/African American DIF Class | | | | | | | | | White/Hispanic DIF Class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | All | | | MC | | | OR | | | All | | | MC | | | OR | | | All | | | MC | | | OR | | |
| **Grade Level** | **Form Number** | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* |
| **4** | Common | 39 | 1 | 0 | 35 | 1 | 0 | 4 | 0 | 0 | 37 | 2 | 1 | 33 | 2 | 1 | 4 | 0 | 0 | 36 | 4 | 0 | 32 | 4 | 0 | 4 | 0 | 0 |
| | 01 | 8 | 1 | 0 | 7 | 1 | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 5 | 3 | 1 | 4 | 3 | 1 | 1 | 0 | 0 |
| | 03 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 |
| | 05 | 8 | 1 | 0 | 7 | 1 | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 |
| | 08 | 3 | 2 | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 4 | 0 | 1 | 3 | 0 | 1 | 1 | 0 | 0 | 3 | 2 | 0 | 2 | 2 | 0 | 1 | 0 | 0 |
| | 10 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 7 | 2 | 0 | 6 | 2 | 0 | 1 | 0 | 0 |
| | 12 | 2 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 |
| **5** | Common | 38 | 2 | 0 | 34 | 2 | 0 | 4 | 0 | 0 | 33 | 7 | 0 | 29 | 7 | 0 | 4 | 0 | 0 | 34 | 6 | 0 | 30 | 6 | 0 | 4 | 0 | 0 |
| | 01 | 8 | 1 | 0 | 7 | 1 | 0 | 1 | 0 | 0 | 7 | 1 | 1 | 6 | 1 | 1 | 1 | 0 | 0 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 |
| | 03 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 1 | 3 | 0 | 1 | 1 | 0 | 0 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 |
| | 05 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 8 | 1 | 0 | 7 | 1 | 0 | 1 | 0 | 0 | 8 | 1 | 0 | 7 | 1 | 0 | 1 | 0 | 0 |
| | 08 | 3 | 2 | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 |
| | 10 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 6 | 3 | 0 | 5 | 3 | 0 | 1 | 0 | 0 | 7 | 2 | 0 | 6 | 2 | 0 | 1 | 0 | 0 |
| | 12 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 |
| **6** | Common | 33 | 7 | 0 | 31 | 5 | 0 | 2 | 2 | 0 | 35 | 5 | 0 | 31 | 5 | 0 | 4 | 0 | 0 | 36 | 3 | 1 | 32 | 3 | 1 | 4 | 0 | 0 |
| | 01 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 8 | 1 | 0 | 7 | 1 | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 |
| | 03 | 3 | 2 | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 3 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 |
| | 05 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 8 | 1 | 0 | 7 | 1 | 0 | 1 | 0 | 0 |
| | 08 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 |
| | 10 | 6 | 3 | 0 | 5 | 3 | 0 | 1 | 0 | 0 | 5 | 4 | 0 | 4 | 4 | 0 | 1 | 0 | 0 | 8 | 0 | 1 | 7 | 0 | 1 | 1 | 0 | 0 |
| | 12 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 2 | 3 | 0 | 1 | 3 | 0 | 1 | 0 | 0 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 |
| **7** | Common | 37 | 2 | 1 | 34 | 1 | 1 | 3 | 1 | 0 | 37 | 3 | 0 | 33 | 3 | 0 | 4 | 0 | 0 | 37 | 2 | 1 | 33 | 2 | 1 | 4 | 0 | 0 |
| | 01 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 8 | 1 | 0 | 7 | 1 | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 |
| | 03 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 | 3 | 2 | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 |
| | 05 | 8 | 1 | 0 | 7 | 1 | 0 | 1 | 0 | 0 | 9 | 0 | 0 | 8 | 0 | 0 | 1 | 0 | 0 | 8 | 1 | 0 | 7 | 1 | 0 | 1 | 0 | 0 |
| | 08 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 | 3 | 2 | 0 | 2 | 2 | 0 | 1 | 0 | 0 |
| | 10 | 7 | 2 | 0 | 6 | 2 | 0 | 1 | 0 | 0 | 5 | 3 | 1 | 4 | 3 | 1 | 1 | 0 | 0 | 7 | 1 | 1 | 6 | 1 | 1 | 1 | 0 | 0 |
| | 12 | 4 | 1 | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 |
| **8** | Common | 36 | 4 | 0 | 34 | 2 | 0 | 2 | 2 | 0 | 33 | 7 | 0 | 29 | 7 | 0 | 4 | 0 | 0 | 30 | 8 | 2 | 26 | 8 | 2 | 4 | 0 | 0 |
| | 01 | 5 | 4 | 0 | 4 | 4 | 0 | 1 | 0 | 0 | 8 | 1 | 0 | 7 | 1 | 0 | 1 | 0 | 0 | 7 | 2 | 0 | 6 | 2 | 0 | 1 | 0 | 0 |
| | 03 | 3 | 2 | 0 | 3 | 1 | 0 | 0 | 1 | 0 | 3 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 3 | 1 | 1 | 2 | 1 | 1 | 1 | 0 | 0 |
| | 05 | 7 | 1 | 1 | 6 | 1 | 1 | 1 | 0 | 0 | 7 | 2 | 0 | 6 | 2 | 0 | 1 | 0 | 0 | 8 | 0 | 1 | 7 | 0 | 1 | 1 | 0 | 0 |
| | 08 | 4 | 1 | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 3 | 2 | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 |
| | 10 | 8 | 1 | 0 | 8 | 0 | 0 | 0 | 1 | 0 | 6 | 3 | 0 | 6 | 2 | 0 | 0 | 1 | 0 | 8 | 0 | 1 | 7 | 0 | 1 | 1 | 0 | 0 |
| | 12 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 | 3 | 2 | 0 | 2 | 2 | 0 | 1 | 0 | 0 |
| **10** | Common | 35 | 4 | 1 | 32 | 3 | 1 | 3 | 1 | 0 | 34 | 6 | 0 | 30 | 6 | 0 | 4 | 0 | 0 | 35 | 5 | 0 | 31 | 5 | 0 | 4 | 0 | 0 |
| | 01 | 12 | 2 | 0 | 12 | 0 | 0 | 0 | 2 | 0 | 10 | 2 | 2 | 8 | 2 | 2 | 2 | 0 | 0 | 8 | 5 | 1 | 6 | 5 | 1 | 2 | 0 | 0 |
| | 02 | 11 | 3 | 0 | 11 | 1 | 0 | 0 | 2 | 0 | 8 | 4 | 2 | 6 | 4 | 2 | 2 | 0 | 0 | 5 | 5 | 4 | 3 | 5 | 4 | 2 | 0 | 0 |
| | 13 | 10 | 4 | 0 | 10 | 2 | 0 | 0 | 2 | 0 | 9 | 2 | 3 | 7 | 2 | 3 | 2 | 0 | 0 | 11 | 1 | 2 | 9 | 1 | 2 | 2 | 0 | 0 |
| | 14 | 8 | 4 | 2 | 7 | 3 | 2 | 1 | 1 | 0 | 6 | 6 | 2 | 4 | 6 | 2 | 2 | 0 | 0 | 4 | 5 | 5 | 3 | 4 | 5 | 1 | 1 | 0 |
| | 25 | 13 | 1 | 0 | 12 | 0 | 0 | 1 | 1 | 0 | 10 | 3 | 1 | 8 | 3 | 1 | 2 | 0 | 0 | 10 | 1 | 3 | 8 | 1 | 3 | 2 | 0 | 0 |
| | 26 | 9 | 5 | 0 | 9 | 3 | 0 | 0 | 2 | 0 | 3 | 9 | 2 | 1 | 9 | 2 | 2 | 0 | 0 | 5 | 5 | 4 | 3 | 5 | 4 | 2 | 0 | 0 |
| | 37 | 10 | 4 | 0 | 10 | 2 | 0 | 0 | 2 | 0 | 10 | 2 | 2 | 8 | 2 | 2 | 2 | 0 | 0 | 10 | 3 | 1 | 8 | 3 | 1 | 2 | 0 | 0 |
| | 38 | 8 | 4 | 2 | 8 | 2 | 2 | 0 | 2 | 0 | 6 | 3 | 5 | 4 | 3 | 5 | 2 | 0 | 0 | 6 | 2 | 6 | 4 | 2 | 6 | 2 | 0 | 0 |

## Table 6.1.4.1.3: MCAS 2007
## DIF Analysis by Form
## Grade 3 Mathematics

*A = negligible DIF, B = low DIF, C = high DIF*

| | Male/Female DIF Class | | | | | | | | | White/African American DIF Class | | | | | | | | | White/Hispanic DIF Class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | | | MC | | | OR | | | All | | | MC | | | OR | | | All | | | MC | | | OR | | |
| Form Number | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* |
| Common | 32 | 3 | 0 | 24 | 1 | 0 | 8 | 2 | 0 | 27 | 7 | 1 | 21 | 3 | 1 | 6 | 4 | 0 | 30 | 4 | 1 | 22 | 2 | 1 | 8 | 2 | 0 |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 3 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| 4 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 5 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 6 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 7 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 8 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 9 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 10 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 11 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 12 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 13 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| 14 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| 15 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |

## Table 6.1.4.1.4: MCAS 2007
## DIF Analysis by Form
## Grade 4 Mathematics

*A = negligible DIF, B = low DIF, C = high DIF*

| | Male/Female DIF Class | | | | | | | | | White/African American DIF Class | | | | | | | | | White/Hispanic DIF Class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | | | MC | | | OR | | | All | | | MC | | | OR | | | All | | | MC | | | OR | | |
| Form Number | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* |
| Common | 37 | 2 | 0 | 27 | 2 | 0 | 10 | 0 | 0 | 33 | 6 | 0 | 23 | 6 | 0 | 10 | 0 | 0 | 34 | 5 | 0 | 24 | 5 | 0 | 10 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 3 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 4 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 |
| 5 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 6 | 2 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | 1 | 1 | 0 | 0 |
| 7 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 8 | 2 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 2 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 |
| 9 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 10 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 |
| 11 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 12 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| 13 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 |
| 14 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 15 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |

## Table 6.1.4.1.5: MCAS 2007
## DIF Analysis by Form
## Grade 5 Mathematics

*A = negligible DIF, B = low DIF, C = high DIF*

| | Male/Female DIF Class | | | | | | | | | White/African American DIF Class | | | | | | | | | White/Hispanic DIF Class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | | | MC | | | OR | | | All | | | MC | | | OR | | | All | | | MC | | | OR | | |
| Form Number | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* |
| Common | 35 | 4 | 0 | 25 | 4 | 0 | 10 | 0 | 0 | 32 | 7 | 0 | 24 | 5 | 0 | 8 | 2 | 0 | 36 | 3 | 0 | 27 | 2 | 0 | 9 | 1 | 0 |
| 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 3 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 4 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 |
| 5 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 6 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 |
| 7 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 8 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 |
| 9 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 10 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 11 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 12 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 13 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 14 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 15 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |

## Table 6.1.4.1.6: MCAS 2007
## DIF Analysis by Form
## Grade 6 Mathematics

*A = negligible DIF, B = low DIF, C = high DIF*

| | Male/Female DIF Class | | | | | | | | | White/African American DIF Class | | | | | | | | | White/Hispanic DIF Class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | | | MC | | | OR | | | All | | | MC | | | OR | | | All | | | MC | | | OR | | |
| Form Number | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* |
| Common | 32 | 7 | 0 | 23 | 6 | 0 | 9 | 1 | 0 | 33 | 5 | 1 | 25 | 4 | 0 | 8 | 1 | 1 | 34 | 5 | 0 | 25 | 4 | 0 | 9 | 1 | 0 |
| 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |
| 2 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 3 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 4 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 |
| 5 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 6 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 |
| 7 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 8 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 |
| 9 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 10 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 11 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 12 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 13 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| 14 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 15 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |

## Table 6.1.4.1.7: MCAS 2007
## DIF Analysis by Form
## Grade 7 Mathematics

*A = negligible DIF, B = low DIF, C = high DIF*

| | Male/Female DIF Class | | | | | | | | | White/African American DIF Class | | | | | | | | | White/Hispanic DIF Class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | | | MC | | | OR | | | All | | | MC | | | OR | | | All | | | MC | | | OR | | |
| **Form Number** | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* |
| Common | 32 | 7 | 0 | 24 | 5 | 0 | 8 | 2 | 0 | 37 | 1 | 1 | 27 | 1 | 1 | 10 | 0 | 0 | 36 | 3 | 0 | 26 | 3 | 0 | 10 | 0 | 0 |
| 1 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 2 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 3 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 4 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 5 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 6 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 7 | 3 | 1 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 |
| 8 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 |
| 9 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 4 | 1 | 0 | 4 | 0 | 0 | 0 | 1 | 0 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 |
| 10 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 |
| 11 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| 12 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |

## Table 6.1.4.1.8: MCAS 2007
## DIF Analysis by Form
## Grade 8 Mathematics

*A = negligible DIF, B = low DIF, C = high DIF*

| | Male/Female DIF Class | | | | | | | | | White/African American DIF Class | | | | | | | | | White/Hispanic DIF Class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | | | MC | | | OR | | | All | | | MC | | | OR | | | All | | | MC | | | OR | | |
| **Form Number** | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* |
| Common | 31 | 6 | 2 | 23 | 5 | 1 | 8 | 1 | 1 | 31 | 8 | 0 | 24 | 5 | 0 | 7 | 3 | 0 | 36 | 3 | 0 | 27 | 2 | 0 | 9 | 1 | 0 |
| 1 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 2 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 3 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 4 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| 5 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 |
| 6 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| 7 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 |
| 8 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 2 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 |
| 9 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 |
| 10 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 | 3 | 2 | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 |
| 11 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| 12 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |

## Table 6.1.4.1.9: MCAS 2007
## DIF Analysis by Form
## Grade 10 Mathematics

*A = negligible DIF, B = low DIF, C = high DIF*

| | Male/Female DIF Class | | | | | | | | | White/African American DIF Class | | | | | | | | | White/Hispanic DIF Class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | | | MC | | | OR | | | All | | | MC | | | OR | | | All | | | MC | | | OR | | |
| Form Number | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* |
| Common | 36 | 6 | 0 | 28 | 4 | 0 | 8 | 2 | 0 | 40 | 1 | 1 | 31 | 1 | 0 | 9 | 0 | 1 | 39 | 3 | 0 | 30 | 2 | 0 | 9 | 1 | 0 |
| 01 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| 02 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 03 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 1 | 3 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 |
| 04 | 2 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |
| 05 | 2 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 2 | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 1 |
| 06 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| 07 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 |
| 08 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 0 |
| 09 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 |
| 10 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| 11 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 |
| 12 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 |
| 13 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| 14 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 |
| 15 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 1 | 1 | 2 | 1 | 1 | 2 | 0 | 0 | 0 |
| 16 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| 17 | 2 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | 1 | 1 | 0 | 0 |
| 18 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 19 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 1 | 3 | 0 | 1 | 2 | 0 | 0 | 1 | 0 |
| 20 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 2 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| 21 | 3 | 1 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 2 | 2 | 0 | 2 | 1 | 0 | 0 | 1 | 0 |
| 22 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 0 |
| 23 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 |
| 24 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 0 |
| 26 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 |
| 28 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 |

## Table 6.1.4.1.10: MCAS 2007
## DIF Analysis by Form
## Grade 5 Science and Technology/Engineering

*A = negligible DIF, B = low DIF, C = high DIF*

| | Male/Female DIF Class | | | | | | | | | White/African American DIF Class | | | | | | | | | White/Hispanic DIF Class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | | | MC | | | OR | | | All | | | MC | | | OR | | | All | | | MC | | | OR | | |
| **Form Number** | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* |
| Common | 31 | 8 | 0 | 27 | 7 | 0 | 4 | 1 | 0 | 34 | 5 | 0 | 29 | 5 | 0 | 5 | 0 | 0 | 34 | 5 | 0 | 29 | 5 | 0 | 5 | 0 | 0 |
| 1 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 |
| 2 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 3 | 0 | 1 | 0 | 0 | 0 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 |
| 3 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| 4 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| 5 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| 6 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 |
| 7 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 8 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 |
| 9 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 10 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 11 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| 12 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 2 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 |

## Table 6.1.4.1.11: MCAS 2007
## DIF Analysis by Form
## Grade 8 Science and Technology/Engineering

*A = negligible DIF, B = low DIF, C = high DIF*

| | Male/Female DIF Class | | | | | | | | | White/African American DIF Class | | | | | | | | | White/Hispanic DIF Class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | | | MC | | | OR | | | All | | | MC | | | OR | | | All | | | MC | | | OR | | |
| **Form Number** | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* |
| Common | 35 | 3 | 1 | 31 | 2 | 1 | 4 | 1 | 0 | 35 | 3 | 1 | 30 | 3 | 1 | 5 | 0 | 0 | 34 | 5 | 0 | 30 | 4 | 0 | 4 | 1 | 0 |
| 1 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 2 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| 3 | 2 | 1 | 0 | 2 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 4 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| 5 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| 6 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 |
| 7 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 8 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 9 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 0 |
| 10 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 11 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 12 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 |

## Table 6.1.4.1.12: MCAS 2007
## DIF Analysis by Form
## High School Biology

*A = negligible DIF, B = low DIF, C = high DIF*

| | Male/Female DIF Class | | | | | | | | | White/African American DIF Class | | | | | | | | | White/Hispanic DIF Class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | | | MC | | | OR | | | All | | | MC | | | OR | | | All | | | MC | | | OR | | |
| Form Number | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C |
| Common | 38 | 7 | 0 | 34 | 6 | 0 | 4 | 1 | 0 | 40 | 5 | 0 | 35 | 5 | 0 | 5 | 0 | 0 | 43 | 2 | 0 | 38 | 2 | 0 | 5 | 0 | 0 |
| 1 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 1 | 1 | 0 | 1 | 1 | 0 | 0 |
| 2 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 3 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 4 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| 5 | 6 | 0 | 0 | 5 | 0 | 0 | 1 | 0 | 0 | 5 | 1 | 0 | 4 | 1 | 0 | 1 | 0 | 0 | 6 | 0 | 0 | 5 | 0 | 0 | 1 | 0 | 0 |
| 6 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 1 | 2 | 0 | 0 | 2 | 0 | 1 | 0 | 0 |
| 7 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 |
| 8 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 9 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 10 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 |
| 11 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 |
| 12 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 2 | 2 | 0 | 2 | 1 | 0 | 0 | 1 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 |
| 13 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 |
| 14 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |

## Table 6.1.4.1.13: MCAS 2007
## DIF Analysis by Form
## High School Chemistry

*A = negligible DIF, B = low DIF, C = high DIF*

| | Male/Female DIF Class | | | | | | | | | White/African American DIF Class | | | | | | | | | White/Hispanic DIF Class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | | | MC | | | OR | | | All | | | MC | | | OR | | | All | | | MC | | | OR | | |
| Form Number | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C | A | B | C |
| Common | 41 | 3 | 1 | 36 | 3 | 1 | 5 | 0 | 0 | 35 | 10 | 0 | 30 | 10 | 0 | 5 | 0 | 0 | 37 | 8 | 0 | 32 | 8 | 0 | 5 | 0 | 0 |
| 1 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 2 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 2 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 |
| 2 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 0 |
| 3 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 2 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 |
| 4 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| 5 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 0 | 0 |
| 6 | 2 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 2 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 |
| 7 | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 2 | 0 | 0 | 0 | 0 |
| 8 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 0 | 0 |
| 9 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 2 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | 1 | 1 | 0 | 0 |
| 10 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 2 | 1 | 0 | 0 | 0 | 0 |
| 11 | 2 | 0 | 2 | 2 | 0 | 2 | 0 | 0 | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 |
| 12 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 | 2 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 3 | 1 | 0 | 2 | 1 | 0 | 1 | 0 | 0 |

## Table 6.1.4.1.14: MCAS 2007
## DIF Analysis by Form
## High School Introductory Physics

*A = negligible DIF, B = low DIF, C = high DIF*

| | Male/Female DIF Class | | | | | | | | | White/African American DIF Class | | | | | | | | | White/Hispanic DIF Class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | | | MC | | | OR | | | All | | | MC | | | OR | | | All | | | MC | | | OR | | |
| **Form Number** | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* |
| Common | 36 | 6 | 3 | 32 | 5 | 3 | 4 | 1 | 0 | 35 | 10 | 0 | 32 | 8 | 0 | 3 | 2 | 0 | 42 | 2 | 1 | 37 | 2 | 1 | 5 | 0 | 0 |
| 1 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 3 | 1 | 1 | 3 | 0 | 1 | 0 | 1 | 0 | 4 | 0 | 1 | 3 | 0 | 1 | 1 | 0 | 0 |
| 2 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 | 2 | 2 | 1 | 2 | 1 | 1 | 0 | 1 | 0 | 4 | 0 | 1 | 3 | 0 | 1 | 1 | 0 | 0 |
| 3 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 |
| 4 | 4 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 1 | 3 | 0 | 1 | 2 | 0 | 0 | 1 | 0 | 2 | 2 | 0 | 2 | 1 | 0 | 0 | 1 | 0 |
| 5 | 5 | 0 | 0 | 5 | 0 | 0 | 0 | 0 | 0 | 3 | 2 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 4 | 0 | 1 | 4 | 0 | 1 | 0 | 0 | 0 |
| 6 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 1 | 2 | 1 | 1 | 2 | 1 | 0 | 0 | 0 |
| 7 | 5 | 0 | 0 | 4 | 0 | 0 | 1 | 0 | 0 | 3 | 2 | 0 | 2 | 2 | 0 | 1 | 0 | 0 | 4 | 1 | 0 | 3 | 1 | 0 | 1 | 0 | 0 |
| 8 | 4 | 1 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 3 | 1 | 1 | 3 | 1 | 1 | 0 | 0 | 0 | 3 | 1 | 1 | 3 | 1 | 1 | 0 | 0 | 0 |
| 9 | 2 | 2 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | 1 | 1 | 0 | 0 | 3 | 0 | 1 | 2 | 0 | 1 | 1 | 0 | 0 |
| 10 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 0 | 0 | 3 | 1 | 0 | 3 | 1 | 0 | 0 | 0 | 0 | 2 | 2 | 0 | 2 | 2 | 0 | 0 | 0 | 0 |

