MI Access™
Michigan's Alternate Assessment Program

TECHNICAL REPORT
MI-ACCESS SCIENCE ASSESSMENTS

Participation, Supported Independence and Functional Independence

Michigan's Alternate Assessment Program

Michigan Department of Education
Office of Educational Assessment and Accountability

August 2008

MI Access™
Michigan's Alternate Assessment Program

MICHIGAN STATE BOARD OF EDUCATION

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EXECUTIVE SUMMARY

The demographic profile of the United States is becoming increasingly diverse and as a result K-12 schools are now serving students who are progressively more varied in cultural background, socioeconomic status, and disability status. Nearly 6 million children with disabilities between the ages of 6 and 21 receive special education services in the United States. About 12% of all students enrolled in K-12 schools are students with disabilities (Thurlow, Thompson, and Lazarus, 2006).

Federal legislation has had a profound impact on the assessment of students with disabilities by requiring that state assessments used for school accountability include students who previously have been under served both instructionally and in the assessment of their achievement. These students include English language learners (ELLs) and students with disabilities.

MI-Access was created out of the need to provide equitable educational opportunities to students with disabilities and to comply with the federal legislative initiatives. For over 30 years, the only statewide assessment available to students in Michigan was the Michigan Educational Assessment Program, which even with assessment accommodations is not appropriate for special education students. As a result, the Michigan Department of Education began developing an alternate assessment program, which is now called MI-Access. MI-Access is one component of the Michigan Educational Assessment System, which was adopted by the State Board of Education in November 2001. The MI-Access Participation, Supported Independence, and Functional Independence Science assessments were administered for the first time statewide in fall 2007 and spring 2008.

The purpose of the *MI-Access Functional Independence Technical Manual* is to provide complete and thorough documentation of the MI-Access Participation, Supported Independence, and Functional Independence Science assessment development process. Documentation of the assessment development procedures can be viewed as the foundation necessary for valid interpretation and use of test scores.

The *Technical Manual* adheres to the highest test development principles, *the Standards for Educational and Psychological Testing* (1999). In so doing, the manual precisely documents all relevant evidence necessary to establish validity and support and defend a test, including careful test construction, adequate score reliability, appropriate test administration and scoring, accurate scaling, equating, and standard setting, and careful attention to examinee fairness issues.

The *Technical Manual* also addresses and documents all key components that are necessary for technical documentation as outlined in the *Standards* (1999). The overview and purpose of the assessments are detailed in Chapter 1, including the philosophical and historical basis for the assessments; the nature of the assessments and the population served; along with appropriate and inappropriate uses of test score interpretations. Chapter 2 addresses the entire assessment development process from content selection and specification, item specifications, test blueprints, item development, committee review procedures, item selection, form design, to a description of the operational forms including events such as the Pilot and Tryout. The test administration, scoring, reporting, test score interpretation, and references to numerous other supplemental materials are discussed in Chapter 3. The actual technical characteristics of the assessments: item and test-level statistics; scaling and equating data; standard setting rationale and processes for setting performance standards; and reliability/measurement error are completely documented and addressed in Chapters 4-6. Lastly, in Chapter 7 the valida-

tion procedures are discussed; each fundamental decision in the test construction process is discussed, documented, and reported as it contributes to the validity evidence for the test scores resulting from assessments.

The *MI-Access Functional Independence Technical Manual* thoroughly documents the overall reliability, validity, and quality of the MI-Access Participation, Supported Independence, and Functional Independence Science assessments and has provided indisputable evidence of meeting the highest standards of assessment and measurement and has been deemed an outstanding assessment program for students with disabilities.

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INTRODUCTION

The concept behind the Technical Reports for MI-Access, including Participation and Supported Independence and Functional Independence for Math and ELA, is to provide a way to communicate with test users. This is the primary purpose of supporting documents of tests as described by the *Standards for Educational and Psychological Testing* (1999). As suggested by the *Standards*, the reports should describe (a) the nature of the tests; (b) their intended uses; (c) the processes involved in their development; (d) technical information related to scoring, interpretation, and evidence of validity and reliability; (e) scaling and equating; and (f) guidelines for test administration and interpretation (p. 67).