## Table 6.1.4.1.15: MCAS 2007
## DIF Analysis by Form
## High School Technology/Engineering

*A = negligible DIF, B = low DIF, C = high DIF*

| | Male/Female DIF Class | | | | | | | | | White/African American DIF Class | | | | | | | | | White/Hispanic DIF Class | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All | | | MC | | | OR | | | All | | | MC | | | OR | | | All | | | MC | | | OR | | |
| **Form Number** | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* | *A* | *B* | *C* |
| Common | 27 | 16 | 2 | 24 | 14 | 2 | 3 | 2 | 0 | 25 | 13 | 7 | 21 | 12 | 7 | 4 | 1 | 0 | 34 | 10 | 1 | 30 | 9 | 1 | 4 | 1 | 0 |
| 1 | 2 | 2 | 1 | 2 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2 | 1 | 1 | 2 | 1 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 3 | 3 | 1 | 1 | 3 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 4 | 1 | 2 | 1 | 1 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5 | 2 | 1 | 1 | 2 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |

### *6.1.4.2 DIF Categorization by Gender and Item Type*

**Table 6.1.4.2.1: MCAS 2007**
**DIF Categorization by Gender and Item Type**
**Grade 3 English Language Arts**

*MC = multiple-choice, OR = open-response*

| | | Negligible DIF | | | | Low DIF | | | | High DIF | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade Level | Item Type | Favor Female | Favor Male | Number | % | Favor Female | Favor Male | Number | % | Favor Female | Favor Male | Number | % |
| 3 | MC | 43 | 27 | 70 | 97% | 0 | 2 | 2 | 3% | 0 | 0 | 0 | 0% |
| | OR | 6 | 0 | 6 | 100% | 0 | 0 | 0 | 0% | 0 | 0 | 0 | 0% |

**Table 6.1.4.2.2: MCAS 2007**
**DIF Categorization by Gender and Item Type**
**English Language Arts**
**Grades 4–8 and 10**

*MC = multiple-choice, OR = open-response and writing prompt*

| | | Negligible DIF | | | | Low DIF | | | | High DIF | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade Level | Item Type | Favor Female | Favor Male | Number | % | Favor Female | Favor Male | Number | % | Favor Female | Favor Male | Number | % |
| 4 | MC | 41 | 22 | 63 | 88% | 0 | 8 | 8 | 11% | 0 | 1 | 1 | 1% |
| | OR | 9 | 1 | 10 | 100% | 0 | 0 | 0 | 0% | 0 | 0 | 0 | 0% |
| 5 | MC | 25 | 42 | 67 | 93% | 1 | 4 | 5 | 7% | 0 | 0 | 0 | 0% |
| | OR | 10 | 0 | 10 | 100% | 0 | 0 | 0 | 0% | 0 | 0 | 0 | 0% |
| 6 | MC | 28 | 33 | 61 | 85% | 0 | 11 | 11 | 15% | 0 | 0 | 0 | 0% |
| | OR | 8 | 0 | 8 | 80% | 2 | 0 | 2 | 20% | 0 | 0 | 0 | 0% |
| 7 | MC | 26 | 39 | 65 | 90% | 0 | 6 | 6 | 8% | 0 | 1 | 1 | 1% |
| | OR | 8 | 0 | 8 | 80% | 2 | 0 | 2 | 20% | 0 | 0 | 0 | 0% |
| 8 | MC | 25 | 37 | 62 | 86% | 0 | 9 | 9 | 13% | 0 | 1 | 1 | 1% |
| | OR | 5 | 0 | 5 | 50% | 5 | 0 | 5 | 50% | 0 | 0 | 0 | 0% |
| 10 | MC | 55 | 56 | 111 | 84% | 5 | 11 | 16 | 12% | 0 | 5 | 5 | 4% |
| | OR | 5 | 0 | 5 | 25% | 15 | 0 | 15 | 75% | 0 | 0 | 0 | 0% |

**Table 6.1.4.2.3: MCAS 2007**
**DIF Categorization by Gender and Item Type**
**Mathematics**
**Grade 3**

*MC = multiple-choice, OR = open-response and short-answer*

| | | Negligible DIF | | | | Low DIF | | | | High DIF | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade Level | Item Type | Favor Female | Favor Male | Number | % | Favor Female | Favor Male | Number | % | Favor Female | Favor Male | Number | % |
| 3 | MC | 29 | 20 | 49 | 98% | 0 | 1 | 1 | 2% | 0 | 0 | 0 | 0% |
| | OR | 9 | 9 | 18 | 90% | 1 | 1 | 2 | 10% | 0 | 0 | 0 | 0% |

## Table 6.1.4.2.4: MCAS 2007
## DIF Categorization by Gender and Item Type
## Mathematics
## Grades 4–8 and 10

*MC = multiple-choice, OR = open-response and short-answer*

| | | Negligible DIF | | | | Low DIF | | | | High DIF | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade Level | Item Type | Favor Female | Favor Male | Number | % | Favor Female | Favor Male | Number | % | Favor Female | Favor Male | Number | % |
| 4 | MC | 29 | 21 | 50 | 86% | 0 | 8 | 8 | 14% | 0 | 0 | 0 | 0% |
| | OR | 13 | 7 | 20 | 100% | 0 | 0 | 0 | 0% | 0 | 0 | 0 | 0% |
| 5 | MC | 34 | 20 | 54 | 93% | 1 | 3 | 4 | 7% | 0 | 0 | 0 | 0% |
| | OR | 14 | 5 | 19 | 95% | 1 | 0 | 1 | 5% | 0 | 0 | 0 | 0% |
| 6 | MC | 31 | 19 | 50 | 86% | 2 | 6 | 8 | 14% | 0 | 0 | 0 | 0% |
| | OR | 15 | 4 | 19 | 95% | 0 | 1 | 1 | 5% | 0 | 0 | 0 | 0% |
| 7 | MC | 29 | 23 | 52 | 90% | 2 | 4 | 6 | 10% | 0 | 0 | 0 | 0% |
| | OR | 9 | 7 | 16 | 80% | 3 | 1 | 4 | 20% | 0 | 0 | 0 | 0% |
| 8 | MC | 25 | 21 | 46 | 79% | 3 | 8 | 11 | 19% | 0 | 1 | 1 | 2% |
| | OR | 10 | 7 | 17 | 85% | 1 | 1 | 2 | 10% | 0 | 1 | 1 | 5% |
| 10 | MC | 35 | 39 | 74 | 77% | 4 | 18 | 22 | 23% | 0 | 0 | 0 | 0% |
| | OR | 22 | 5 | 27 | 90% | 0 | 3 | 3 | 10% | 0 | 0 | 0 | 0% |

## Table 6.1.4.2.5: MCAS 2007
## DIF Categorization by Gender and Item Type
## Science and Technology/Engineering
## Grades 5 and 8

*MC = multiple-choice, OR = open-response*

| | | Negligible DIF | | | | Low DIF | | | | High DIF | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade Level | Item Type | Favor Female | Favor Male | Number | % | Favor Female | Favor Male | Number | % | Favor Female | Favor Male | Number | % |
| 5 | MC | 25 | 34 | 59 | 87% | 1 | 8 | 9 | 13% | 0 | 0 | 0 | 0% |
| | OR | 8 | 1 | 9 | 90% | 1 | 0 | 1 | 10% | 0 | 0 | 0 | 0% |
| 8 | MC | 30 | 31 | 61 | 90% | 0 | 6 | 6 | 9% | 0 | 1 | 1 | 1% |
| | OR | 7 | 1 | 8 | 80% | 2 | 0 | 2 | 20% | 0 | 0 | 0 | 0% |

## Table 6.1.4.2.6: MCAS 2007
## DIF Categorization by Gender and Item Type
## High School Biology

*MC = multiple-choice, OR = open-response*

| | | Negligible DIF | | | | Low DIF | | | | High DIF | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade Level | Item Type | Favor Female | Favor Male | Number | % | Favor Female | Favor Male | Number | % | Favor Female | Favor Male | Number | % |
| H.S. | MC | 35 | 35 | 70 | 88% | 2 | 8 | 10 | 13% | 0 | 0 | 0 | 0% |
| | OR | 9 | 0 | 9 | 90% | 1 | 0 | 1 | 10% | 0 | 0 | 0 | 0% |

## Table 6.1.4.2.7: MCAS 2007
## DIF Categorization by Gender and Item Type
## High School Chemistry

*MC = multiple-choice, OR = open-response*

| | | Negligible DIF | | | | Low DIF | | | | High DIF | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade Level | Item Type | Favor Female | Favor Male | Number | % | Favor Female | Favor Male | Number | % | Favor Female | Favor Male | Number | % |
| H.S. | MC | 29 | 36 | 65 | 81% | 2 | 10 | 12 | 15% | 0 | 3 | 3 | 4% |
| | OR | 9 | 1 | 10 | 100% | 0 | 0 | 0 | 0% | 0 | 0 | 0 | 0% |

**Table 6.1.4.2.8: MCAS 2007**
**DIF Categorization by Gender and Item Type**
**High School Introductory Physics**
*MC = multiple-choice, OR = open-response*

| | | Negligible DIF | | | | Low DIF | | | | High DIF | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade Level | Item Type | Favor Female | Favor Male | Number | % | Favor Female | Favor Male | Number | % | Favor Female | Favor Male | Number | % |
| H.S. | MC | 29 | 36 | 65 | 81% | 3 | 9 | 12 | 15% | 1 | 2 | 3 | 4% |
| | OR | 8 | 1 | 9 | 90% | 1 | 0 | 1 | 10% | 0 | 0 | 0 | 0% |

**Table 6.1.4.2.9: MCAS 2007**
**DIF Categorization by Gender and Item Type**
**High School Technology/Engineering**
*MC = multiple-choice, OR = open-response*

| | | Negligible DIF | | | | Low DIF | | | | High DIF | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Grade Level | Item Type | Favor Female | Favor Male | Number | % | Favor Female | Favor Male | Number | % | Favor Female | Favor Male | Number | % |
| H.S. | MC | 16 | 17 | 33 | 54% | 7 | 13 | 20 | 33% | 3 | 5 | 8 | 13% |
| | OR | 0 | 3 | 3 | 50% | 3 | 0 | 3 | 50% | 0 | 0 | 0 | 0% |

## 6.1.5 Item Response Theory (IRT) Analyses

IRT uses mathematical models to define the relationship between an unobserved measure of student ability, usually called *theta* (θ), and the probability (*p*) of the student getting a dichotomous item correct or of getting a particular score on a polytomous item. This process is called *item calibration.* All MCAS items were calibrated using IRT.

Calibration establishes a set of item parameters that specifies the nonlinear, monotonically increasing relationship between θ and *p* that has been modeled for each item. Once the item parameters are known, the estimated theta ($\hat{\theta}$) for each student can be calculated on the same scale. Like raw scores, $\hat{\theta}$ is considered to be an estimate of a student's true score (a general representation of student performance), but has some characteristics that may make its use preferable for rank-ordering students in terms of ability. Section 4.3.2 on scaling explains the relationships among raw scores, estimated thetas, and scaled scores.

Several IRT models are commonly used to specify the relationship between θ and *p* (Hambleton and van der Linden, 1997; Hambleton and Swaminathan, 1985). For MCAS 2007, the 3PL model was used for dichotomous items. The 3PL model can be defined as:

$$P_i\left(1\middle|\theta_j\right) = c_i + \left(1-c_i\right)\frac{\exp Da_i\left(\theta_j - b_i\right)}{1+\exp Da_i\left(\theta_j - b_i\right)}$$

where

*i* indexes the items,
*j* indexes students,
*a* represents item discrimination,
*b* represents item difficulty,
*c* is the pseudo-guessing parameter, and
*D* is a normalizing constant equal to approximately 1.701.

The graded-response model (GRM) was used for polytomous MCAS 2007 items. In the GRM, an item is scored in $m + 1$ graded categories that can be viewed as a set of $m$ dichotomies. At each point of dichotomization (i.e., at each threshold), a two-parameter model can be used. This implies that a polytomous item with $m + 1$ categories can be characterized by $m$ item category threshold curves (ICTC) of the two-parameter logistic form:

$$P_{ik}^{*}\left(1\middle|\theta_j\right) = \frac{\exp Da_i\left(\theta_j - b_i + d_{ik}\right)}{1 + \exp Da_i\left(\theta_j - b_i + d_{ik}\right)}$$

where *i* indexes the items,
*j* indexes students,
*k* indexes threshold,
*a* represents item discrimination,
*b* represents item difficulty,
*d* represents threshold, and
*D* is a normalizing constant equal to 1.701.

After computing $m$ ICTCs in the GRM, $m + 1$ item category characteristic curves (ICCC) are derived by subtracting adjacent ICTC curves:

$$P_{ik}(1 \mid \theta_j) = P_{i(k-1)}^{*}(1 \mid \theta_j) - P_{ik}^{*}(1 \mid \theta_j)$$

where

$P_{ik}$ represents the probability that the score on item *i* falls in category *k*

$P_{ik}^{*}$ represents the probability that the score on item *i* falls above the threshold *k* ( $P_{i0}^{*} = 1$ and $P_{i(m+1)}^{*} = 0$ )

Finally, the item characteristic curve (ICC) for polytomous items is computed as a weighted sum of ICCCs, where each ICCC is weighted by a score assigned to a corresponding category:

$$P_i(1 \mid \theta_j) = \sum_{k}^{m+1} w_{ik} P_{ik}(1 \mid \theta_j)$$

For more information about item calibration and determination, the reader is referred to Lord and Novick (1968) or Hambleton and Swaminathan (1985). For information about the GRM, see Ostini and Nering (2006).

Test Characteristic Curves (TCCs) are computed by summing the ICCs of all items that contribute to the raw score of a test. TCCs display the expected (average) raw score associated with each $\theta_j$ value between –4.0 and 4.0. Using the notation introduced above, the expected raw score at a given value of $\theta_j$ is

$$E(X \mid \theta_j) = \sum_{i=1}^{n} P_i\left(1 \middle| \theta_j\right),$$

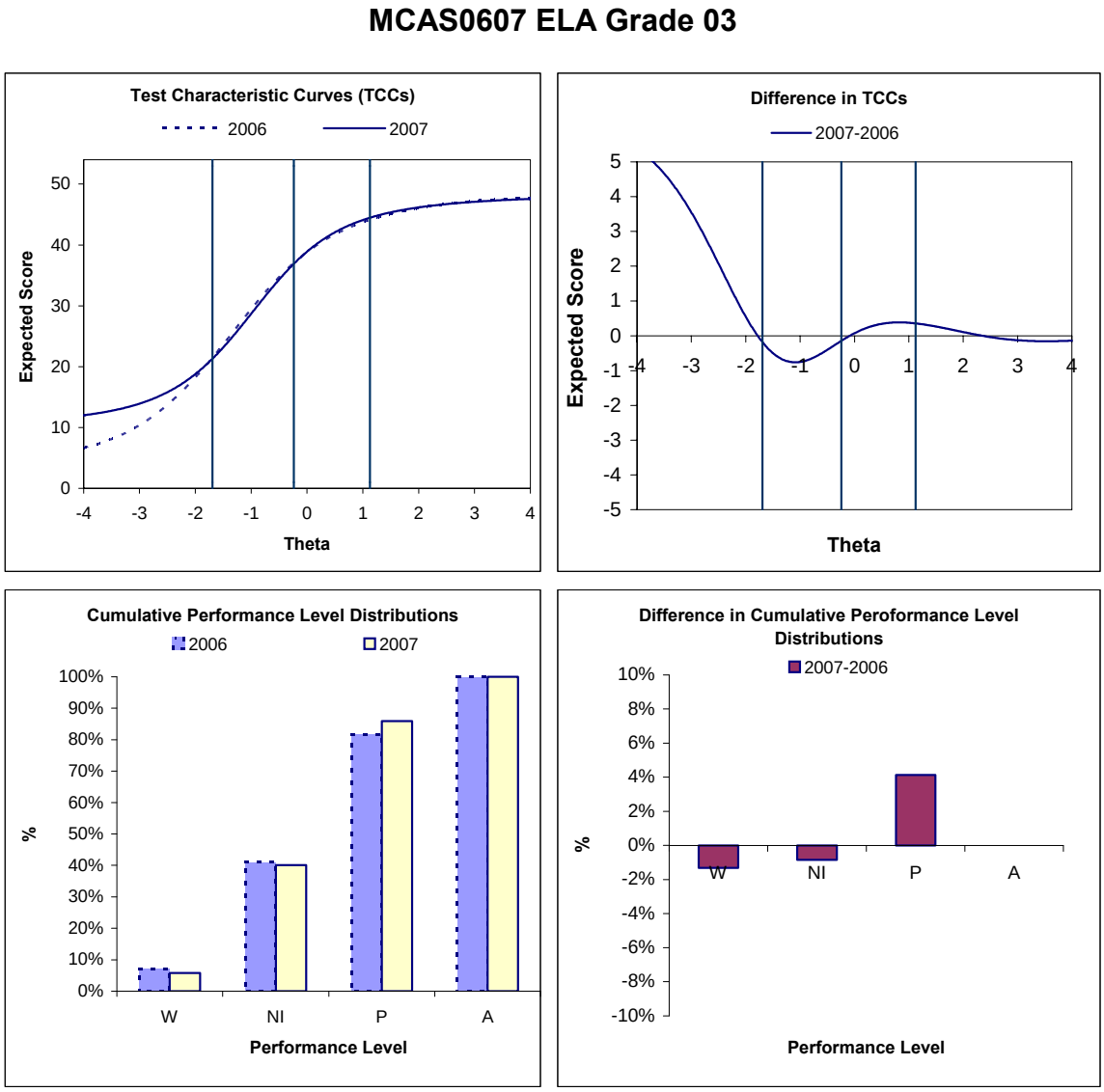
where

$i$ indexes the items (and $n$ is the number of items contributing to the raw score),
$j$ indexes students (here, $\theta_j$ runs from –4.0 to 4.0), and
$E(X \mid \theta_j)$ is the expected raw score for a student of ability $\theta_j$.

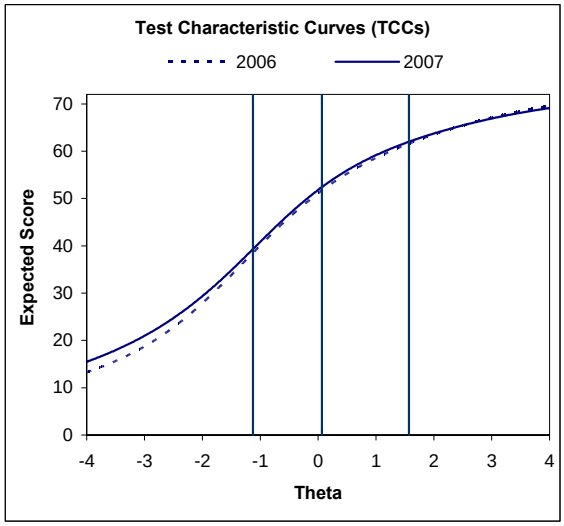
The expected raw score is monotonic, in that it increases with $\theta_j$, consistent with the notion that students of high ability tend to earn higher raw scores than do students of low ability. Most TCCs are "S-shaped" in that they are flatter at the ends of the distribution and are steeper in the middle.

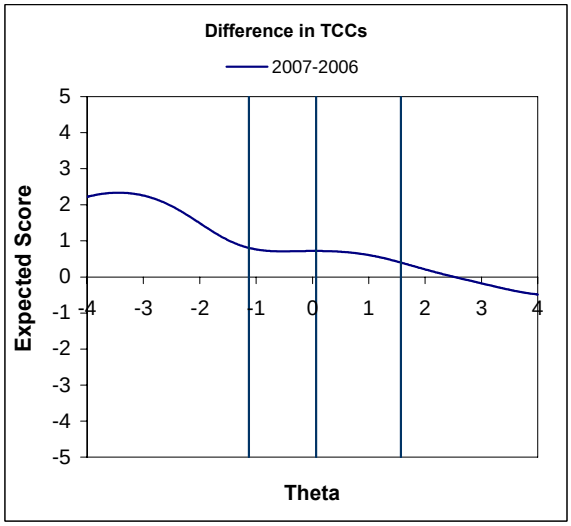
Figure 6.1.5.A on pages 179–198 presents, for each grade and content area test combination, the 2007 MCAS Test Characteristic Curve (TCC), along with the 2006 TCC, when applicable. The difference between the 2007 and 2006 TCCs is also provided wherever applicable. Below the TCC information is a plot of the 2007 cumulative scaled score distribution (at grade 3, cumulative performance level distribution), along with the 2006 cumulative distribution when applicable. Finally, the difference in cumulative distributions is shown, if applicable. A positive shift in cumulative distribution (i.e., a shift to the right when comparing one year to the next) would suggest that student performance has improved.

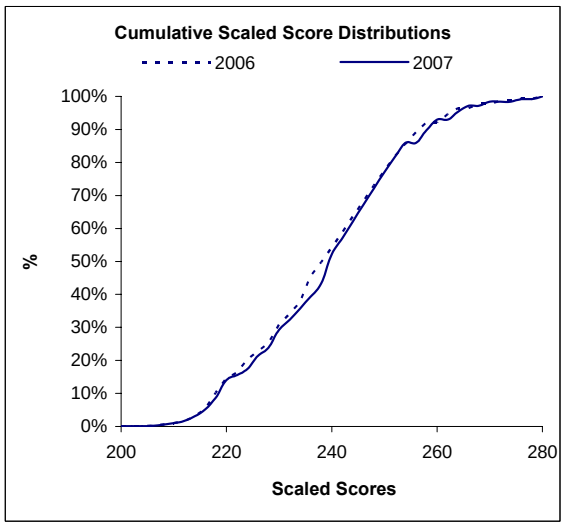
**Figure 6.1.5.A: MCAS 2007 Administration Calibration Statistics By Grade and Content Area**

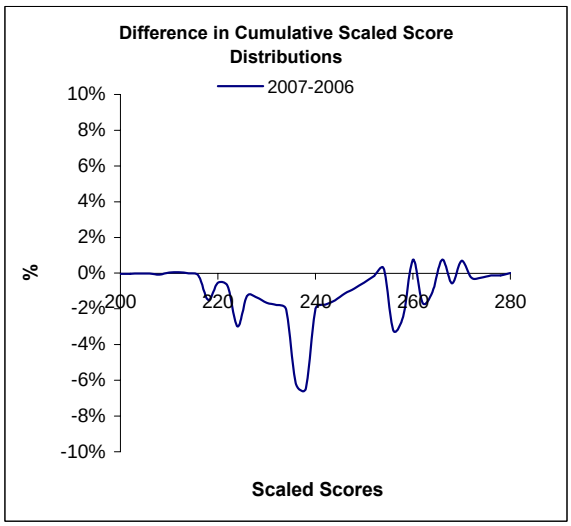


## MCAS0607 ELA Grade 04

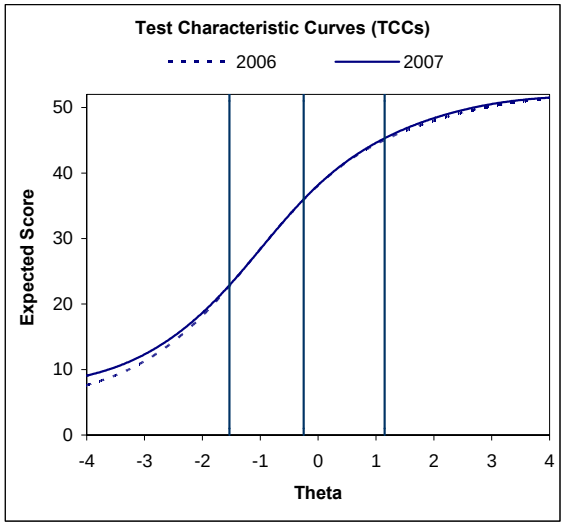


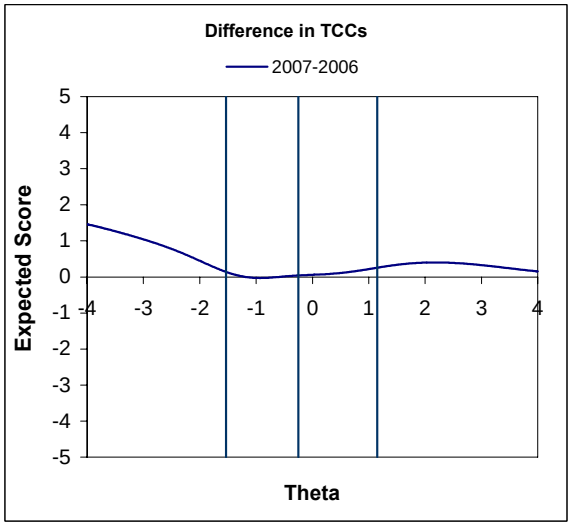



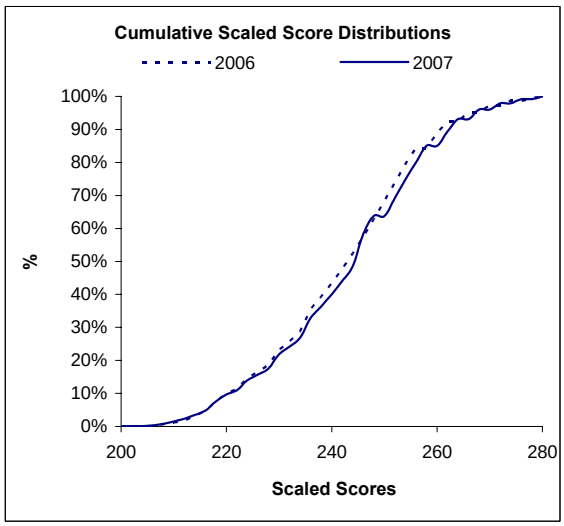



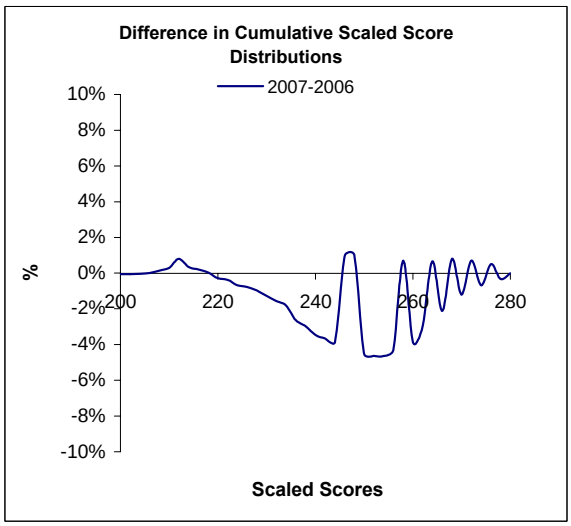



# MCAS0607 ELA Grade 05

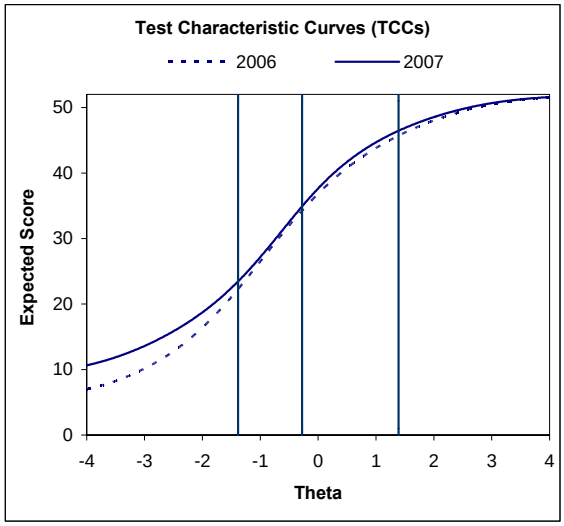


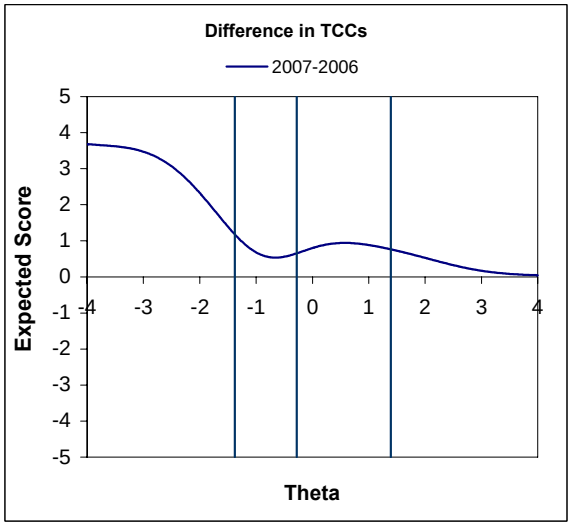



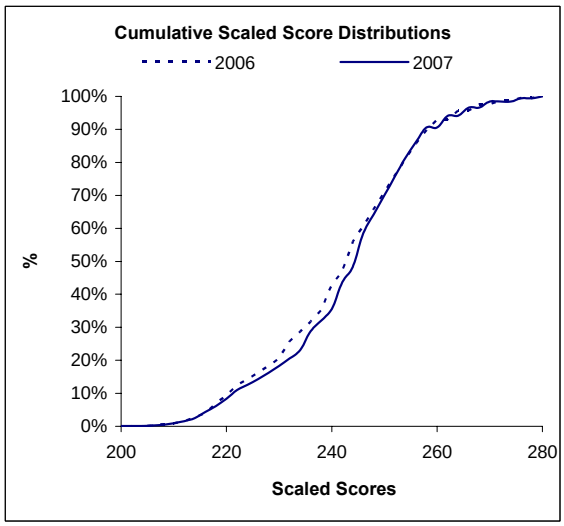



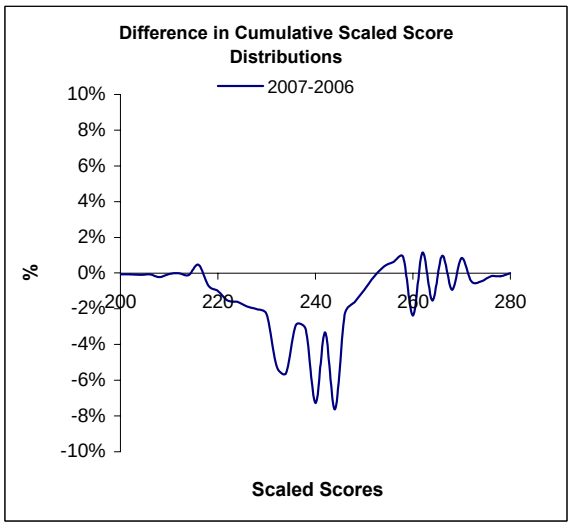



## MCAS0607 ELA Grade 06

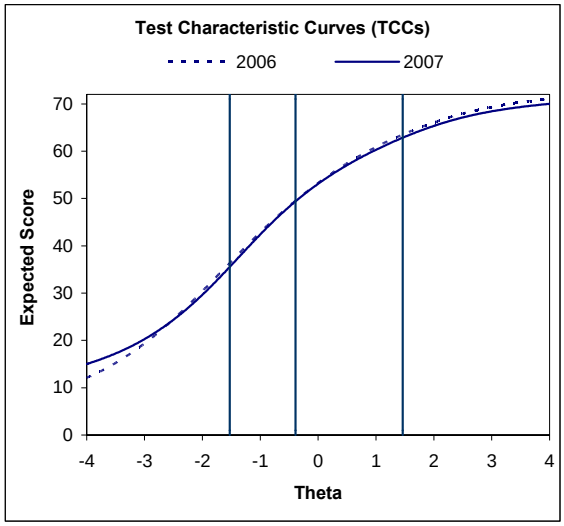


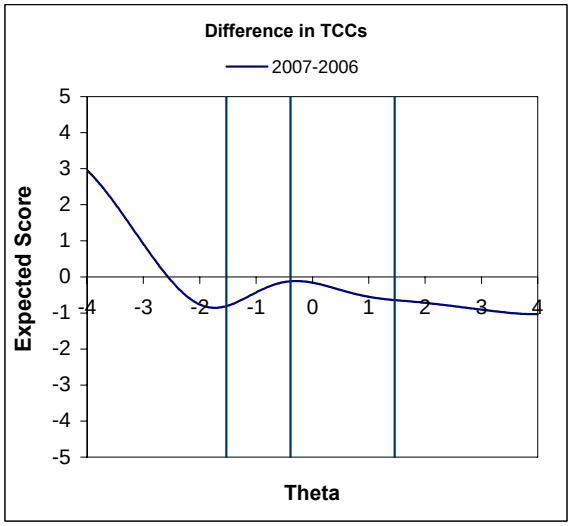



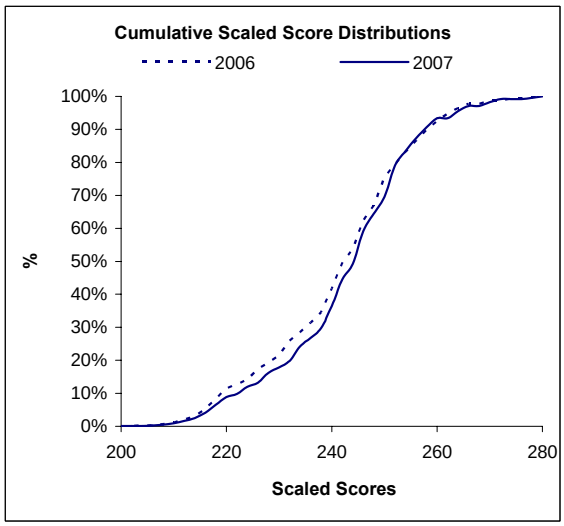



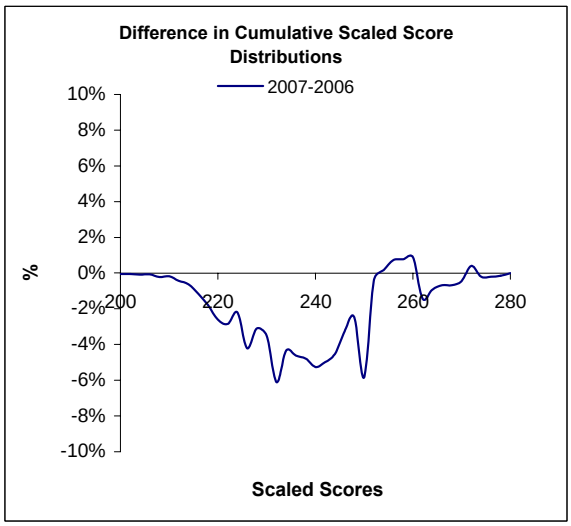



# MCAS0607 ELA Grade 07

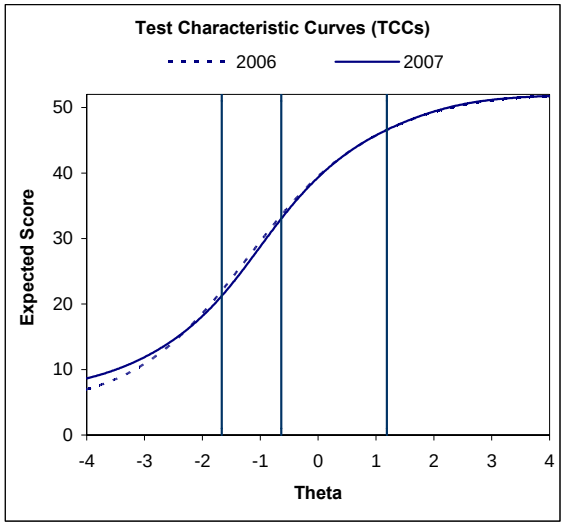


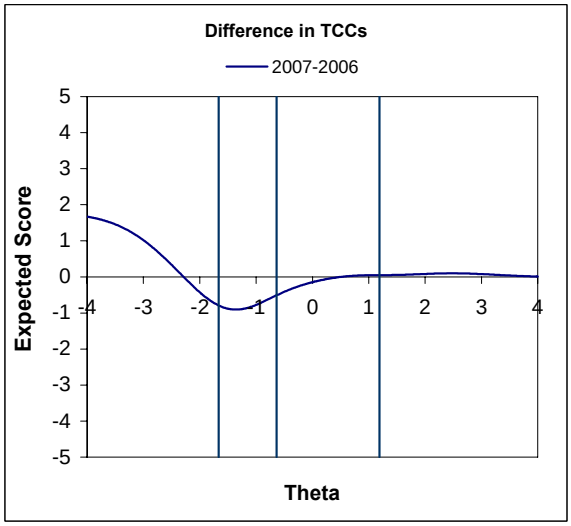



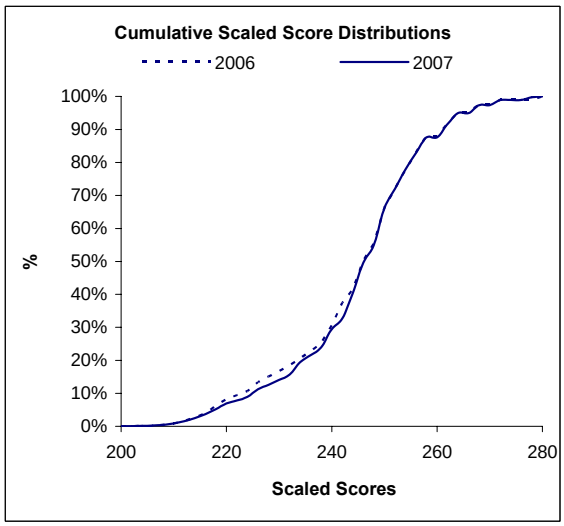



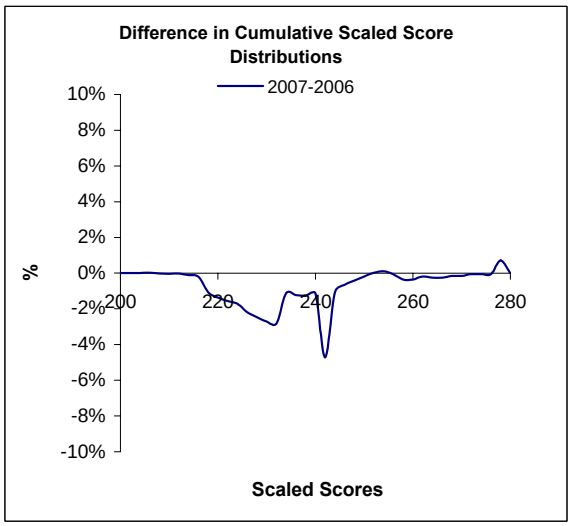



## MCAS0607 ELA Grade 08

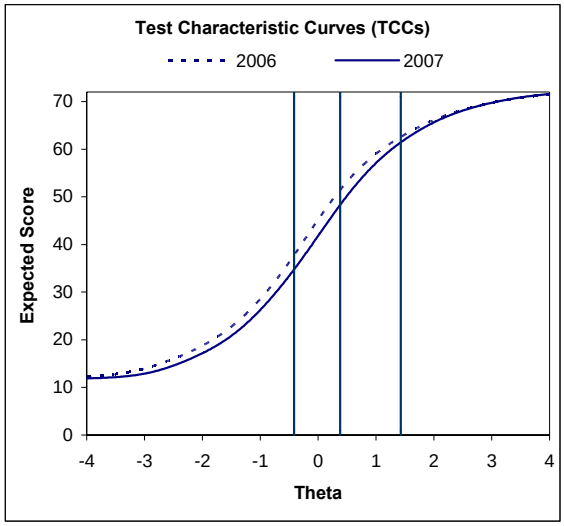


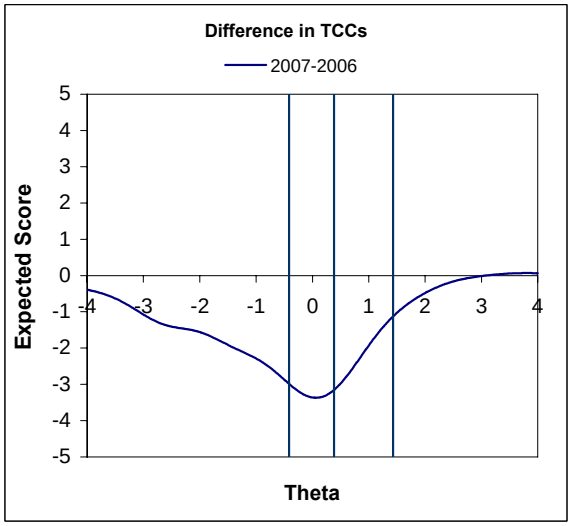



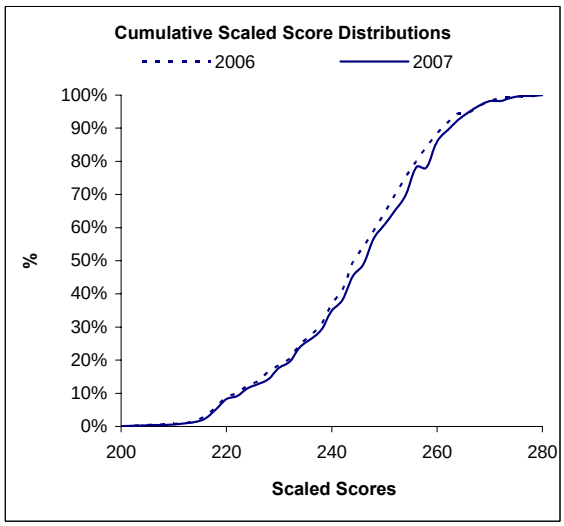



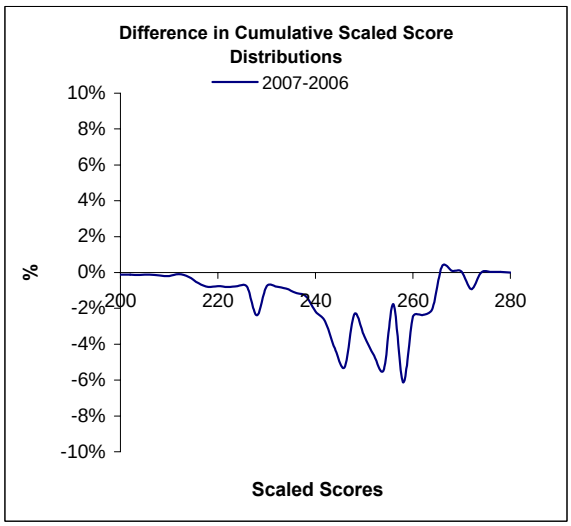



## MCAS0607 ELA Grade 10

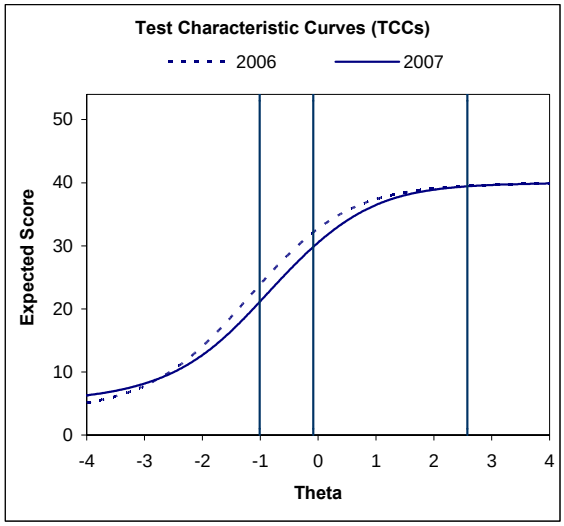


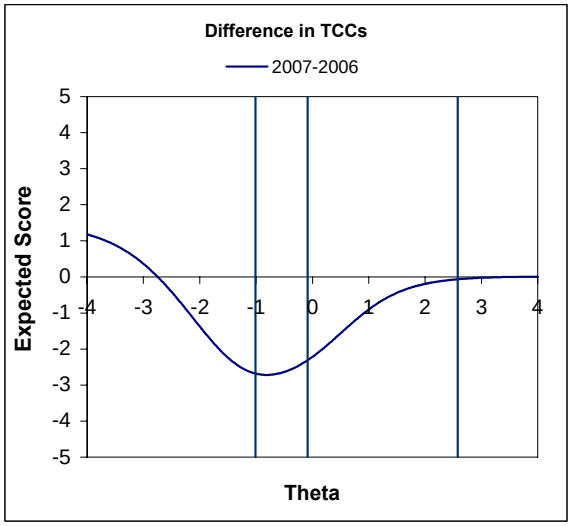



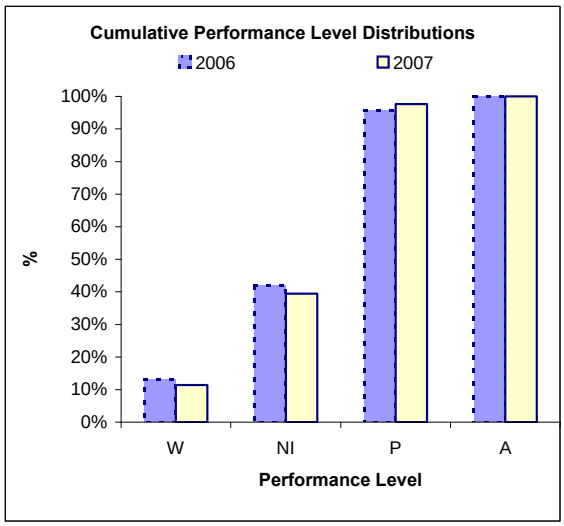



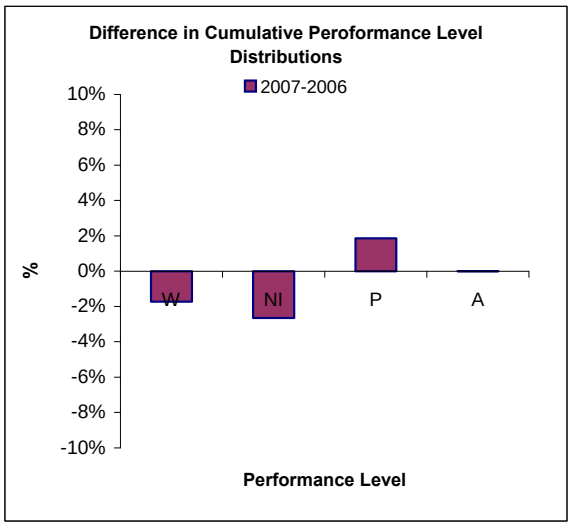



## MCAS0607 Math Grade 03

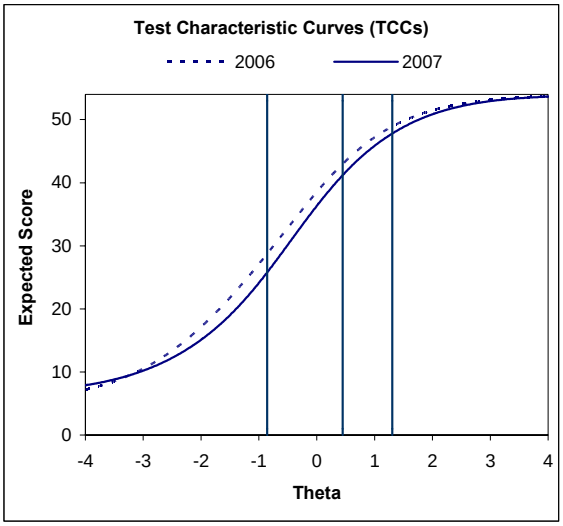


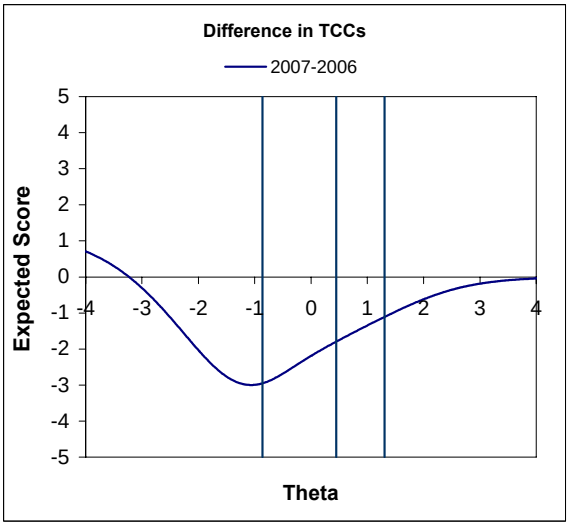



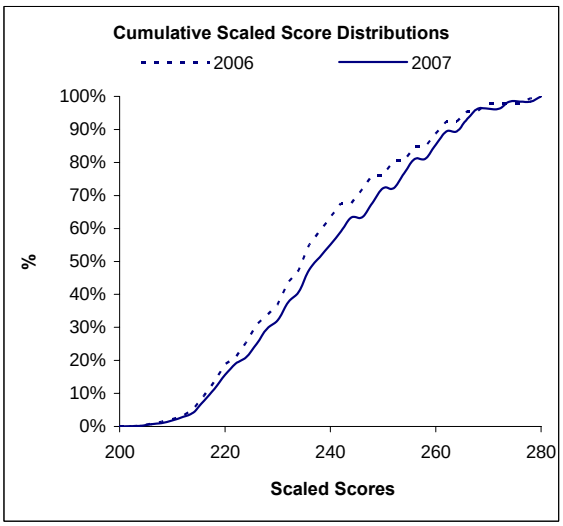



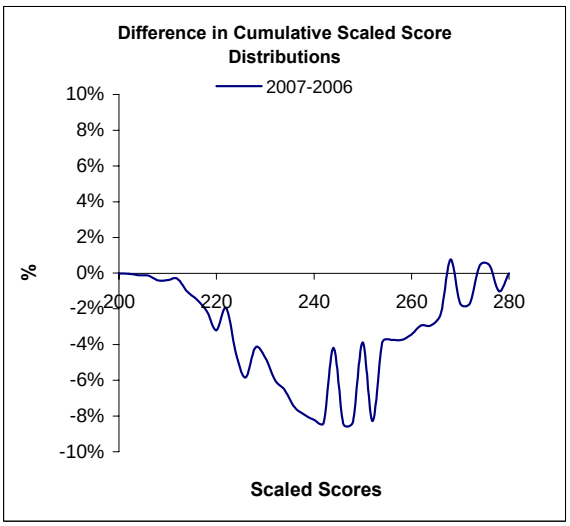



## MCAS0607 Math Grade 04

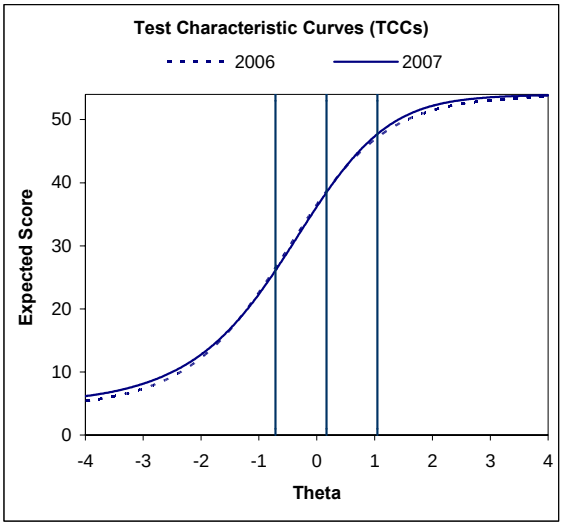


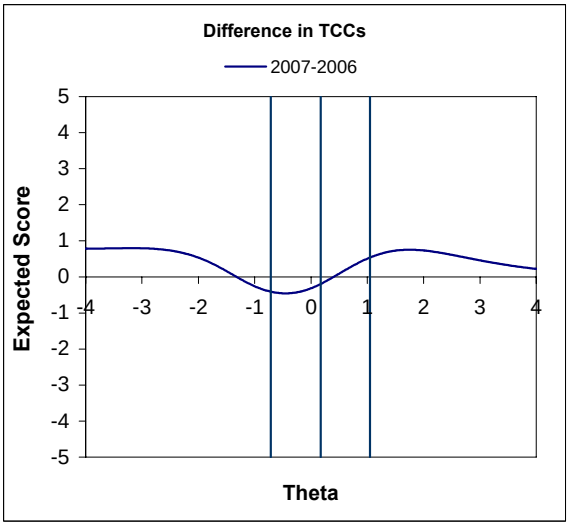



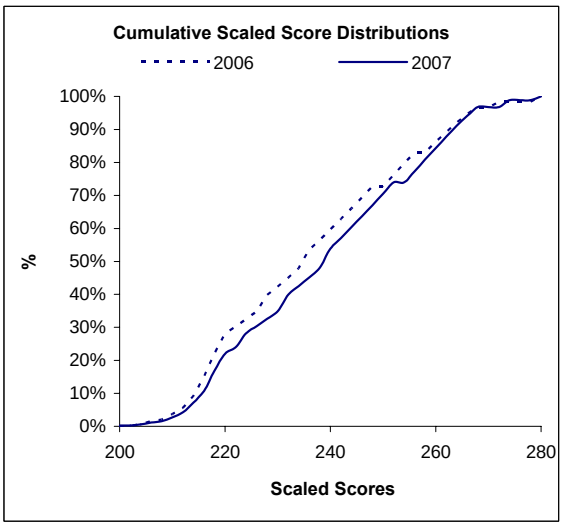



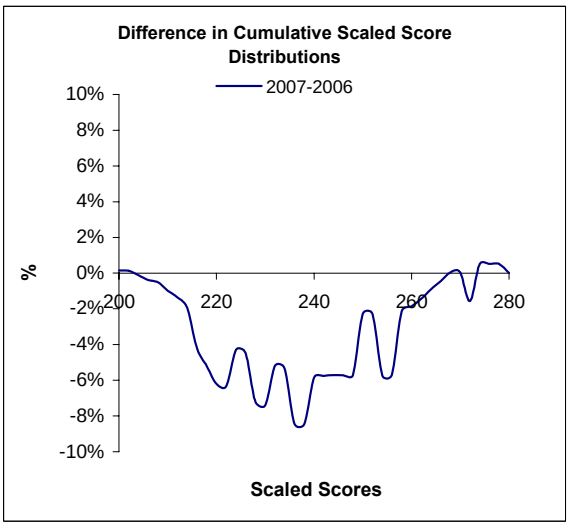



## MCAS0607 Math Grade 05

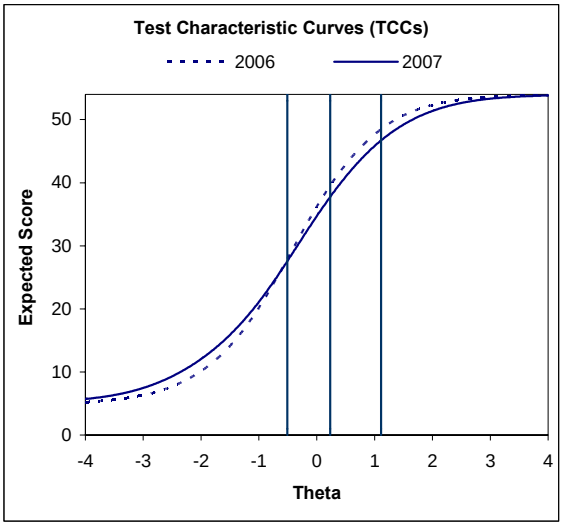


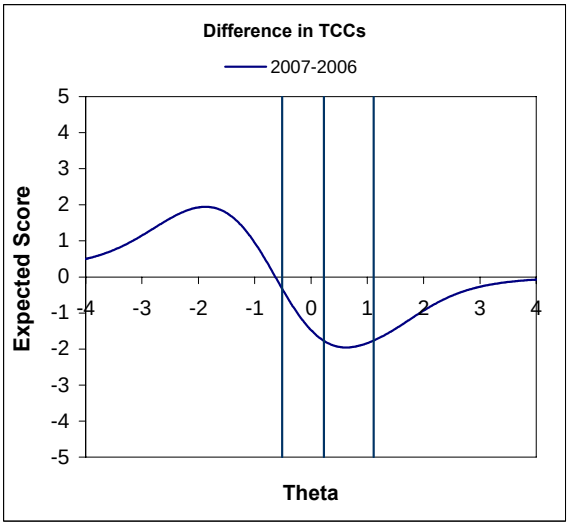



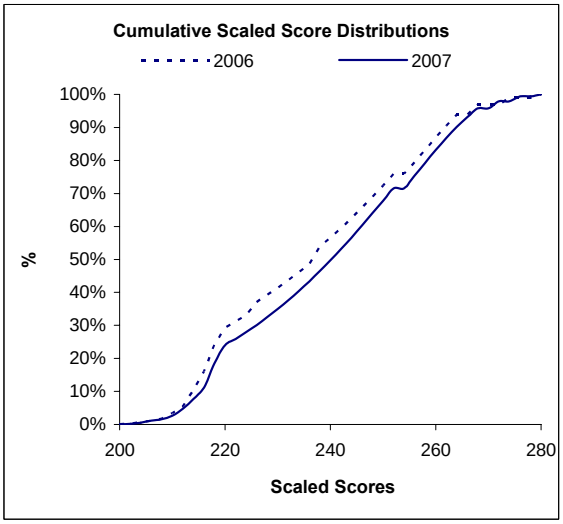



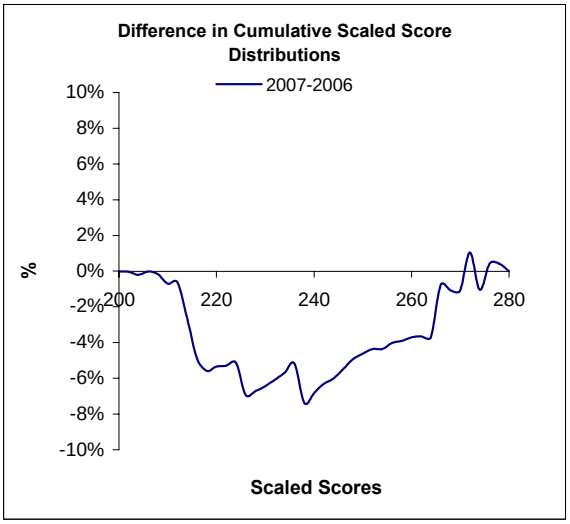



## MCAS0607 Math Grade 06

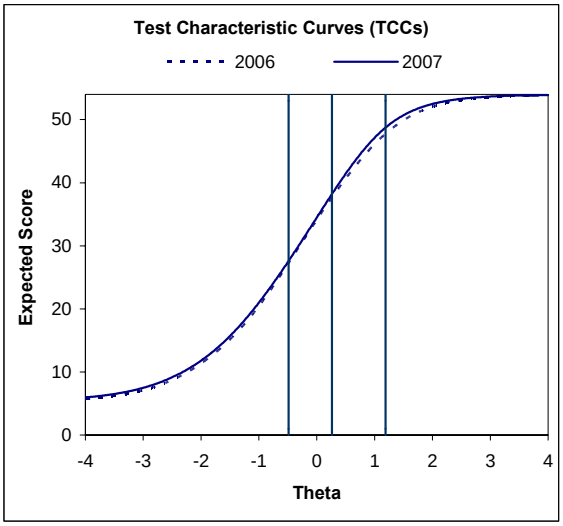


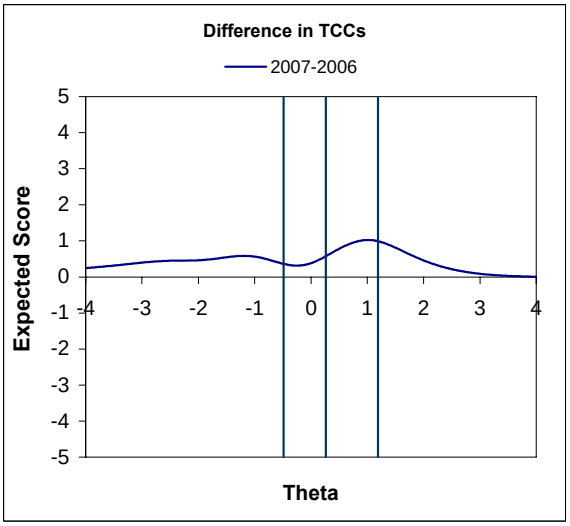



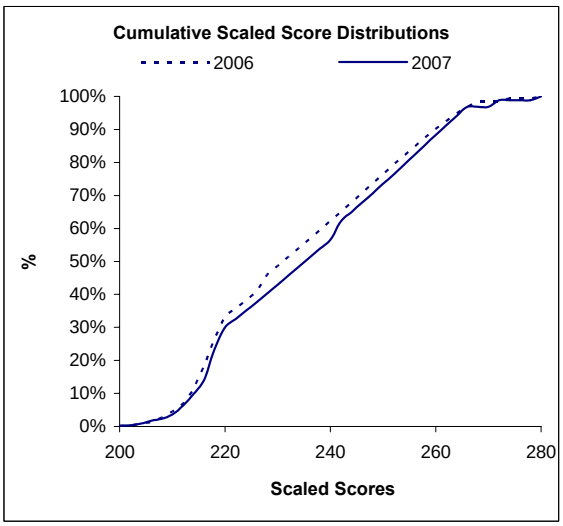



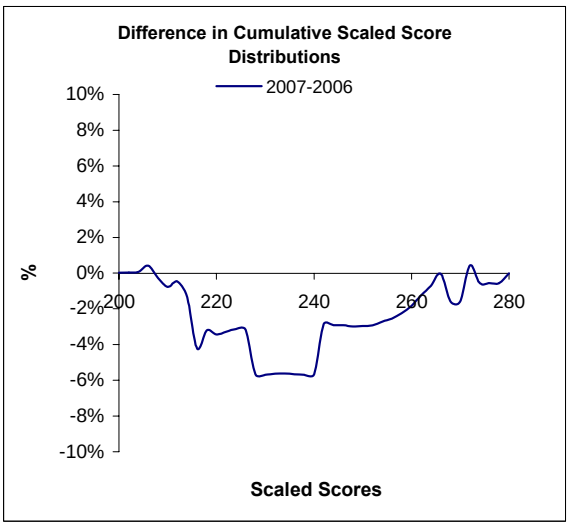



## MCAS0607 Math Grade 07

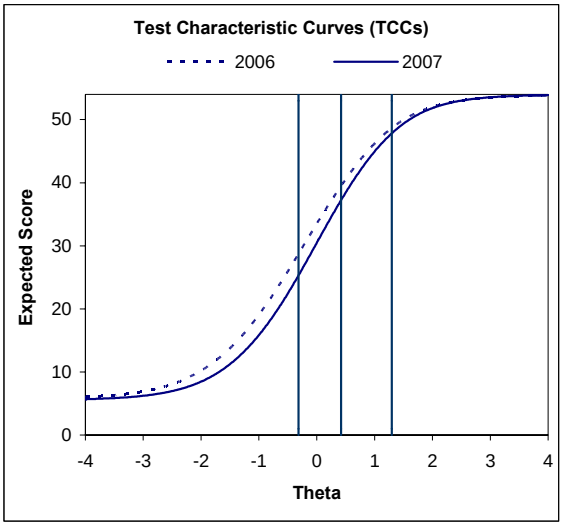


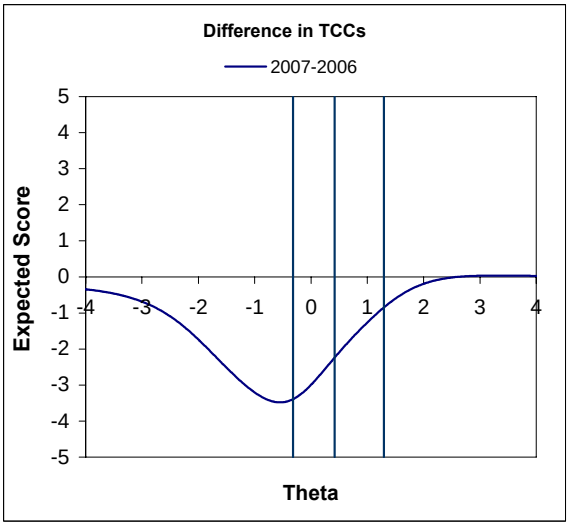



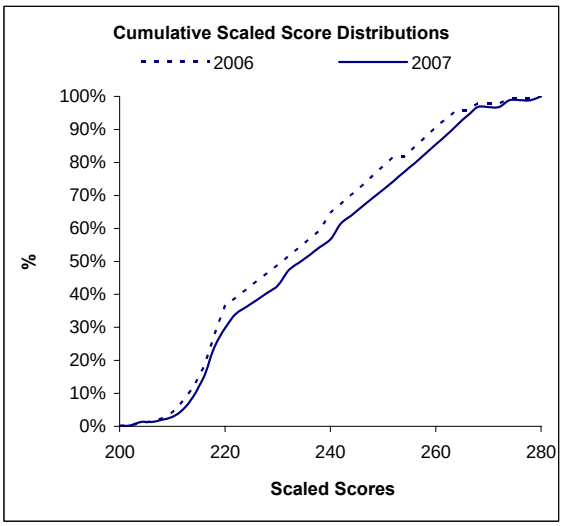



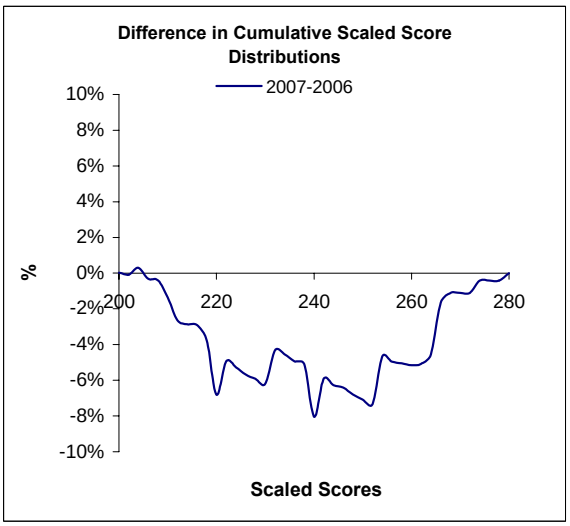



## MCAS0607 Math Grade 08

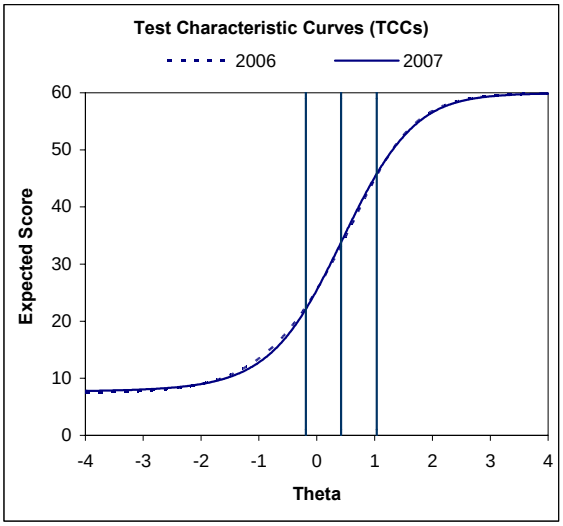


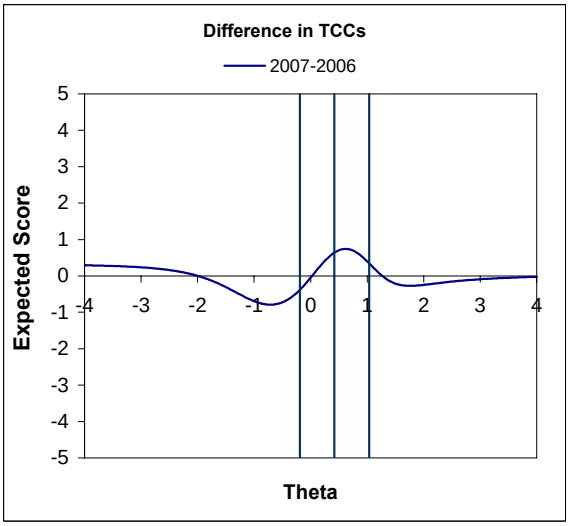



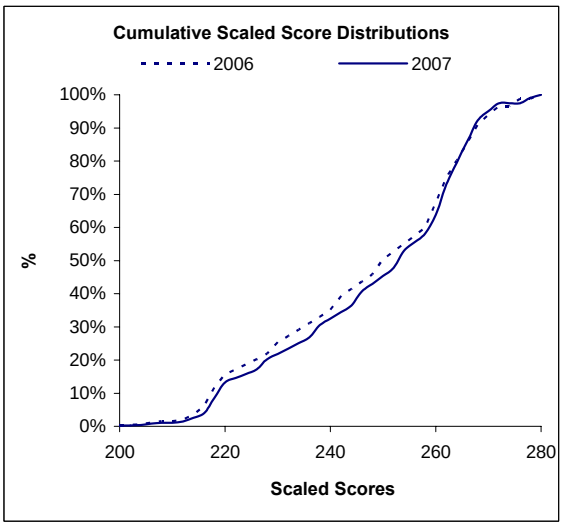



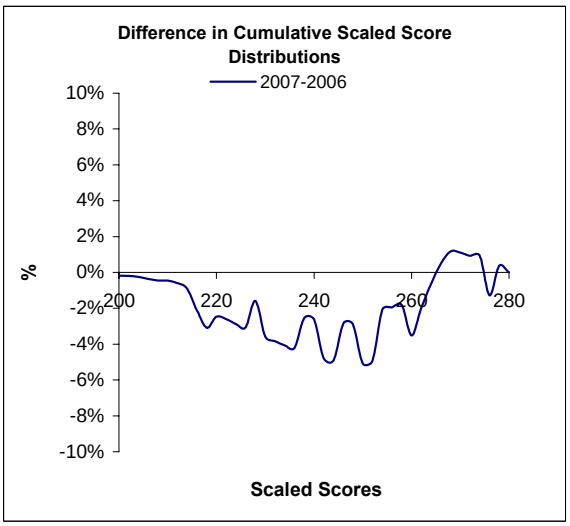



## MCAS0607 Math Grade 10

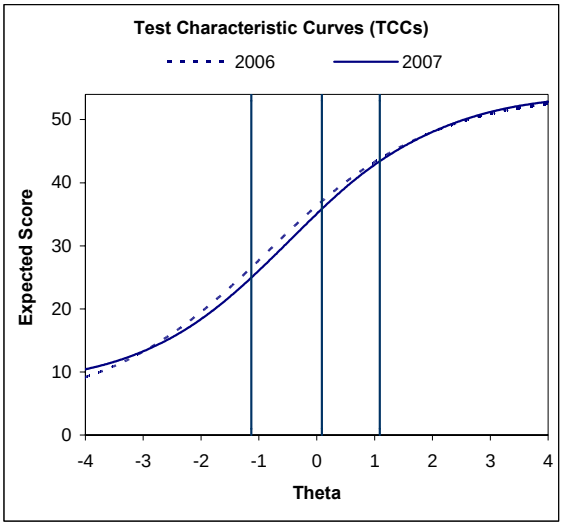


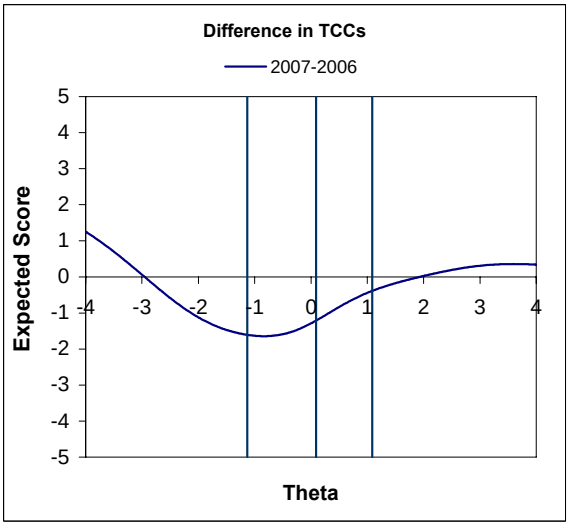



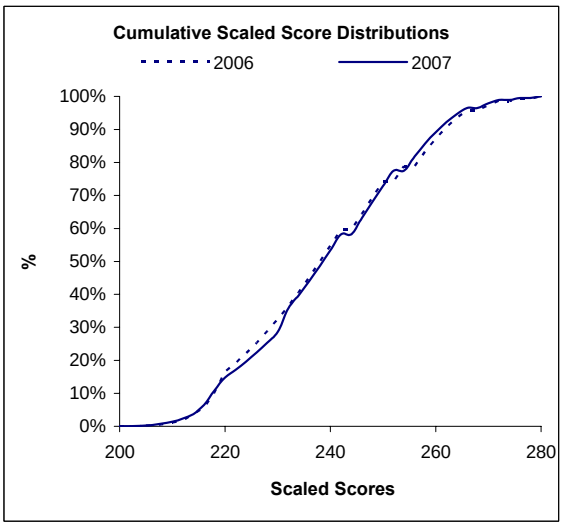



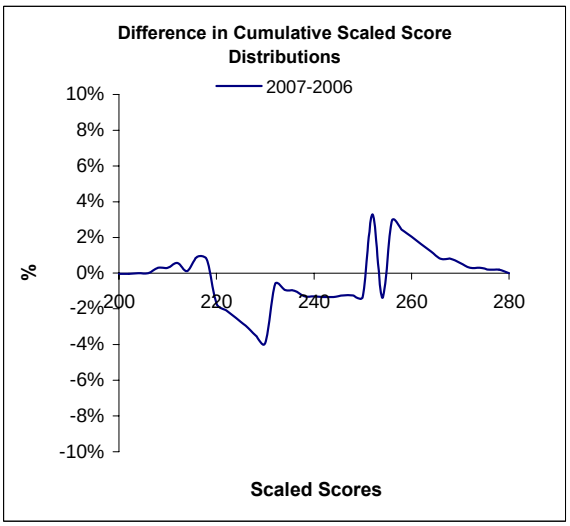



## MCAS0607 SCI Grade 05

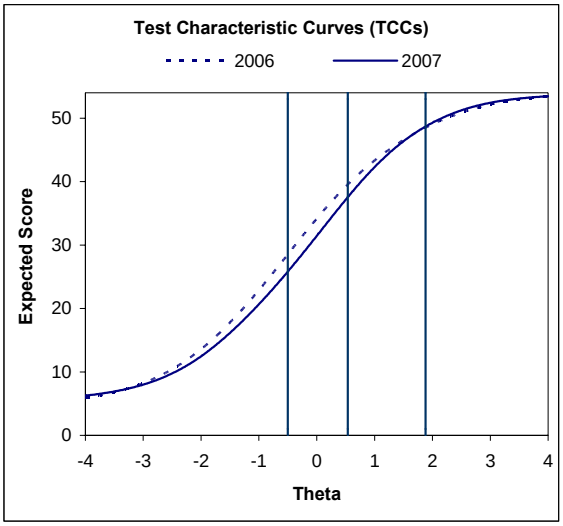


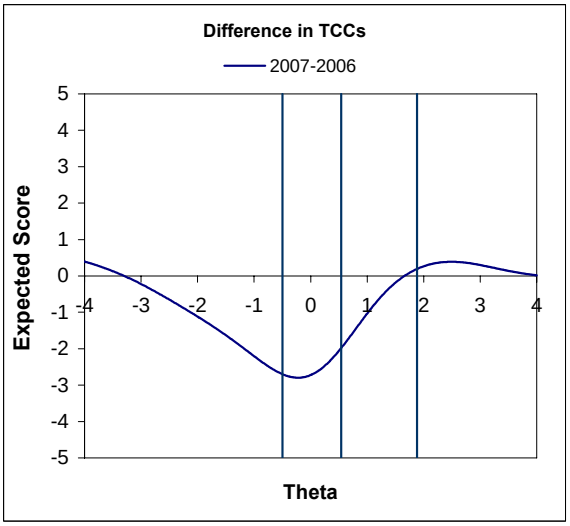



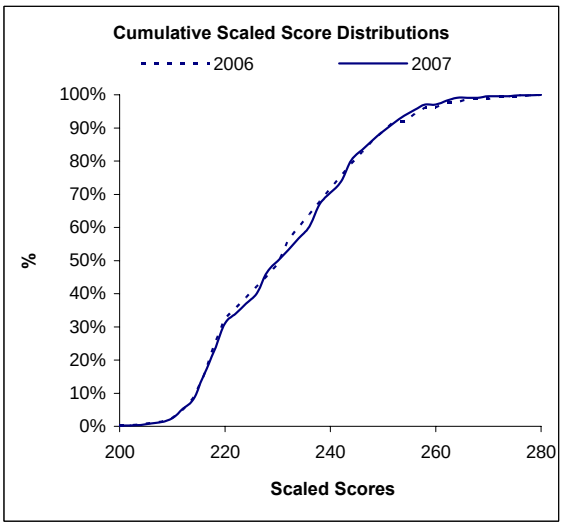



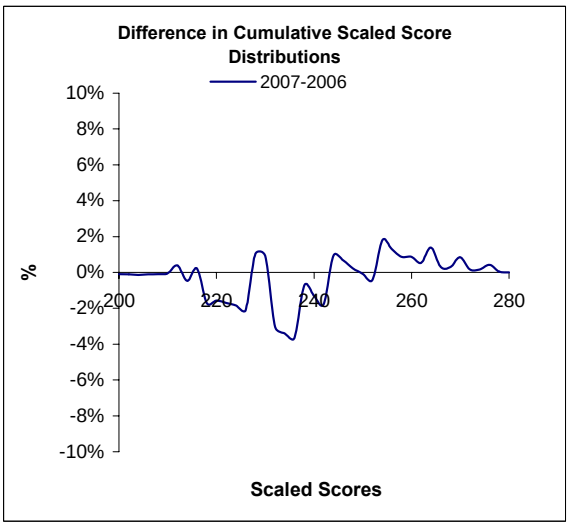



## MCAS0607 SCI Grade 08

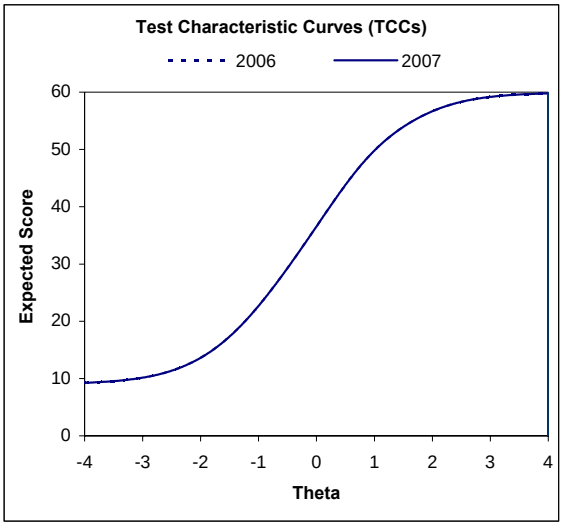


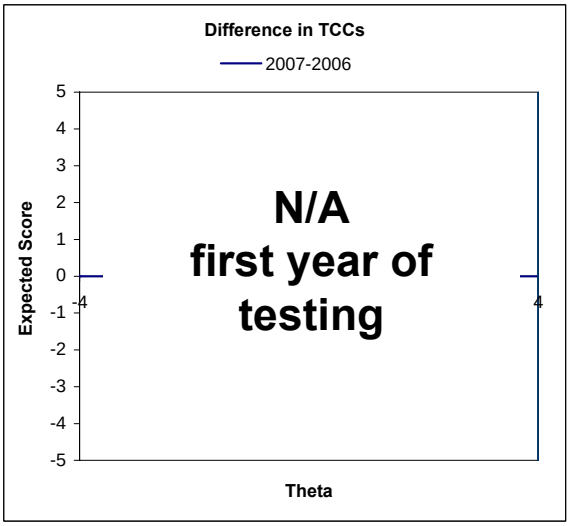



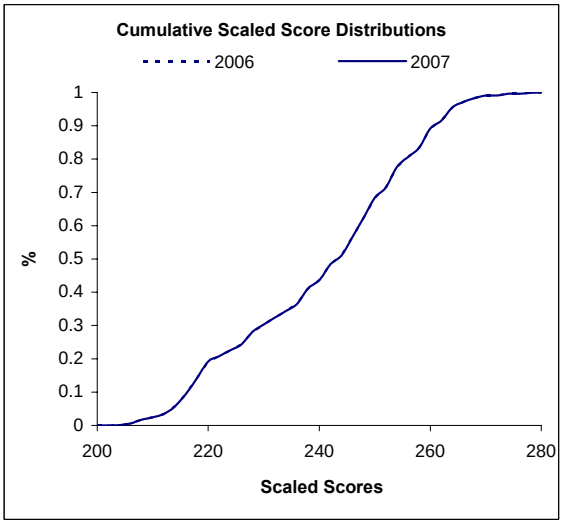



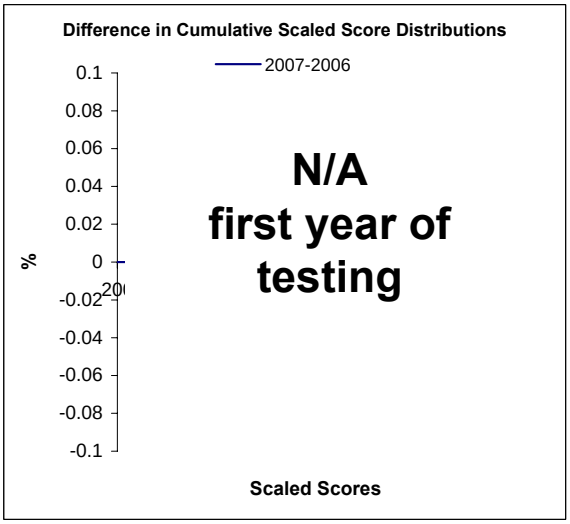



## MCAS H.S. SCI (Bio)

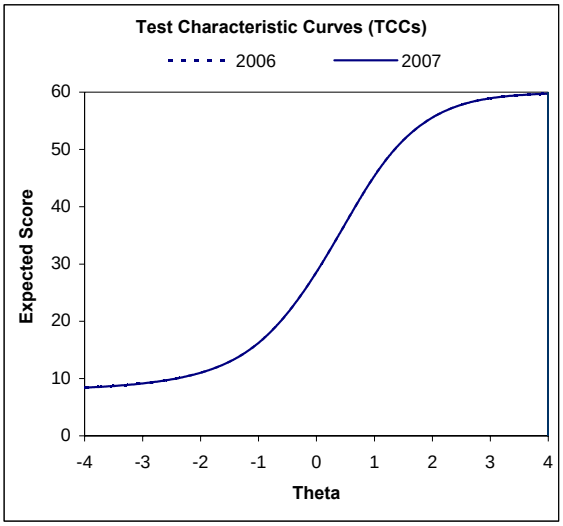


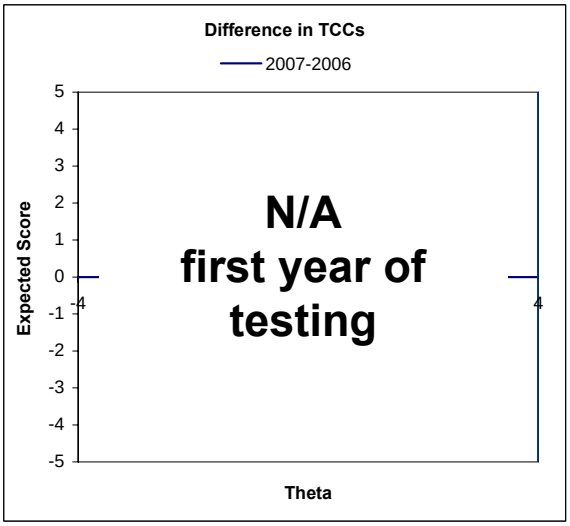



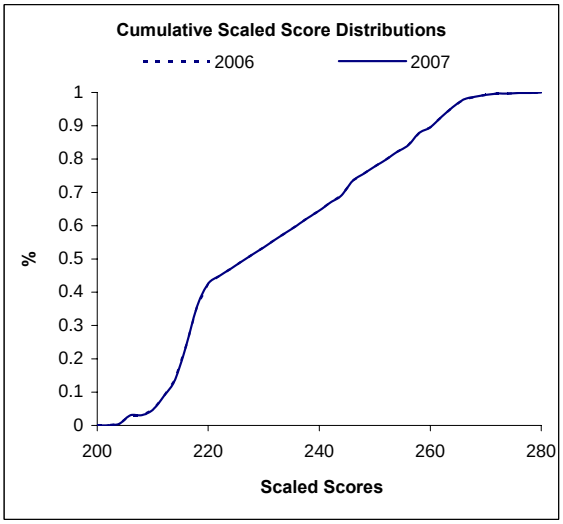



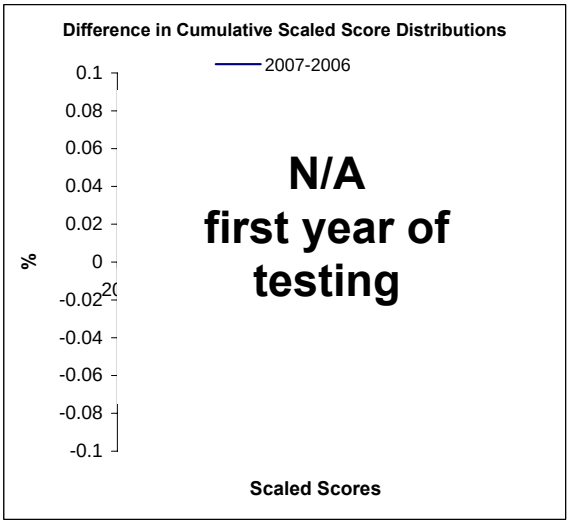



## MCAS H.S. SCI (Chem)

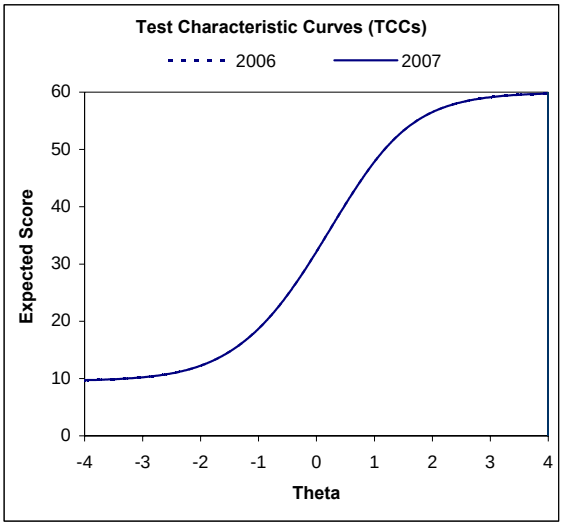


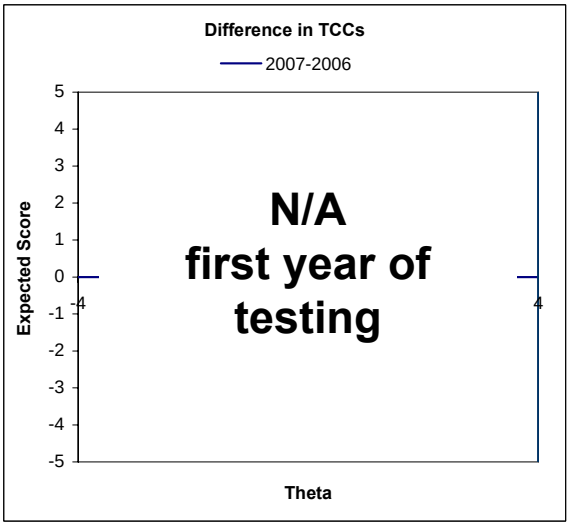



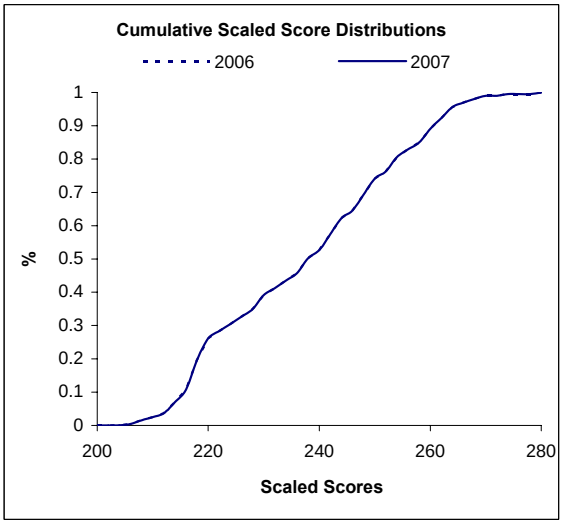



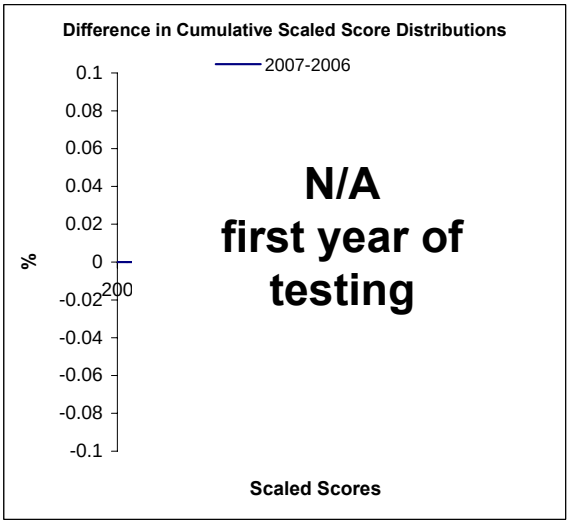



## MCAS H.S. SCI (Intro Phys)

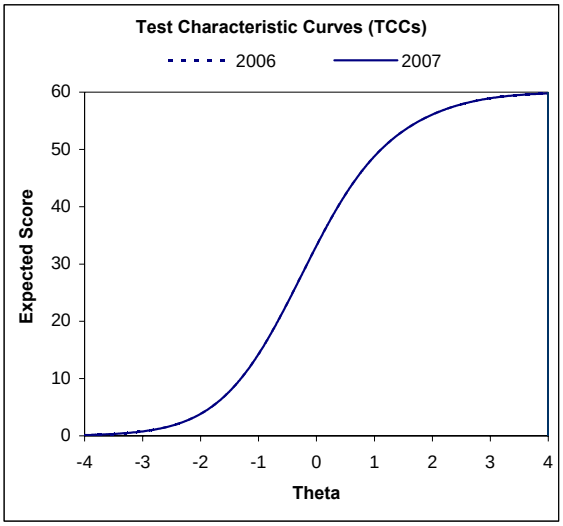


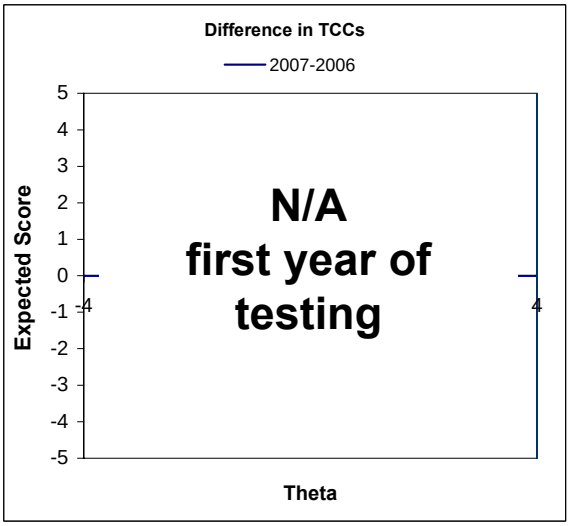



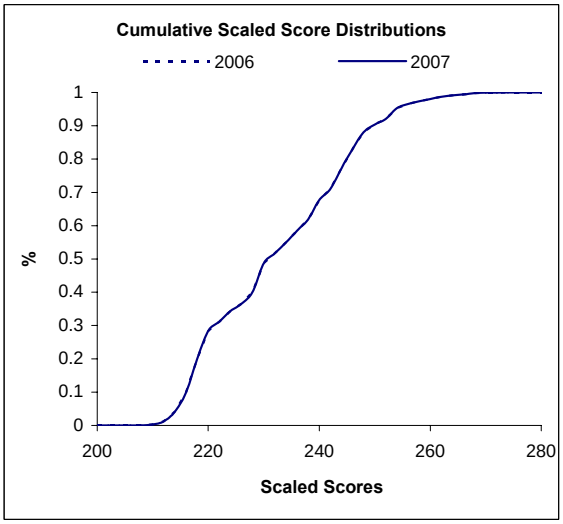