The technical reports for MI-Access are designed to communicate with multiple users, including state policy makers and their staffs, school and district administrators, teachers, and parents and other advocates interested in such documentation. The MI-Access reports are not designed to be inclusive of the volumes of documentation available for MI-Access. At some point, excessive documentation renders such reports inaccessible. To the extent possible, additional existing documentation will be referenced within the reports and made available upon request.

The *MI-Access Science Technical Report* contains a summary of the quantitative and qualitative evidence gathered to support the purposes and uses of the MI-Access Participation, Supported Independence, and Functional Independence Science assessments (also referred to as Phase 4). The primary purposes of MI-Access assessments are described in the MI-Access Handbooks and Assessment Plan documents provided by MDE (see references). The intent of this technical report is to provide relevant technical evidence for the Participation, Supported Independence, and Functional Independence Science assessments specifically.

The technical report uses the *Standards for Educational and Psychological Testing* (AERA, APA, NCME, 1999) as a guiding framework. The *Standards* provide guidelines regarding the relevant technical information that test developers need to make available to test users. The *Standards* provide clear criteria for test designers, publishers, and users, as well as guidelines for the evaluation of tests. Specific references to the *Standards* are made at applicable points throughout the report.

The *MI-Access Science Technical Report* is organized around the *Standards* that relate to test development, reliability, validity, and test administration, with additional attention paid to standards regarding testing individuals with disabilities. It also relies on the recommendations provided in the *Standards* that address essential supporting documentation for tests. Among the recommended supporting documentation, the report addresses "the nature of the test; its intended use; the processes involved in the test's development; technical information related to scoring, interpretation, and evidence of validity and reliability; … and guidelines for test administration and interpretation" (p. 67).

The report responds to the first standard on supporting documentation for tests (Standard 6.1), which reads:

> Test documents (e.g., test manuals, technical manuals, user's guides, and supplemental material) should be made available to prospective test users and other qualified persons at the time a test is published or released for use (p. 68).

Throughout the report, where applicable and appropriate, the corresponding standards to which the documented evidence applies are referenced in footnotes.

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CHAPTER 1

MI-ACCESS: MICHIGAN'S ALTERNATE ASSESSMENT PROGRAM

1.1 The Origins of MI-Access

MI-Access, Michigan's Alternate Assessment Program, is the state's response to federal and state educational mandates and policies related to inclusion, assessment, and accountability. Relevant mandates and policies are described below.

Federal Requirements

Federal mandates requiring the inclusion of students with disabilities in assessment programs were strengthened and clarified in the *Elementary and Secondary Education Act of 1994 (Title 1)* and the *Individuals with Disabilities Education Act of 1997 (IDEA)*. The IDEA contains the most specific requirements. It stipulates that:

- All children with disabilities should have available to them educational programs and services that will prepare them for employment and independent living.
- Children with disabilities should be included in general state and district-wide assessment programs, with appropriate accommodations where necessary.
- State or local educational agencies must develop guidelines for the participation of children with disabilities in alternate assessments for those children who cannot participate in the general assessment program (required to be in place by July 1, 2000).

Furthermore, the recently passed *No Child Left Behind Act of 2001 (NCLB)* introduced an additional set of mandates requiring the inclusion of every child in state assessment programs with specific grade- and subject-matter requirements.

State Requirements

In 1995, the Michigan State Board of Education (SBE) adopted the Model Content Standards contained in the *Michigan Curriculum Framework* as performance indicators for assessing progress toward achieving goals and standards for Michigan students. In November 1998, the SBE also approved the use of *Addressing Unique Educational Needs of Students with Disabilities* (AUEN 3.0) performance standards in developing a model for instruction and alternate assessment. The AUEN is not seen as a separate set of standards, but a model of how to operationalize the Model Content Standards for students with disabilities at various levels of cognitive functioning.

In addition, in October 2001, the SBE adopted a policy to include all students in the Michigan Educational Assessment System (MEAS). The MEAS includes the Michigan Educational Assessment Program (the state's general assessment program), MI-Access (the state's alternate assessment program), and ELL-Access (for English language learners). MI-Access is the one component of the MEAS designed specifically to assess students with disabilities whose Individualized Education Program (IEP) Teams have determined that the MEAP is inappropriate for them, even with assessment accommodations. The SBE's policy reads as follows:

> It shall be the policy of the State Board of Education that each local and intermediate school district and public school academy will ensure the participation of all students in the Michigan Educational Assessment System [the MEAP, MEAP with assessment accommodations, MI-Access, or ELL-Access].