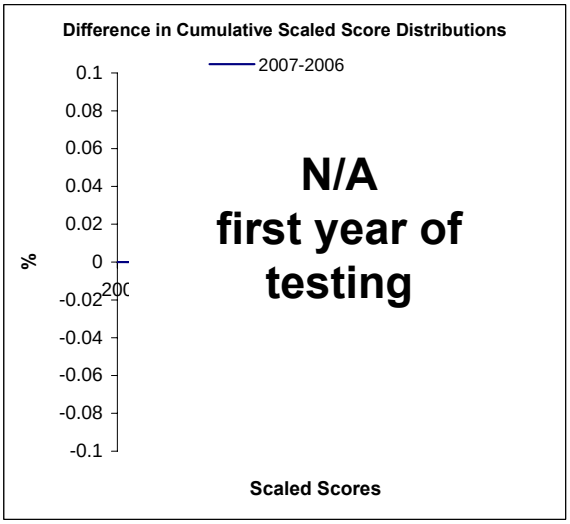



## MCAS H.S. SCI (Tech/Eng)



## 6.2 Assessment Reliability

No academic assessment can measure student performance with perfect accuracy; some students will receive scores that underestimate their true ability, and other students will receive scores that overestimate their true ability. Items that function well together will produce an assessment that has a low amount of error and can therefore be described as "reliable."

There are a number of ways to estimate an assessment's reliability. One approach is to split all test items into two groups and then correlate students' scores on the two half-tests. This procedure is known as a *split-half estimate of reliability*. If the two half-test scores correlate highly, items on the two half-tests are likely to be measuring very similar knowledge or skills. This is evidence that the items complement one another and function well as a group. This also suggests that measurement error will be minimal.

The split-half method requires psychometricians to select items that contribute to each half-test score. This decision may have an impact on the resulting correlation. Cronbach (1951) provided a statistic that avoids this concern about the split-half method. Cronbach's α coefficient is an estimate of the average of all possible split-half reliability coefficients. Cronbach's α is computed using the following formula:

$$\alpha \equiv \frac{n}{n-1}\left[1 - \frac{\sum_{i=1}^{n} \sigma^2_{(Y_i)}}{\sigma^2_x}\right]$$

where

$i$ indexes the item,
$n$ is the total number of items,
$\sigma^2\left(Y_i\right)$ represents individual item variance, and
$\sigma^2_x$ represents the total test variance.

### 6.2.1 Reliability and Standard Errors of Measurement

Table 6.2.1 presents descriptive statistics, Cronbach's α coefficient, and raw score standard errors of measurement for each 2007 MCAS test administration and grade level.

**Table 6.2.1: MCAS 2007**
**Test Reliabilities, Descriptive Statistics, and Standard Errors of Measurement**
*SD = Standard Deviation*
*Rel = Reliability*
*SEM = Standard Error of Measurement*

| Content Area | Grade Level | Number of Students | Raw Score Points | Minimum Score | Maximum Score | Mean Score | SD | Rel | SEM |
|---|---|---|---|---|---|---|---|---|---|
| English Language Arts (Composition not included) | 3 | 70,282 | 48 | 0 | 48 | 36.35 | 8.53 | 0.91 | 2.57 |
| | 4 | 69,458 | 52 | 0 | 52 | 37.12 | 7.39 | 0.90 | 2.56 |
| | 5 | 70,099 | 52 | 0 | 52 | 36.83 | 8.98 | 0.90 | 2.86 |
| | 6 | 71,737 | 52 | 0 | 52 | 37.04 | 8.48 | 0.90 | 2.75 |
| | 7 | 72,690 | 52 | 0 | 52 | 38.30 | 8.51 | 0.90 | 2.69 |
| | 8 | 73,560 | 52 | 0 | 52 | 37.53 | 8.87 | 0.90 | 2.75 |
| | 10 | 72,178 | 52 | 0 | 52 | 37.14 | 8.83 | 0.90 | 2.81 |
| Mathematics | 3 | 70,412 | 40 | 0 | 40 | 29.83 | 7.50 | 0.89 | 2.51 |
| | 4 | 69,575 | 54 | 0 | 54 | 37.95 | 10.37 | 0.89 | 3.39 |
| | 5 | 70,379 | 54 | 0 | 54 | 36.18 | 11.72 | 0.90 | 3.66 |
| | 6 | 71,900 | 54 | 0 | 54 | 36.42 | 11.24 | 0.92 | 3.15 |
| | 7 | 72,694 | 54 | 0 | 54 | 34.91 | 12.04 | 0.92 | 3.44 |
| | 8 | 73,466 | 54 | 0 | 54 | 33.35 | 13.16 | 0.92 | 3.66 |
| | 10 | 71,353 | 60 | 0 | 60 | 39.93 | 13.43 | 0.92 | 3.75 |
| Science and Technology/ Engineering | 5 | 70,367 | 54 | 0 | 54 | 34.68 | 8.47 | 0.85 | 3.29 |
| | 8 | 73,423 | 54 | 0 | 54 | 31.80 | 10.23 | 0.89 | 3.46 |
| | HS Bio | 62,894 | 60 | 0 | 60 | 31.90 | 12.34 | 0.91 | 3.63 |
| | HS Chem | 13,410 | 60 | 1 | 60 | 30.36 | 13.20 | 0.91 | 3.92 |
| | HS Phys | 14,873 | 60 | 3 | 60 | 33.10 | 13.21 | 0.92 | 3.74 |
| | HS T/E | 1,883 | 60 | 6 | 60 | 32.78 | 10.52 | 0.88 | 3.66 |