MI-Access as a Response to Federal and State Mandates

In response to federal and state policies and mandates, the Michigan Department of Education (MDE), first through the Office of Special Education and Early Intervention Services (OSE/EIS) and now through the newly established Office of Educational Assessment and Accountability (OEAA), undertook the responsibility of developing an alternate assessment program so that students with disabilities could participate meaningfully in the state's assessment system.

Due to the enormity of the task, the MDE decided to develop and implement MI-Access—its alternate assessment program—in four phases.

First Phase of Development: Participation and Supported Independence

The first generation of MI-Access Participation and Supported Independence assessments were developed in phase one. MI-Access Participation assessments are designed specifically for students who have, or function as if they have, severe cognitive impairment. These students are expected to require ongoing support in adulthood. They may also have both considerable cognitive and physical impairments that limit their ability to generalize or transfer learning, and thus may make determining their actual abilities and skills difficult. For that reason, the first generation of the MI-Access Participation assessments focused only on how a student responded to the opportunity to participate in an activity, not on how well he or she carried out that activity.

The MI-Access Supported Independence assessments are designed for students who have, or function as if they have, moderate cognitive impairment. These students are expected to require ongoing support in adulthood. They may also have both cognitive and physical impairments that impact their ability to generalize or transfer learning; however, they usually can follow learned routines and demonstrate independent living skills. The Supported Independence assessments, therefore, are designed to provide students with opportunities to demonstrate their skills. Specifically, they measure how students perform certain tasks while acknowledging that they may require some allowable level of assistance to do so. (See Figure 1 for more information on the characteristics of students who would likely participate in MI-Access Participation and Supported Independence assessments.)

In the first two years of implementation, MI-Access Participation and Supported Independence assessments were administered once each year to students who were 9, 10, 13, 14, 17, and 18 years old. These ages were selected because (1) many students taking part in these assessments were not assigned a grade level, and (2) they ensured that students assessed with MI-Access were assessed with the same frequency as general education students (that is, the ages corresponded with the grades assessed by the MEAP).

In 2003/2004, however, MI-Access Participation and Supported Independence were converted from ages to grades in order to comply with NCLB requirements of assessing student once in elementary school, middle school and high school. With that conversion, students in grades 4, 7, 8, and 11 were assessed since these were the grades in which English language arts and/or mathematics were assessed by the MEAP.

In 2005/2006, grades 3, 5, and 6 were added as required by federal law. The first generation of the MI-Access Participation and Supported Independence assessments did not meet all of the NCLB criteria for alternate assessments based on alternate achievement standards. As a result, new Participation and Supported Independence v1.5 assessments in the content areas of English language arts and mathematics are in the third phase of development: MI-Access Participation and Supported Independence v1.5.

Second Phase of Development: MI-Access Functional Independence

The MI-Access Functional Independence assessments are designed for students whose IEP Teams have determined it is not appropriate for them to take part in the MEAP, the MEAP with assessment accommodations, MI-Access Participation v1.5, or MI-Access Supported Independence v1.5. This primarily involves students who have, or function as if they have, mild cognitive impairment. They also have a limited ability to generalize learning across contexts, their learning rates are significantly slower than those of their age-level peers, they have a restricted knowledge base, they tend not to be very aware of environmental cues or details, and they do not learn incidentally. In adulthood, these students will most likely be able to meet their own needs and live successfully in their communities without overt support from others. It was determined that these students could benefit from an assessment containing a mix of English language arts and mathematics items presented in the contexts of daily living, employment, and community experience.

The MI-Access Functional Independence assessments were implemented for the first time statewide in 2005/2006. They were administered in the fall to students in grades 3 through 8 and in the spring to students in grade 11. As required by federal law, the assessments include the content areas of English language arts and mathematics.

Third Phase of Development: New Participation and Supported Independence v1.5 Assessments in the Content Areas of English Language Arts and Mathematics

The third phase of completing MI-Access, Michigan's Alternate Assessment Program is to retire the first generation of MI-Access Participation and Supported Independence v1.5 assessments and develop new ones, which meet all of the NCLB criteria for alternate assessments based on alternate achievement standards. These assessments are referred to as the MI-Access Participation and Supported Independence v1.5 assessments in the content areas of English language arts and mathematics.