### 6.2.2 Stratified Coefficient Alpha (α)

According to Feldt and Brennan (1989), a prescribed distribution of items over categories (such as different item types) indicates the presumption that at least a small, but important, degree of unique variance is associated with the categories. In contrast, Cronbach's coefficient α is built on the assumption that there are no such local or clustered dependencies. A stratified version of coefficient α corrects for this problem:

$$\alpha_{strat} = 1 - \frac{\sum_{j=1}^{k} \sigma_{x_j}^2 (1-\alpha)}{\sigma_x^2}$$

where

$j$ indexes the subtests or categories,
$\sigma_{x_j}^2$ represents the variance of the $k$ individual subtests or categories,
$\alpha$ is the unstratified Cronbach's $\alpha$ coefficient, and
$\sigma_x^2$ represents the total test variance.

Stratified coefficient $\alpha$ was calculated separately for each grade/content combination. The stratification was based on item types (multiple-choice v. open-response). These results are provided in table 6.2.2. Note that in table 6.2.2, $N_{mc}$ refers to the number of multiple-choice items on a given test, while $N_{or}$ denotes the number of open-response items (with number of possible points on OR items in parentheses).

**Table 6.2.2: MCAS 2007 Test Coefficients**
**Cronbach's $\alpha$ and Stratified $\alpha$**

| Content Area | Grade Level | Cronbach's $\alpha$ | Cronbach's $\alpha_{mc}$ | $N_{mc}$ | Cronbach's $\alpha_{or}$ | $N_{or}$ | Stratified $\alpha$ |
|---|---|---|---|---|---|---|---|
| English Language Arts | 3 | 0.91 | 0.91 | 40 | 0.51 | 2 (8) | 0.91 |
| | 4 | 0.90 | 0.89 | 36 | 0.77 | 4 (16) | 0.91 |
| | 5 | 0.90 | 0.89 | 36 | 0.80 | 4 (16) | 0.92 |
| | 6 | 0.90 | 0.88 | 36 | 0.78 | 4 (16) | 0.91 |
| | 7 | 0.90 | 0.89 | 36 | 0.82 | 4 (16) | 0.92 |
| | 8 | 0.90 | 0.89 | 36 | 0.84 | 4 (16) | 0.92 |
| | 10 | 0.90 | 0.89 | 36 | 0.81 | 4 (16) | 0.92 |
| Mathematics | 3 | 0.89 | 0.86 | 25 | 0.71 | 10 (15) | 0.89 |
| | 4 | 0.89 | 0.86 | 29 | 0.77 | 10 (25) | 0.90 |
| | 5 | 0.90 | 0.89 | 29 | 0.78 | 10 (25) | 0.91 |
| | 6 | 0.92 | 0.90 | 29 | 0.81 | 10 (25) | 0.93 |
| | 7 | 0.92 | 0.88 | 29 | 0.84 | 10 (25) | 0.93 |
| | 8 | 0.92 | 0.90 | 29 | 0.84 | 10 (25) | 0.93 |
| | 10 | 0.92 | 0.88 | 32 | 0.87 | 10 (28) | 0.93 |
| Science and Technology/Engineering | 5 | 0.85 | 0.81 | 34 | 0.72 | 5 (20) | 0.86 |
| | 8 | 0.89 | 0.84 | 34 | 0.81 | 5 (20) | 0.90 |
| | HS Bio | 0.91 | 0.89 | 40 | 0.83 | 5 (20) | 0.93 |
| | HS Chem | 0.91 | 0.89 | 40 | 0.85 | 5 (20) | 0.93 |
| | HS Phys | 0.92 | 0.90 | 40 | 0.84 | 5 (20) | 0.93 |
| | HS T/E | 0.88 | 0.84 | 40 | 0.77 | 5 (20) | 0.89 |

## 6.2.3 Reliability of Performance Level Categorization

All test scores contain measurement error; thus, classifications based on test scores are also subject to measurement error. For the 2007 MCAS administration, after students were classified into performance levels, empirical analyses were conducted to determine the statistical accuracy and consistency of those classifications.

### *6.2.3.1 Accuracy*

*Accuracy* refers to the extent to which decisions based on test scores match decisions that would have been made if the scores did not contain any measurement error. Accuracy must be estimated because errorless test scores do not exist.

#### 6.2.3.2 Consistency

Consistency measures the extent to which classification decisions based on test scores match the decisions based on scores from a second, parallel form of the same test. Consistency can be evaluated directly from actual responses to test items if two complete, parallel forms of the test are administered to the same group of students. This is usually impractical, especially on lengthy tests, such as the MCAS administration. To overcome this issue, techniques have been developed to estimate both accuracy and consistency of classification decisions on the basis of a single administration of a test. The technique developed by Livingston and Lewis (1995) was used for MCAS because their technique can be used with both open-response and multiple-choice items.

#### 6.2.3.3 Calculating Accuracy and Consistency

All of the accuracy and consistency estimation techniques described herein make use of the concept of "true scores" in the sense of classical test theory. A true score is the score that would be obtained on a test that had no measurement error. It is a theoretical concept that cannot be observed, although it can be estimated. Following Livingston and Lewis (1995), the true-score distribution for the MCAS tests was estimated using a four-parameter beta distribution, which is a flexible model that allows for extreme degrees of skewness in test scores.

In the Livingston and Lewis method, the estimated true scores are used to classify students into their "true" performance categories, labeled "true status." After various technical adjustments (described in Livingston and Lewis, 1995), to calculate accuracy, a $4 \times 4$ contingency table was created for each content area test and grade level. The cells in the table show the proportions of students who were classified into each performance category by their actual (or observed) scores on the MCAS test and by their true scores (i.e., true status).

To estimate consistency, the true scores are used to estimate the distribution of classifications on an independent, parallel test form. After statistical adjustments (see Livingston and Lewis, 1995), a new $4 \times 4$ contingency table was created for each MCAS test and grade level that showed the proportions of students who were classified into each performance category by the actual test and who would be classified into each performance category by another (hypothetical) parallel test form. Consistency, which is the proportion of students classified into exactly the same categories by both forms of the test, is the sum of the diagonal for the new contingency table.

#### 6.2.3.4 Kappa ($\kappa$)

Another way to measure consistency is to use Cohen's (1960) coefficient $\kappa$ (kappa), which assesses the proportion of consistent classifications after removing the proportion of consistent classification that would be expected by chance. Cohen's $\kappa$ can be used to estimate the classification consistency of a test from two parallel forms of the test. The second form in this case was the one estimated using the Livingston and Lewis (1995) method. Because Cohen's $\kappa$ is corrected for chance, the values of $\kappa$ are lower than other consistency estimates.

### 6.2.3.5 Results of Accuracy, Consistency, and Kappa Analyses

Summaries of the accuracy and consistency analyses are provided in tables 6.2.3.5.1 through 6.2.3.5.20.

The first section of each table shows the overall accuracy and consistency indices, as well as κ. The overall index is, as described, the sum of the diagonal elements of the appropriate contingency table.

The second section of each table shows accuracy and consistency values, conditional upon performance level. For instance, the conditional accuracy value is 0.831 for the *Needs Improvement* category for grade 4 ELA. This indicates that, of the students whose true scores placed them in the *Needs Improvement* category, 83.1 percent would be expected to be in the *Needs Improvement* category if categorized according to their actual scores. The corresponding consistency value of 0.783 indicates that 78.3 percent of the grade 4 students in the *Needs Improvement* category would be expected to score in the *Needs Improvement* category again if a second, parallel test form were administered.