Fourth Phase of Development: Development of MI-Access Science Assessments

The fourth phase of completing the MI-Access assessments is the development of science assessments for all three levels of MI-Access. These assessments are required by NCLB to be implemented no later than the 2007/2008 school year. The development of these assessments began during the 2005/2006 school year and assessments were piloted in spring 2007. The science assessments were administered statewide for the first time in fall 2007.

This report provides information *only* on phase 4 MI-Access (MI-Access Science Assessments).

Involvement of Michigan Stakeholders

To support the development of MI-Access, the MDE convened numerous committees of Michigan stakeholders.

- The Alternate Assessment Advisory Committee (AAAC) was formed to develop specifications for MI-Access assessments and advise the MDE throughout the development process. The AAAC is comprised of special and general education teachers, other special education professionals, administrators, higher education staff, assessment experts, and MDE staff. The first AAAC objective was to develop a proposed plan to guide the overall development of MI-Access. To date, the AAAC has provided advice to the MDE on all aspects of development, implementation, and reporting.[1]

- The Phase 4 Assessment Plan Writing Team (APWT) was comprised of approximately 26 educators and parents experienced in working with learners with special needs. The MDE's goal in convening the APWT was to establish a well-balanced team of individuals representing a broad spectrum of backgrounds and experience, including general and special education teachers, parents, teacher consultants, administrators, school psychologists, and so forth. The group also was intentionally geographically and demographically diverse. The team was charged with the development of the Assessment Plan (described below), test blueprint, item specifications, and item prototypes. In addition, the team reviewed the Grade Level Content Expectations (GLCE) and benchmarks and 'extended' them as necessary for the target population.

- The Content Advisory Committee (CAC) was comprised of members of the APWT and additional practitioners familiar with students at each MI-Access level. It was charged with determining which content standards were assessable at the state level and extending the benchmarks as needed. It reviewed all developed assessment items and materials prior to pilot administration and again following the pilot by reviewing pilot item analysis results. The CAC provided important validity evidence in their reviews, certifying that items (a) accurately reflect intended content standards and GLCE/benchmarks, (b) meet specifications for conceptual accuracy and completeness, and (c) are grade appropriate.

- The Sensitivity Review Committee (SRC) consisted of two groups: one for Participation and Supported Independence, and another for Functional Independence. The SRC was responsible for reviewing all assessment items and materials for inappropriate language or differential performance based on race/ethnicity and gender. In addition, it looked for topics that, because of their sensitive nature, may not be appropriate for statewide assessment. Following these guidelines the SRC reviewed each item before and after administration of pilot items. To ensure independent review, SRC members did not participate on any other committees related to MI-Access.

- A national Technical Advisory Committee (TAC) provided the MDE with psychometric and technical advice related to the development, implementation, reporting, and evaluation of all phases of MI-Access. Its members were drawn from a pool of national assessment experts. The TAC met several times during the development and initial implementation of MI-Access and continues to meet to provide advice regarding issues related to reporting, the state's accountability system, Adequate Yearly Progress, and other federal requirements.

1 Standard 3.5. When appropriate, relevant experts external to the testing program should review the test specifications.

Members of the AAAC, SRC, and CAC are listed in the alternate assessment development plan.[2] It should be noted that the MDE selected Beck Evaluation & Testing Associates, Inc./Touchstone Applied Sciences Associates, Inc. (BETA/TASA) as the operational contractor for the MI-Access assessments. As contractor, BETA/TASA provides a wide range of assessment development and support services.

1.2 The Nature of the Assessment & Population

MI-Access is an alternate assessment system that employs a standardized set of instruments covering state content frameworks in English language arts, mathematics, and science, used to ultimately yield an overall classification of student performance into one of three levels: surpassed the performance standard, attained the performance standard, and emerging toward the performance standard.

IEP Teams, through a deliberative process, determine which assessment their students will take. More information regarding the assessment administration process—with a focus on the technical adequacy of the procedures—is provided in Chapter 3.[3]

Participation (P)

Students that are determined to function at the P Level have, or function as if they have, severe cognitive impairments. These students may have both considerable cognitive and physical impairments that limit their ability to generalize or transfer learning, and thus may make determining their actual abilities and skills difficult. These students are expected to require ongoing support in adulthood.