The third section of each table provides data at each of the cut points. These values indicate the accuracy and consistency of the dichotomous decisions, either above or below the associated cut point. In addition, false positive and false negative accuracy rates are provided. These values are estimates of the proportions of students who were categorized above the cut when their true score would place them below the cut, and vice-versa.

**Table 6.2.3.5.1: 2007 MCAS**
**Accuracy and Consistency**
**Grade 3 English Language Arts**

| | | | | | |
|---|---|---|---|---|---|
| **Overall Indices** | **Accuracy** | | **Consistency** | | **Kappa (κ)** |
| | 0.765 | | 0.689 | | 0.538 |
| **Indices Conditional on Level** | **Performance Level** | | **Accuracy** | | **Consistency** |
| | *Warning* | | 0.816 | | 0.730 |
| | *Needs Improvement* | | 0.813 | | 0.758 |
| | *Proficient* | | 0.733 | | 0.686 |
| | *Above Proficient* | | 0.729 | | 0.554 |
| **Indices at Cut Points** | | **Accuracy** | | | **Consistency** |
| | | **Accuracy** | ***False Positives*** | ***False Negatives*** | |
| | ***W: NI*** | 0.973 | 0.013 | 0.014 | 0.963 |
| | ***NI :P*** | 0.916 | 0.049 | 0.036 | 0.883 |
| | ***P:AP*** | 0.875 | 0.094 | 0.031 | 0.842 |

## Table 6.2.3.5.2: 2007 MCAS
## Accuracy and Consistency
## Grade 4 English Language Arts

| Overall Indices | Accuracy | Consistency | Kappa (κ) |
|---|---|---|---|
| | 0.821 | 0.751 | 0.630 |
| **Indices Conditional on Level** | | **Accuracy** | **Consistency** |
| | *Warning* | 0.815 | 0.714 |
| | *Needs Improvement* | 0.831 | 0.783 |
| | *Proficient* | 0.798 | 0.731 |
| | *Advanced* | 0.861 | 0.736 |

| Indices at Cut Points | | Accuracy | | | Consistency |
|---|---|---|---|---|---|
| | | Accuracy | *False Positives* | *False Negatives* | |
| | ***W:NI*** | 0.969 | 0.014 | 0.018 | 0.956 |
| | ***NI :P*** | 0.910 | 0.051 | 0.039 | 0.875 |
| | ***P:A*** | 0.943 | 0.040 | 0.018 | 0.920 |

## Table 6.2.3.5.3: 2007 MCAS
## Accuracy and Consistency
## Grade 5 English Language Arts

| Overall Indices | Accuracy | Consistency | Kappa (κ) |
|---|---|---|---|
| | 0.820 | 0.750 | 0.631 |
| **Indices Conditional on Level** | | **Accuracy** | **Consistency** |
| | *Warning* | 0.802 | 0.697 |
| | *Needs Improvement* | 0.818 | 0.765 |
| | *Proficient* | 0.801 | 0.744 |
| | *Advanced* | 0.877 | 0.754 |

| Indices at Cut Points | | Accuracy | | | Consistency |
|---|---|---|---|---|---|
| | | Accuracy | *False Positives* | *False Negatives* | |
| | ***W: NI*** | 0.974 | 0.011 | 0.015 | 0.964 |
| | ***NI:P*** | 0.915 | 0.048 | 0.037 | 0.882 |
| | ***P:A*** | 0.930 | 0.049 | 0.021 | 0.904 |

## Table 6.2.3.5.4: 2007 MCAS
## Accuracy and Consistency
## Grade 6 English Language Arts

| Overall Indices | Accuracy | Consistency | Kappa (κ) |
|---|---|---|---|
| | 0.830 | 0.765 | 0.623 |
| **Indices Conditional on Level** | | **Accuracy** | **Consistency** |
| | *Warning* | 0.786 | 0.663 |
| | *Needs Improvement* | 0.802 | 0.741 |
| | *Proficient* | 0.844 | 0.804 |
| | *Advanced* | 0.861 | 0.706 |

| Indices at Cut Points | | Accuracy | | | Consistency |
|---|---|---|---|---|---|
| | | Accuracy | *False Positives* | *False Negatives* | |
| | ***W:NI*** | 0.977 | 0.009 | 0.013 | 0.968 |
| | ***NI :P*** | 0.914 | 0.047 | 0.039 | 0.881 |
| | ***P:A*** | 0.939 | 0.045 | 0.016 | 0.916 |

## Table 6.2.3.5.5: 2007 MCAS
## Accuracy and Consistency
## Grade 7 English Language Arts

| Overall Indices | Accuracy | Consistency | Kappa (κ) |
|---|---|---|---|
| | 0.838 | 0.774 | 0.643 |

| Indices Conditional on Level | | Accuracy | Consistency |
|---|---|---|---|
| | *Warning* | 0.801 | 0.685 |
| | *Needs Improvement* | 0.812 | 0.752 |
| | *Proficient* | 0.850 | 0.808 |
| | *Advanced* | 0.863 | 0.733 |

| Indices at Cut Points | | Accuracy | | | Consistency |
|---|---|---|---|---|---|
| | | Accuracy | *False Positives* | *False Negatives* | |
| | ***W:NI*** | 0.978 | 0.009 | 0.013 | 0.969 |
| | ***NI:P*** | 0.919 | 0.044 | 0.038 | 0.887 |
| | ***P:A*** | 0.942 | 0.041 | 0.018 | 0.919 |

## Table 6.2.3.5.6: 2007 MCAS
## Accuracy and Consistency
## Grade 8 English Language Arts

| Overall Indices | Accuracy | Consistency | Kappa (κ) |
|---|---|---|---|
| | 0.846 | 0.787 | 0.646 |

| Indices Conditional on Level | | Accuracy | Consistency |
|---|---|---|---|
| | *Warning* | 0.786 | 0.661 |
| | *Needs Improvement* | 0.798 | 0.731 |
| | *Proficient* | 0.861 | 0.832 |
| | *Advanced* | 0.875 | 0.743 |

| Indices at Cut Points | | Accuracy | | | Consistency |
|---|---|---|---|---|---|
| | | Accuracy | *False Positives* | *False Negatives* | |
| | ***W:NI*** | 0.983 | 0.007 | 0.010 | 0.976 |
| | ***NI:P*** | 0.930 | 0.037 | 0.033 | 0.902 |
| | ***P:A*** | 0.933 | 0.048 | 0.019 | 0.909 |

## Table 6.2.3.5.7: 2007 MCAS
## Accuracy and Consistency
## Grade 10 English Language Arts

| Overall Indices | Accuracy | Consistency | Kappa (κ) |
|---|---|---|---|
| | 0.839 | 0.775 | 0.663 |

| Indices Conditional on Level | | Accuracy | Consistency |
|---|---|---|---|
| | *Failing* | 0.808 | 0.697 |
| | *Needs Improvement* | 0.823 | 0.763 |
| | *Proficient* | 0.827 | 0.776 |
| | *Advanced* | 0.891 | 0.800 |

| Indices at Cut Points | | Accuracy | | | Consistency |
|---|---|---|---|---|---|
| | | Accuracy | *False Positives* | *False Negatives* | |
| | ***F:NI*** | 0.982 | 0.008 | 0.011 | 0.974 |
| | ***NI :P*** | 0.928 | 0.038 | 0.034 | 0.899 |
| | ***P:A*** | 0.929 | 0.046 | 0.024 | 0.902 |

## Table 6.2.3.5.8: 2007 MCAS
## Accuracy and Consistency
## Grade 3 Mathematics

| Overall Indices | Accuracy | Consistency | Kappa (κ) |
|---|---|---|---|
| | 0.727 | 0.638 | 0.495 |

| Indices Conditional on Level | | Accuracy | Consistency |
|---|---|---|---|
| | *Warning* | 0.824 | 0.757 |
| | *Needs Improvement* | 0.682 | 0.587 |
| | *Proficient* | 0.695 | 0.626 |
| | *Above Proficient* | 0.791 | 0.637 |

| Indices at Cut Points | | Accuracy | | | Consistency |
|---|---|---|---|---|---|
| | | Accuracy | *False Positives* | *False Negatives* | |
| | ***W:NI*** | 0.952 | 0.025 | 0.024 | 0.933 |
| | ***NI :P*** | 0.909 | 0.053 | 0.038 | 0.874 |
| | ***P:AP*** | 0.866 | 0.095 | 0.038 | 0.825 |

## Table 6.2.3.5.9: 2007 MCAS
## Accuracy and Consistency
## Grade 4 Mathematics

| Overall Indices | Accuracy | Consistency | Kappa (κ) |
|---|---|---|---|
| | 0.756 | 0.673 | 0.537 |

| Indices Conditional on Level | | Accuracy | Consistency |
|---|---|---|---|
| | *Warning* | 0.813 | 0.732 |
| | *Needs Improvement* | 0.807 | 0.755 |
| | *Proficient* | 0.637 | 0.543 |
| | *Advanced* | 0.815 | 0.670 |

| Indices at Cut Points | | Accuracy | | | Consistency |
|---|---|---|---|---|---|
| | | Accuracy | *False Positives* | *False Negatives* | |
| | ***W:NI*** | 0.960 | 0.019 | 0.021 | 0.944 |
| | ***NI:P*** | 0.903 | 0.059 | 0.039 | 0.866 |
| | ***P:A*** | 0.892 | 0.075 | 0.033 | 0.854 |

## Table 6.2.3.5.10: 2007 MCAS
## Accuracy and Consistency
## Grade 5 Mathematics

| Overall Indices | Accuracy | Consistency | Kappa (κ) |
|---|---|---|---|
| | 0.771 | 0.689 | 0.575 |

| Indices Conditional on Level | | Accuracy | Consistency |
|---|---|---|---|
| | *Warning* | 0.825 | 0.759 |
| | *Needs Improvement* | 0.752 | 0.680 |
| | *Proficient* | 0.713 | 0.633 |
| | *Advanced* | 0.870 | 0.734 |

| Indices at Cut Points | | Accuracy | | | Consistency |
|---|---|---|---|---|---|
| | | Accuracy | *False Positives* | *False Negatives* | |
| | ***W:NI*** | 0.947 | 0.027 | 0.026 | 0.925 |
| | ***NI :P*** | 0.909 | 0.055 | 0.036 | 0.875 |
| | ***P:A*** | 0.915 | 0.062 | 0.023 | 0.885 |

## Table 6.2.3.5.11: 2007 MCAS Accuracy and Consistency Grade 6 Mathematics

| Overall Indices | Accuracy | Consistency | Kappa (κ) |
|---|---|---|---|
| | 0.792 | 0.714 | 0.613 |

| Indices Conditional on Level | | Accuracy | Consistency |
|---|---|---|---|
| | *Warning* | 0.859 | 0.806 |
| | *Needs Improvement* | 0.760 | 0.684 |
| | *Proficient* | 0.731 | 0.649 |
| | *Advanced* | 0.875 | 0.766 |

| Indices at Cut Points | | Accuracy | | | Consistency |
|---|---|---|---|---|---|
| | | Accuracy | *False Positives* | *False Negatives* | |
| | ***W:NI*** | 0.951 | 0.025 | 0.024 | 0.932 |
| | ***NI :P*** | 0.921 | 0.046 | 0.033 | 0.890 |
| | ***P:A*** | 0.920 | 0.054 | 0.026 | 0.890 |

## Table 6.2.3.5.12: 2007 MCAS Accuracy and Consistency Grade 7 Mathematics

| Overall Indices | Accuracy | Consistency | Kappa (κ) |
|---|---|---|---|
| | 0.798 | 0.723 | 0.621 |

| Indices Conditional on Level | | Accuracy | Consistency |
|---|---|---|---|
| | *Warning* | 0.858 | 0.810 |
| | *Needs Improvement* | 0.746 | 0.667 |
| | *Proficient* | 0.775 | 0.706 |
| | *Advanced* | 0.877 | 0.735 |

| Indices at Cut Points | | Accuracy | | | Consistency |
|---|---|---|---|---|---|
| | | Accuracy | *False Positives* | *False Negatives* | |
| | ***W:NI*** | 0.939 | 0.032 | 0.029 | 0.915 |
| | ***NI :P*** | 0.919 | 0.050 | 0.032 | 0.887 |
| | ***P:A*** | 0.940 | 0.045 | 0.015 | 0.919 |

## Table 6.2.3.5.13: 2007 MCAS Accuracy and Consistency Grade 8 Mathematics

| Overall Indices | Accuracy | Consistency | Kappa (κ) |
|---|---|---|---|
| | 0.798 | 0.723 | 0.627 |

| Indices Conditional on Level | | Accuracy | Consistency |
|---|---|---|---|
| | *Warning* | 0.857 | 0.814 |
| | *Needs Improvement* | 0.761 | 0.684 |
| | *Proficient* | 0.741 | 0.661 |
| | *Advanced* | 0.886 | 0.766 |

| Indices at Cut Points | | Accuracy | | | Consistency |
|---|---|---|---|---|---|
| | | Accuracy | *False Positives* | *False Negatives* | |
| | ***W:NI*** | 0.939 | 0.034 | 0.028 | 0.915 |
| | ***NI :P*** | 0.924 | 0.047 | 0.029 | 0.895 |
| | ***P:A*** | 0.935 | 0.047 | 0.018 | 0.911 |

## Table 6.2.3.5.14: 2007 MCAS
## Accuracy and Consistency
## Grade 10 Mathematics

| Overall Indices | Accuracy | Consistency | Kappa (κ) |
|---|---|---|---|
| | 0.824 | 0.757 | 0.644 |

| Indices Conditional on Level | | Accuracy | Consistency |
|---|---|---|---|
| | *Failing* | 0.807 | 0.722 |
| | *Needs Improvement* | 0.766 | 0.689 |
| | *Proficient* | 0.723 | 0.635 |
| | *Advanced* | 0.927 | 0.872 |

| Indices at Cut Points | | Accuracy | | | Consistency |
|---|---|---|---|---|---|
| | | Accuracy | *False Positives* | *False Negatives* | |
| | ***F:NI*** | 0.969 | 0.015 | 0.016 | 0.957 |
| | ***NI :P*** | 0.935 | 0.036 | 0.029 | 0.909 |
| | ***P:A*** | 0.919 | 0.050 | 0.030 | 0.888 |

## Table 6.2.3.5.15: 2007 MCAS
## Accuracy and Consistency
## Grade 5 Science and Technology/Engineering

| Overall Indices | Accuracy | Consistency | Kappa (κ) |
|---|---|---|---|
| | 0.749 | 0.657 | 0.505 |

| Indices Conditional on Level | | Accuracy | Consistency |
|---|---|---|---|
| | *Warning* | 0.765 | 0.638 |
| | *Needs Improvement* | 0.762 | 0.700 |
| | *Proficient* | 0.694 | 0.603 |
| | *Advanced* | 0.840 | 0.676 |

| Indices at Cut Points | | Accuracy | | | Consistency |
|---|---|---|---|---|---|
| | | Accuracy | *False Positives* | *False Negatives* | |
| | ***W:NI*** | 0.950 | 0.021 | 0.029 | 0.929 |
| | ***NI :P*** | 0.880 | 0.072 | 0.049 | 0.834 |
| | ***P:A*** | 0.919 | 0.059 | 0.022 | 0.888 |

## Table 6.2.3.5.16: 2007 MCAS
## Accuracy and Consistency
## Grade 8 Science and Technology/Engineering

| Overall Indices | Accuracy | Consistency | Kappa (κ) |
|---|---|---|---|
| | 0.806 | 0.731 | 0.594 |

| Indices Conditional on Level | | Accuracy | Consistency |
|---|---|---|---|
| | *Warning* | 0.833 | 0.768 |
| | *Needs Improvement* | 0.798 | 0.743 |
| | *Proficient* | 0.803 | 0.721 |
| | *Advanced* | 0.760 | 0.471 |

| Indices at Cut Points | | Accuracy | | | Consistency |
|---|---|---|---|---|---|
| | | Accuracy | *False Positives* | *False Negatives* | |
| | ***W:NI*** | 0.929 | 0.036 | 0.035 | 0.901 |
| | ***NI :P*** | 0.905 | 0.060 | 0.035 | 0.869 |
| | ***P:A*** | 0.972 | 0.024 | 0.004 | 0.960 |

## Table 6.2.3.5.17: 2007 MCAS
## Accuracy and Consistency
## High School Biology

| Overall Indices | Accuracy | Consistency | Kappa (κ) |
|---|---|---|---|
| | 0.812 | 0.740 | 0.632 |

| Indices Conditional on Level | | Accuracy | Consistency |
|---|---|---|---|
| | *Failing* | 0.826 | 0.757 |
| | *Needs Improvement* | 0.782 | 0.709 |
| | *Proficient* | 0.813 | 0.755 |
| | *Advanced* | 0.853 | 0.740 |

| Indices at Cut Points | | Accuracy | | | Consistency |
|---|---|---|---|---|---|
| | | Accuracy | *False Positives* | *False Negatives* | |
| | ***F:NI*** | 0.955 | 0.023 | 0.022 | 0.938 |
| | ***NI :P*** | 0.928 | 0.041 | 0.031 | 0.900 |
| | ***P:A*** | 0.929 | 0.047 | 0.024 | 0.902 |

## Table 6.2.3.5.18: 2007 MCAS
## Accuracy and Consistency
## High School Chemistry

| Overall Indices | Accuracy | Consistency | Kappa (κ) |
|---|---|---|---|
| | 0.815 | 0.743 | 0.647 |

| Indices Conditional on Level | | Accuracy | Consistency |
|---|---|---|---|
| | *Failing* | 0.889 | 0.860 |
| | *Needs Improvement* | 0.743 | 0.648 |
| | *Proficient* | 0.760 | 0.672 |
| | *Advanced* | 0.863 | 0.754 |

| Indices at Cut Points | | Accuracy | | | Consistency |
|---|---|---|---|---|---|
| | | Accuracy | *False Positives* | *False Negatives* | |
| | ***F:NI*** | 0.930 | 0.040 | 0.030 | 0.902 |
| | ***NI :P*** | 0.935 | 0.039 | 0.026 | 0.910 |
| | ***P:A*** | 0.949 | 0.033 | 0.018 | 0.929 |

## Table 6.2.3.5.19: 2007 MCAS
## Accuracy and Consistency
## High School Introductory Physics

| Overall Indices | Accuracy | Consistency | Kappa (κ) |
|---|---|---|---|
| | 0.809 | 0.735 | 0.635 |

| Indices Conditional on Level | | Accuracy | Consistency |
|---|---|---|---|
| | *Failing* | 0.814 | 0.753 |
| | *Needs Improvement* | 0.778 | 0.701 |
| | *Proficient* | 0.806 | 0.738 |
| | *Advanced* | 0.880 | 0.775 |

| Indices at Cut Points | | Accuracy | | | Consistency |
|---|---|---|---|---|---|
| | | Accuracy | *False Positives* | *False Negatives* | |
| | ***F:NI*** | 0.936 | 0.035 | 0.029 | 0.911 |
| | ***NI :P*** | 0.927 | 0.043 | 0.030 | 0.898 |
| | ***P:A*** | 0.946 | 0.036 | 0.018 | 0.925 |

## Table 6.2.3.5.20: 2007 MCAS
## Accuracy and Consistency
## High School Technology/Engineering

| | | | | | |
|---|---|---|---|---|---|
| **Overall Indices** | **Accuracy** | | **Consistency** | | **Kappa (κ)** |
| | 0.804 | | 0.727 | | 0.586 |
| **Indices Conditional on Level** | | | **Accuracy** | | **Consistency** |
| | *Failing* | | 0.818 | | 0.740 |
| | *Needs Improvement* | | 0.769 | | 0.704 |
| | *Proficient* | | 0.838 | | 0.765 |
| | *Advanced* | | 0.777 | | 0.494 |
| **Indices at Cut Points** | | **Accuracy** | | | **Consistency** |
| | | **Accuracy** | ***False Positives*** | ***False Negatives*** | |
| | ***F:NI*** | 0.929 | 0.034 | 0.037 | 0.901 |
| | ***NI :P*** | 0.897 | 0.063 | 0.040 | 0.857 |
| | ***P:A*** | 0.978 | 0.019 | 0.004 | 0.968 |

## 6.3 Validity

Evidence is presented in detail throughout this document to support inferences of student achievement of the learning standards of the *Massachusetts Curriculum Frameworks*, as measured by MCAS, including test development, test alignment, test administration, scoring, equating, item analyses, reliability, scaled scores, performance levels, and reporting. The purpose of this section of the document is to discuss how MCAS ensures the validity of its tests and their results.

### 6.3.1 Validity Evidence for Standard MCAS Tests

MCAS tests are rigorously examined in reference to the guidelines provided in the *Standards for Educational and Psychological Testing* (1985, 1999), which provide criteria for the evaluation of tests, testing practices, and effects of test use for a broad set of assessments, including alternate assessments.

The *Standards for Educational and Psychological Testing* describes sources of evidence to consider when constructing a validity argument. Examples of standards prescribed by the manual, as well as evidence of how MCAS tests satisfy these standards, are presented below.