Supported Independence (SI)

Students that are determined to function at the SI Level have, or function as if they have, moderate cognitive impairment. These students may have both cognitive and physical impairments that impact their ability to generalize or transfer learning; however, they usually can follow learned routines and demonstrate independent living skills. These students are expected to require ongoing support in adulthood.

Functional Independence (FI)

Students that are determined to function at the FI Level have or function as if they have mild cognitive impairments that impact their ability to transfer and generalize learning across performance contexts. Learning rate is significantly slower than for their age-level peers (roughly one-half to three-fourths the rate). Students have a restricted knowledge base and tend not be very aware of environmental cues or details. The instructional approach includes authentic experiences in settings in which the student is expected to function. Students at the FI level are expected to achieve a functional level of independence in adulthood. They are capable of meeting their own needs and living successfully in the community without direct support from others (Frey, Burke, Jakwerth, Lynch, & Sumpter, 1999).

2 Standard 1.7. When a validation rests in part on the opinion or decisions of expert judges, observers, or raters, procedures for selecting such experts and for eliciting judgments or ratings should be fully described. The qualifications, and experience, of the judges should be presented.

3 Standard 3.6. The type of items, the response formats, scoring procedures, and test administration procedures should be selected based on the purposes of the test, the domain to be measured, and the intended test takers.

1.3 Intended Uses

Phase 4 MI-Access Science Assessments were developed primarily to allow students with severe, moderate, and mild cognitive impairment—who would otherwise not be assessed with the state's general assessment—to participate in the MEAS.[4] Thus, MI-Access is moving the state toward its own goal of including all students in the state's educational accountability system and toward compliance with federal educational rules and requirements, including the calculation of Adequate Yearly Progress (AYP).

Scores from MI-Access assessments can be used in a variety of meaningful ways by students, programs, schools, districts, and the state. For example, MI-Access results can:

1. Inform parents about their child's level of performance by (a) providing periodic criterion-related performance information on curriculum-relevant and functional areas of achievement, (b) clarifying instructional and behavioral educational targets, and (c) improving parents' understanding of their child's learning objectives and achievement.
2. Inform teachers about their students' level of performance by (a) helping them focus instruction on targets related to important content strands in science, (b) supporting the creation of instructional activities related to developing skills in areas needing improvement, and (c) identifying areas of program-wide instructional strengths and weaknesses.
3. Inform IEP team decision making by helping with the (a) determination of IEP goals and educational targets, (b) assessing the attainment of IEP goals, and (c) writing present level of educational performance statements.
4. Inform district, school, and program accountability by (a) using student performance data for continuous improvement efforts, (b) including students previously exempted from assessments, (c) developing incentives for stronger monitoring of program development, and (d) enhancing the ability of students to participate in and benefit from school experiences.

The following potential uses are *not* appropriate because they are unsupported by available research evidence.[5]

1. Teacher quality or merit-based decisions -
   There is no evidence to suggest that the information obtained through MI-Access could be used to determine teacher quality or provide support for individual teacher merit-based decisions. This is particularly difficult for students at the Participation, Supported Independence, and Functional Independence levels as these students rely on special education services in a variety of ways and to different degrees. Uses for information derived from MI-Access should focus instead on curricular content and the opportunities provided to students by programs.
2. A single source for IEP development -
   MI-Access is based on critical aspects of participation in major life roles. Although the range of outcomes specified within the framework is broad, it is not absolute. There are likely to be important and meaningful aspects of individual goals that are related to, but not contained within, MI-Access but are relevant to IEP development. MI-Access results should not constrain an IEP Team's deliberations, but instead should guide, expand, and inform them.

4 Standard 1.1. A rationale should be presented for each recommended interpretation and use of test scores, together with a comprehensive summary of the evidence and theory bearing on the intended use or interpretation.
5 Standard 4.3. If there is sound reason to believe that specific misinterpretations of a score scale are likely, test users should be explicitly forewarned.

1.4 Assessment Development Process

Early in the MI-Access planning stages, multiple phases were defined. Phases I-III include the development of assessments for Participation, Supported Independence and Functional Independence in Mathematics and English Language Arts. The technical manuals for these phases have been completed. As stated above, Phase IV MI-Access involves the development and implementation of the Science assessment for Levels 1-3: Participation (P), Supported Independence (SI), and Functional Independence (FI). This manual focuses on the P/SI/FI Science assessments.

Plan for the Development of the Alternate Assessment

During the development of MI-Access, the *MI-Access Science Assessment Plan* was developed by the APWT (described above), a group of approximately 26 educators and parents experienced in working with learners with special needs. The list of team members is in the Appendix of the Assessment Plan. The plan includes

> (1) the assumptions underlying the assessment; (2) the population and subject areas assessed; (3) the number of assessment items and their formats; (4) prototype items to guide item writers; and (5) other information clarifying how and why the assessment should be developed. (MDE, 2005b, p.8)

The Plan was made available for statewide review as well as review by critical stakeholders and policy makers in fall 2003. A feedback form was created to obtain formal input from individuals who have had experience working with students receiving special education services. Results from the statewide review are presented in Chapter 7.

The basic time line for the development of the MI-Access FI Assessment includes the following:

- April-June 2006: Development of the items/assessments by Questar
- July 2006: SRC/CAC item review
- Spring 2007: Pilot Administration (grades 5, 8, and 11)
- June 25-28, 2007: SRC/CAC data review (grades 5, 8, and 11)
- Fall 2007: First operational administration of assessment (grades 5 and 8)
- December 2007: Standard setting (grades 5 and 8)
- Spring 2008: First operational administration of assessment (grade 11)
- April 2008: Standard setting (grade 11)

CHAPTER 2

SCIENCE ASSESSMENT DEVELOPMENT

2.1 The MI-Access Science Assessment Design

To meet both the intent and function of state and federal legislation, rules, and policies, MI-Access was designed to parallel the existing MEAP assessment model (MEAP is Michigan's general state assessment program). The ideal alternate assessment program was envisioned as one that would parallel the existing general assessment program in as many ways as practical. Primary design considerations included the timing of the assessment window, the age groups/grades assessed, and the assessment administration burden on teachers and students.

The existing MEAP is (a) structured to assess students in specific grades and specific content areas with the content areas alternating across grades, and is (b) administered in the fall of each school year with students in grades 5 and 8 and in the spring with students in grade 11. These two considerations were emulated in the design of MI-Access to ensure that students with disabilities participating in alternate assessment would have experiences similar to those of students participating in the MEAP.

Constructs Assessed

The MI-Access Participation science assessments assess much of the same content as the MEAP. There are differences, however, in the number of assessment items and the depth, breadth and complexity have been reduced appropriately for the populations being assessed. In addition, many of the standard and nonstandard accommodations that students with disabilities need to participate fully in the MEAP are not needed to participate in MI-Access Participation and Supported Independence assessments. This is because the latter assessments are universally designed, which means they were developed in such a way that the need for accommodations is reduced, if not eliminated, by removing barriers to accessing the assessment to demonstrate what students know related to science.

The Assessment Plan Writing Team (APWT) reviewed several sources of information to identify and select content standards essential for the MI-Access Science assessments. The Michigan Curriculum Framework was viewed as the foundation of local curricula in general education programs. NCLB requires direct links between state assessments and state curriculum. The AUEN documents specifying educational performance expectations appropriate for students at the Participation, Supported Independence, and Functional Independence (P/SI/FI) levels provided further guidance regarding the appropriateness of content standards. Finally, the team reviewed alternate assessments from other states.

The Science APWT was divided into four groups by science subject matter/strand – Constructing New Scientific Knowledge, Reflecting on Scientific Knowledge, Using Life Science, Using Physical Science, and Using Earth Science. Each group was composed of 5-8 people and contained at least one general education content specialist who served as facilitator. Each group studied one domain or cluster of science content standards and benchmarks at a time, and beginning with the first cluster, they answered the following questions for each of the three grade-level spans (elementary, middle school, high school):

1. "What is the fundamental meaning or content of this cluster of standards and benchmarks?"
2. "What are the underlying key concepts and understandings?"
3. "What knowledge and skills will be assessed?"

APWT members wrote 1-3 statements which sufficiently captured the content and skills of the benchmark. Groups were instructed to express this as a measurable and observable student performance.