- Standard 1.2 (p.17): "The test developer should set forth clearly how test scores are intended to be interpreted and used."

For the 2007 MCAS operational administration, the *Guide to Interpreting the Spring 2007 MCAS Reports for Schools and Districts* provides this information. The *Guide* outlines general guidelines for the interpretation and use of MCAS reports, gives instructions on how to read and interpret specific reports, and provides information on how to make appropriate comparisons and inferences from statistics. Additionally, the *Guide to the 2007 MCAS for Parents/Guardians* provides information on how parents and guardians should interpret MCAS results.

- Standard 1.13 (p.20): "When validity evidence includes statistical analyses of test results, either alone or together with data on other variables, the conditions under which the data were collected should be described in enough detail that users can judge the relevance of the statistical findings to local conditions. Attention should be drawn to any features of a validation data collection that are likely to differ from typical operational testing conditions and that could plausibly influence test performance."

This standard concerns the degree to which the data collected for validity evidence may be generalized to operational conditions. Most of the statistical evidence of validity for the 2007 MCAS tests (see section 6.3.1.2 on Internal Structure) was derived from the tests themselves; thus, this evidence is immediately applicable to MCAS. Whenever validity evidence was accrued from a subset of the Massachusetts test-taking population, rather than the entire population (e.g., study of the concordance between MCAS and other instruments, described

below), any potential differences between sample and population were thoroughly documented.

- Standard 1.14 (p.20): "The patterns of association between and among scores on the instrument under study and other variables should be consistent with theoretical expectations."

Massachusetts has accumulated a substantial amount of evidence of the criterion-related validity of MCAS tests. This evidence shows that MCAS test results are correlated strongly with relevant measures of academic achievement. Specific examples include the following:

After the MCAS program was first introduced, the Department commissioned two separate studies (Gong, 1999; Thacker & Hoffman, 1999) to examine the relationship between performance on the MCAS tests of students in two large urban districts in Massachusetts and performance of the same sample of students on a locally administered, national standardized achievement test. Gong (1999) examined the relationship between MCAS scores and performance on the Metropolitan Achievement Test (MAT-7) at grade 10 and the relationship between MCAS scores and the Stanford Achievement Test (SAT-9) scores at grade 4. Thacker and Hoffman (1999) examined the relationship between MCAS scores and performance on the Stanford 9 at grades 4, 8, and 10. The two studies also examined the relationship between MCAS performance and students' enrollment in specific courses.

These studies found that students in each of the four MCAS performance levels (*Warning/Failing, Needs Improvement, Proficient,* and *Advanced*) generally performed similarly on a commercially available, standardized instrument. That is, students at higher performance levels on MCAS also tended to perform at higher performance levels on the commercial tests. It was also found that students who scored *Proficient* or *Advanced* on MCAS tended to score above the 75$^{th}$ percentile on the Stanford 9 tests. Students who scored at the *Needs Improvement* level on MCAS scored around the 50$^{th}$ percentile, and students whose MCAS performance was at the *Warning/Failing* level consistently averaged below the 25$^{th}$ percentile on the Stanford-9.

The two studies mentioned above were based on the results of individual school districts, since the commercially available tests (MAT-7 and Stanford) were administered by the districts rather than by the Commonwealth. One commercially available standardized test, however, has been administered to students statewide. From 1996–1998, third-grade students were administered the Iowa Test of Basic Skills (ITBS) in reading. Fourth-grade students who completed the 1998 MCAS tests had also taken the ITBS reading tests as third-graders in 1997. Although the MCAS and ITBS tests were administered approximately one year apart and differed slightly in what was assessed—reading only on ITBS and reading and writing on grade 4 MCAS—the results from these two tests provide an opportunity to examine the relationship between performance on MCAS and performance on an external measure. A comparison of the performance of approximately 55,000 students who were assessed statewide revealed a strong relationship—a positive correlation of approximately 0.75—between the performances on the MCAS and ITBS tests. Students who performed at

higher levels on the MCAS test tended to score at the higher percentile ranks on the ITBS test.

In 2005–2006, Massachusetts looked to other large-scale assessments in which its students participated to further demonstrate the strength of the state's MCAS tests. Two in particular, the NAEP and the SAT I tests, demonstrated results that in most instances paralleled trends seen on MCAS over recent years. Additionally, an examination of MCAS and NAEP revealed that there was a strong correlation between performances on the two instruments in both reading and mathematics. This correlation provides evidence that MCAS and NAEP content and performance standards are closely related.

In addition to the above, the *Standards for Educational and Psychological Testing* advocates that evidence in the following three general areas be considered (pp. 11–17):

- test content
- internal structure
- consequences of testing

Although each of the sources may speak to a different aspect of validity, they are not distinct types of validity. Instead, each contributes to a body of evidence about the comprehensive validity of score interpretations.

#### *6.3.1.1 Test Content*

Test content validity is the degree to which MCAS items align to the *Massachusetts Curriculum Framework* learning standards for each content area and grade level. Evidence of test content validity is described in detail in section 2 of this document, "MCAS 2007 Test Development and Design."

***Assessment Development Committees***

The primary gauge of the developmental appropriateness of MCAS test items is the review of all MCAS test items by Massachusetts teachers who serve on MCAS Assessment Development Committees (ADCs). All ADC members have experience teaching students in the subject and grade level for which items are being developed (e.g., grade 5 ELA Reading Comprehension items are reviewed by Massachusetts teachers who are currently teaching or have recently taught grade 5 reading), so that all items are reviewed by individuals who are best equipped to evaluate the developmental appropriateness of test material. The following gives a chronological listing of the steps taken to review the content of every operational MCAS item:

- Item is provided by Measured Progress (MP) to Massachusetts Department of Education (DOE) for review 10 days prior to ADC meeting.
- Item is reviewed by DOE for alignment with *Massachusetts Curriculum Framework* and for content accuracy.
- Item is returned to MP with edits.
- Item is reviewed by ADC panelists for alignment, content accuracy, and bias.
- Post-ADC debriefing: Item is reviewed by MP and DOE developers.

- Item is presented to Bias Committee for review.
- Item and comments from Bias Committee are reviewed by DOE; decision is made to field test.
- Item is field-tested.
- Item is sent to expert reviewer for content and alignment review. Expert reviewers are scholars in their respective fields. Their charge is to review items for content accuracy and to recommend that items be kept as is, edited, or deleted. There is a selection/recruitment process for expert reviewers with final approval by DOE.
- Item is reviewed by ADC panelists for statistics (performance), alignment, content, and expert review comments. Panelists make recommendations.
- DOE makes final decision to designate item as a common item, and item becomes part of that year's test.

Additionally, for the English Language Arts tests, each reading passage is subjected to a minimum of two readability tests, and the grade-level appropriateness of vocabulary within test items is checked against a widely used grade-level guide for vocabulary, the *EDL Core Vocabularies in Reading, Mathematics, Science and Social Studies*.

Items and reading passages may be rejected and removed from further consideration at any point in the above processes.

***Bias Committee***

Four two- to three-day Bias Committee meetings are held annually to review passages and items in order to ensure that students are not disadvantaged by test materials for reasons that are not educationally relevant. The Bias Committee consists of classroom teachers, school administrators, and other educators from the community.

Each item is reviewed two times, once before field testing and again after field testing. Items and passages are checked for conformity to the standards outlined in *Bias Issues in Test Development*. Committee members decide whether to recommend that materials be kept as is, edited, or deleted. The decisions of the Bias Committee are reviewed by the DOE for a final determination.

#### *6.3.1.2 Internal Structure*

Standard 1.11 of the *Standards for Educational and Psychological Testing* states (p.20): "If the rationale for a test use or interpretation depends on premises about the relationships among parts of the test, evidence concerning the internal structure of the test should be provided."

Evidence of the internal structure of MCAS tests is provided through detailed statistical analyses within this document. Technical characteristics of the internal structures of the assessments are presented in terms of the following:

- classical item statistics (item difficulty, section 6.1.1; item-test correlation, section 6.1.2)
- differential item functioning analyses (section 6.1.4)
- a variety of reliability coefficients (section 6.2)
- standard errors of measurement (section 6.2.1)
- item response theory parameters and procedures (section 6.1.5)

In addition, psychometricians closely examine theoretically derived and empirically derived item characteristic curves. This allows for the evaluation of item model fit as well as a structural evaluation across all MCAS test items. Redundant analysis performed by the University of Massachusetts at Amherst also supports data structure found through Item Response Theory analysis. Each test is equated to the same grade and content test from the prior year to preserve the meaning of scores over time. Detailed discussions of equating, scaling, and item analyses are provided in sections 4.3 and 6.1 of this document.

#### *6.3.1.3 Consequences of Testing*

Reporting information is provided in section 5 of this document, "Reporting of MCAS 2007 Results." The state has ascertained that reporting structures are consistent with the sub-domain structures of its academic content standards, i.e., item interrelationships are consistent with the *Framework* on which the test is based. MCAS reporting categories report results for items that are grouped by *Framework* subtopic or content categories. Educators also have the flexibility to customize reports for local needs using a data analysis tool provided to each school system.

The consequences of MCAS testing are consistent with the purposes of the MCAS program, which have been widely documented and have remained unchanged since the introduction of the program in 1998. The state has specified the purposes of the assessments, delineating the types of uses and decisions most appropriate to each. The purposes of MCAS examinations, which are common among standard tests and alternate assessments, are as follows:

- to evaluate the performance of students, schools, districts, and the state based upon the *Massachusetts Curriculum Framework* content standards and the MCAS performance standards
- to improve classroom instruction and student academic achievement by providing data that assist local educators in improving curriculum design and instruction
- to relate MCAS test scores to AYP requirements, in concert with other evidence, to determine NCLB federal funding
- to certify students for eligibility to earn a high school diploma: the state's high school Competency Determination requirement was first applied to the class of 2003 in English Language Arts and Mathematics; students in the class of 2010 will also be required to earn a Competency Determination in Science in order to be eligible for a Massachusetts high school diploma

### 6.3.2 Validity Evidence for the MCAS-Alt

According to the *2007 Educator's Manual for MCAS-Alt*, the purposes of the MCAS-Alt are as follows:

- to include difficult-to-assess students in assessment and accountability, as required by law
- to determine whether students with significant disabilities are receiving a program of instruction based on the state's academic learning standards
- to measure the extent to which students have learned the academic curriculum
- to use assessment results to provide challenging academic instruction for students with disabilities
- to provide an alternative pathway for some students to earn a Competency Determination in order to be eligible to receive a diploma

To demonstrate validity for the MCAS-Alt, two types of validity are discussed below:

- content validity
- procedural validity

#### *6.3.2.1 Content Validity*

Content validity is the degree to which an assessment measures the knowledge and skills it was designed to measure. Content validity is generally determined by the expert judgment of content area specialists who review the assessment instrument, and by the judgment of qualified portfolio scorers who are closely monitored during the scoring process.

MCAS-Alt portfolio content is based on the *Massachusetts Curriculum Framework* learning standards that describe the concepts, skills, and knowledge that students are expected to learn by the end of each grade cluster from PreK through grade 12.

The *Resource Guide to the Massachusetts Curriculum Frameworks for Students with Significant Disabilities* provides instructional and assessment strategies for teaching students with disabilities the same learning standards as regular education students. The *Resource Guide* is intended to promote "access to the general curriculum," as required by law, and to assist educators of students with significant cognitive disabilities.

The *Resource Guide* was developed by panels of educational experts in each content area, including DOE staff, contractor staff, higher education faculty, panelists, and regular and special educators. Each section was written, reviewed, and validated by panels of content area experts to ensure that each modified standard (entry point) was based on the essence of the grade-level learning standard on which it was based.

Specific guidelines help teachers assemble MCAS-Alt portfolios based on academic outcomes in the subject and strand being assessed, while maintaining the flexibility necessary

to meet the needs of diverse learners. The requirements for constructing student portfolios necessitate that challenging skills based on grade-level content standards will be taught in order to produce the needed evidence. It is therefore virtually guaranteed that students will be taught, and will make progress on, academic skills at an appropriate level of complexity. Rigorous scoring procedures include holding scorers to high standards of accuracy and consistency, using monitoring methods that include frequent double-scoring and recalibration to verify and validate portfolio scores. These procedures, along with DOE review of each year's MCAS-Alt results, confirm that the MCAS-Alt is being successfully used for the purposes for which it was intended.

#### *6.3.2.2 Procedural Validity*

Procedural validity is shown by thorough documentation of the process used to develop the assessment instrument and of the processes of scoring, standard setting, and describing and reporting performance. Although procedural evidence does not guarantee validity of assessment results, the lack of procedural evidence can negatively affect credibility of results.

Procedural validity is determined based on a review of the following questions:

- Who participated in the development process?
- How were decisions made during development?
- Was the plan implemented as discussed?
- After implementation, was the plan reviewed at intervals, and revised as needed?
- Was the development process documented?

***Who participated in the development process?***
The MCAS-Alt was developed by a group of diverse stakeholders, including representatives from special education, regular education, and higher education; and administrators from urban and non-urban districts; collaboratives; and approved special education private schools. Also included in the development process were psychometricians, education and assessment policy makers, inclusion specialists, attorneys, special education advocates, and the Northeast Regional Resource Center.

External members of the original MCAS-Alt Development Committee were Dr. Ed Roeber, Dr. Sue Bechard, Dr. Kenneth Warlick, and Dr. Jacqui Kearns, who served in key roles in the development and implementation of large-scale alternate assessments in Colorado, Illinois, Iowa, Kentucky, Maine, Maryland, Massachusetts, Montana, New Hampshire, New Jersey, New Mexico, New York, Puerto Rico, Rhode Island, South Carolina, Tennessee, Washington, Washington D.C., and West Virginia.

As the MCAS-Alt is revised and updated to reflect new mandates and greater efficiencies, DOE staff continue to consult recognized experts in the field of alternate assessment for their views and ideas.

***How were decisions made during development?***
Care was taken to include all stakeholder viewpoints during development and revision of the assessment. While making decisions, developers kept the following guidelines in mind:

- The MCAS-Alt should parallel the standard MCAS test.
- The MCAS-Alt should provide results that can be used to make valid and reliable decisions.
- The MCAS-Alt should be flexible enough for a wide range of students to participate.
- The MCAS-Alt should not unnecessarily burden the state's teachers.

All discussions and recommendations made by the technical and stakeholder advisory committees are documented and maintained in the public minutes of the statewide MCAS-Alt Advisory Committee, Project Leadership Team, and Technical Advisory Committee meetings.

***Was the plan implemented as discussed?***
The 2007 MCAS-Alt was administered as stipulated in published materials on implementation, scoring, and reporting of this assessment. Intensive training was provided for teachers during the year, including

- thirty-five DOE-sponsored training sessions each year
- online publications and training modules
- monthly newsletters
- three Teacher's Network meetings annually (see below for more information about the Teacher's Network)
- a three-week scoring institute emphasizing the professional development of participants

Materials were delivered to schools within the specified time frame. Portfolios were scored as indicated using the scoring rubric from the *2007 Educators Manual,* disseminated in the fall of 2006, and the *2007 Guidelines for Scoring Student Portfolios* (Appendix D). Scores were analyzed using the 2007 decision rules. Reports were generated in accordance with those rules and shipped to schools. Score appeals were received and reviewed using the procedures outlined in the policy that was posted and sent to schools with the materials in spring and fall.

***After implementation, was the plan reviewed at intervals, and revised as needed?***
Both the MCAS-Alt Advisory Committee and the MCAS-Alt Teacher's Network meet quarterly to review the status of the MCAS-Alt and to recommend changes, as needed, to the DOE. The Advisory Committee has discussed every change made to the MCAS-Alt since its inception. The Teacher's Network includes about 100 educators directly responsible for administering the MCAS-Alt. This group evaluates the effectiveness of the current policies, and advises on future directions.

***Was the development process documented?***
Minutes of every meeting of the MCAS-Alt Advisory Committee have been recorded and kept on file at the DOE, along with all research reports and other documentation. Additional documentation can be found on the DOE MCAS-Alt web page, including the following:

- definition and purpose of the assessment
- definition of assessment standards
- description of the assessment method and rationale for its choice
- selection and training of scorers
- description of scoring procedures and rubrics used
- feedback from scorers, including their level of satisfaction with the training and scoring processes
- description of procedures used to determine student-level results, as well as aggregated results
- description of procedures used to set performance levels
- monthly reports from the testing contractor provided to the DOE
- state performance and participation results from 2001-2006
- MCAS and MCAS-Alt Technical Reports

### 6.3.3 MCAS 2007 High School Science and Technology/Engineering Tests: Psychometric Evaluation

In 2007, the Department commissioned a series of studies to investigate the psychometric properties of the MCAS High School Science and Technology/Engineering assessments in Biology, Chemistry, Introductory Physics, and Technology/Engineering. The results of the studies may be found at www.mcasservicecenter.com/files/MCAS/2006MCASHS_PA.pdf.

# References


Allen, Mary J. & Wendy M. Yen. (1979). *Introduction to measurement theory*. Belmont, CA: Wadsworth, Inc.

American Educational Research Association, American Psychological Association, & National Council on Measurement in Education (1999). *Standards for educational and psychological testing*. Washington, DC: American Educational Research Association.

Brown, F. G. (1983). *Principles of educational and psychological testing* (3rd ed.). Fort Worth: Holt, Rinehart and Winston.

Cohen, J. (1960). A coefficient of agreement for nominal scales. *Educational and Psychological Measurement*, 20, 37–46.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, *16*, 297–334.

Dorans, N. J., & P. W. Holland. (1993). DIF detection and description. In P. W. Holland & H. Wainer (Eds.), *Differential item functioning* (pp. 35-66). Hillsdale, NJ: Lawrence Erlbaum Associates.

Dorans, N. J., & E. Kulick. (1986). Demonstrating the utility of the standardization approach to assessing unexpected differential item performance on the Scholastic Aptitude Test. *Journal of Educational Measurement*, *23,* 355–368.

Feldt, L. S., & R. L. Brennan. (1989). Reliability. In R. L. Linn (Ed.), *Educational Measurement* (3rd ed., pp. 105–146).

Fleiss, J. L. & J. Cohen. (1973). The equivalence of weighted kappa and the intraclass correlation coefficient as measures of reliability. *Educational and Psychological Measurement*, 33, 613–619.

Gong, B. (1999). Relationships between student performance on the MCAS (Massachusetts Comprehensive Assessment System) and other tests—collaborating district A, grades 4 and 10. Prepared for the Massachusetts Department of Education. Dover, NH: The National Center for the Improvement of Educational Assessment, Inc.

Hambleton, R.K., and H. Swaminathan. (1985). *Item response theory: Principles and applications*. Boston, MA: Kluwer Academic Publishers.

Hambleton, R. K., H. Swaminathan, and H. J. Rogers. (1991). *Fundamentals of item response theory*. Newbury Park, CA: Sage Publication.

Hambleton, R.K., and W. J. van der Linden. (1997). *Handbook of modern item response theory.* New York, NY: Springer-Verlag.

Holland, P.W., & H. Wainer, Eds.. (1993). *Differential item functioning.* Hillsdale, NJ: Erlbaum Associates.

Joint Committee on Testing Practices. (1988). *Code of fair testing practices in education*. Washington, DC: National Council on Measurement in Education.

Kim, S. (2006). A comparative study of IRT fixed parameter calibration methods. *Journal of Educational Measurement, 43*(4), 355–81.

Li, Y. H., W.D. Griffith, & H.P. Tam. (1997). *Equating multiple tests via an IRT linking design: Utilizing a single set of anchor items with fixed common item parameters during the calibration process.* Paper presented at the meeting of the Psychometric Society, Knoxville, TN.

Livingston, S. A., & C. Lewis. (1995). Estimating the consistency and accuracy of classifications based on test scores. *Journal of Educational Measurement*, *32,* 179–197.

Lord, F. M. (1980). *Application of item response theory to practical testing problems.* Hillsdale, NJ: Lawrence Erlbaum.

Lord, F. M. & M. R. Novick. (1968). *Statistical theories of mental test scores.* Reading, MA: Addison-Wesley.

Massachusetts Department of Education. (2006). *2007 Educator's Manual for MCAS-Alt*. Malden, MA: Massachusetts Department of Education.

Massachusetts Department of Education. (2001). *Resource Guide to the Massachusetts Curriculum Frameworks for Students with Significant Disabilities.* Malden, MA: Massachusetts Department of Education.

Muraki, E. & R. D. Bock. (2003). PARSCALE 4.1. Lincolnwood, IL: Scientific Software International.

National Evaluation Systems, Inc. (1991). *Bias Issues in Test Development.* Amherst, MA: National Evaluation Systems, Inc.

Ostini, R., & Nering, M.L. (2006). *Polytomous Item Response Theory Models.* Thousand Oaks, CA: Sage Publications, Inc.

Petersen, N. S., M. J. Kolen., & H. D. Hoover. (1989). Scaling, norming, and equating. In R.L. Linn (Ed.), *Educational measurement* (3rd ed., pp. 221–262).

Steck-Vaughn Company. (1989). *EDL Core Vocabularies in Reading, Mathematics, Science, and Social Studies*. Austin, Texas: Steck-Vaughn Company.

Thacker, A.A., & R.G. Hoffman. (1999). Relationship between MCAS and SAT-9 for one district in Massachusetts. (Report No. FR-WATSD-99-05). Radcliff, KY: HumRRO.