The MEAP model includes a fall and spring assessment window. Science assessments are administered in the fall of each year to grades 5 and 8, and in the spring of each year to grade 11. These assessments were designed to meet NCLB requirements as well as provide information for the Michigan Merit program, which provides scholarships to students based on their high school performance.

To parallel the MEAP, MI-Access administers Science assessments to grades 5 and 8 in the fall and to grade 11 in the spring.

2.2 Item Development

The APWT P/SI/FI science sub-groups recommended that the MI-Access science assessments for each of these levels would be based on the fundamental meaning or content of the existing Michigan Curriculum Framework Science Content Benchmarks, 2000 version (MCF v.2000). Appropriate knowledge and skills based on the key concepts and understandings of the framework standards and benchmarks would be assessed. All items would be aligned to extended benchmarks, related to key concepts, related to real-world contexts, and reflect functional life skills.

It is understood that the MI-Access P/SI/FI student populations access information—including scientific information and concepts—in a variety of ways. While some students will read written text, others will use listening, viewing, speaking, and visual representation (such as drawing) skills when responding during the assessment activities. Therefore, the science assessments will pay close attention to the needs of non-reading and non-writing students, and will be designed in such a way that they measure a student's knowledge of scientific concepts as opposed to his or her reading and/or writing ability.

Science Benchmarks

In the *Michigan Curriculum Framework*, there are five Science strands. Under each strand there are two to five content standards-or broad curriculum statements common to all grades-that describe what students should know and be able to do by the time they graduate from high school.

Following each of the content standards, there are one to six benchmarks that describe the knowledge and skills students must have in order to achieve particular content standards. The benchmarks are not written at individual grade levels, but instead are written for grade-level *clusters*, including elementary, middle school, and high school.

Assessment Format

While item difficulty varies on specific grade-level within MI-Access science assessments, they generally are designed the same way.

1. All items are provided in a real-world context.
2. Hands-on materials or objects—such as electrical appliances, containers of liquids, and so forth—may be used as long as the material or object does NOT change the nature of a question or elicit a different response.
3. Multiple choice/selected response items will have 2 to 3 answer choices in a text and/or picture format, depending on the level of the assessment.
   a. Functional Independence multiple choice items will have 3 answer choices in a text and/or picture format.
   b. Supported Independence selected response items will have 3 answer choices in only a picture format.
   c. Participation selected response items will have 2 answer choices in a picture format.
   d. Observation activities will also be included for Participation.

Universal Design

Throughout the item development phase (including item review following the Pilot), elements of universal design (Thompson, Johnstone, & Thurlow, 2002) were employed. The elements that were emphasized during item development included:

1. Simple, clear, commonly-used words should be used, and any unnecessary words should be eliminated;
2. When technical terms must be used, they should be clearly defined;
3. Compound complex sentences should be broken down into several short sentences, stating the most important ideas first;
4. Only one idea, fact, or process should be introduced at a time, then develop the ideas logically;
5. All noun-pronoun relationships should be made clear;
6. When time and setting are important to the sentence, place them at the beginning of the sentence;
7. When presenting instructions, sequence steps in the exact order of the occurrence; and
8. If processes are being described, they should be simply illustrated, labeled, and placed close to the text they support.

2.3 Assessment Blueprints

The purpose of a blueprint is to show how many assessment items are included in an assessment, in this case, by strand and topic. Two tables were created for each level to provide this information as it relates to science.

The science assessments include both core and embedded assessment activities. Core items are those upon which students' scores are based. Embedded items are those that are placed in the assessment for field testing purposes to gather statistical data; performance on these items does not impact a student's score.

Participation

Figure 2.1 lists the number of core items on each Participation assessment. The number of items per strand and per standard within a strand is shown for each grade level.

Figure 2.1

Number of Items by Strand and Standard on the Participation Assessments

MI-Access Science Assessment Blueprint (Number of Core Items per Standard)				
Strand	Standard	Elementary	Middle	High
Constructing New and Reflecting on Scientific Knowledge				
C	CN	1	1	1
R	RO	1	1	1
Subtotal		2	2	2
Using Life Science Knowledge (1 ITEM RELEASED FROM STRAND)				
L	CE	1	1	1
L	OR	4	4	4
L	HE	0	0	0
L	EV	0	0	0
L	EC	0	0	0
Subtotal		5	5	5
Using Physical Science Knowledge (1 ITEM RELEASED FROM STRAND)				
P	ME	1	1	1
P	CM	0	0	0
P	MO	2	2	2
P	WV	2	2	2
Subtotal		5	5	5
Using Earth Science Knowledge (1 ITEM RELEASED FROM STRAND)				
E	GE	1	1	1
E	HY	1	1	1
E	AW	1	1	1
E	SS	0	0	0
Subtotal		3	3	3
CORE TOTAL		15	15	15
FIELD TEST ITEMS		5	5	5
TOTAL ITEMS		20	20	20
RELEASED ITEMS	3 (ONE FROM EACH OF EARTH, LIFE, AND PHYSICAL SCIENCE)			

Figure 2.2 indicates the number of **core** items on the assessment, as well as the number of **field-test** items that will be embedded on the operational assessment at each grade level. The embedded items will be distributed in a manner similar to the core items, that is, approximately 7% will come from Strand I, 7% will come from Strand II, 33% will come from Strand III, 33% from Strand IV, and 20% from Strand V.

Student scores will be based on their performance on the core items. Ten of the core items will be selected response. Five of the core items will be performance observation. Each item will yield up to six points. Data will be collected about student performance on the embedded field test items, but will not count toward student's overall performance scores used for accountability purposes.

Figure 2.2

Number of Core Items and Embedded Field-Test Items on the Participation Assessments

Science Assessment	Number of Core Items	Scored Points	Number of Embedded Field-Test Items	Total Number of Items on Assessment	Number of Items Released each Year
Elementary	15 (10 SR, 5 Observation)	90	5 (3 SR, 2 Observation)	25	3
Middle	15 (10 SR, 5 Observation)	90	5 (3 SR, 2 Observation)	25	3
High	15 (10 SR, 5 Observation)	90	5 (3 SR, 2 Observation)	25	3

MI Access™ Michigan's Alternate Assessment Program

Supported Independence

Figure 2.3 lists the number of core items on each SI assessment. The number of items per strand and per standard within a strand is shown for each grade level.

Figure 2.3
Number of Items by Strand and Standard on the Supported Independence Assessments

MI-Access Science Assessment Blueprint (Number of Core Items per Standard)				
Strand	Standard	Elementary	Middle	High
Constructing New and Reflecting on Scientific Knowledge				
C	CN	1	1	1
R	RO	1	1	1
Subtotal		2	2	2
Using Life Science Knowledge				
L	CE	1	1	1
L	OR	5	5	5
L	HE	0	0	0
L	EV	0	0	0
L	EC	1	1	1
Subtotal		7	7	7
Using Physical Science Knowledge				
P	ME	1	1	1
P	CM	0	0	0
P	MO	1	1	1
P	WV	1	1	1
Subtotal		3	3	3
Using Earth Science Knowledge				
E	GE	1	1	1
E	HY	2	2	2
E	AW	1	1	1
E	SS	1	1	1
Subtotal		5	5	5
CORE TOTAL		17	17	17
FIELD TEST ITEMS		5	5	5
TOTAL ITEMS		22	22	22
RELEASED ITEMS	3 (ONE FROM EACH OF EARTH, LIFE, AND PHYSICAL SCIENCE)			

Figure 2.4 indicates the number of core items on the assessment, as well as the number of field-test items that will be embedded on the operational assessment at each grade level. The embedded items will be distributed in a manner similar to the core items, that is, approximately 10% will come from Strand I, 10% will come from Strand II, 40% will come from Strand III, 15% from Strand IV, and 25% from Strand V.

Student scores will be based on their performance on the core items. Each of the core items will be selected response and yield 4 points per item. Data will be collected about student performance on the embedded field test items, but will not count toward student's overall performance scores used for accountability purposes.

Figure 2.4

Number of Core Items and Embedded Field-Test Items on the Supported Independence Assessments

Science Assessment	Number of Core Items	Scored Points	Number of Embedded Field-Test Items	Total Number of Items on Assessment	Number of Items Released each Year
Elementary	17 SR	88	5	22	3
Middle	17 SR	88	5	22	3
High	17 SR	88	5	22	3

Functional Independence

Figure 2.5 lists the number of core items on each FI assessment. The number of items per strand and per standard within a strand is shown for each grade level.

Figure 2.5

Number of Items by Strand and Standard on the Functional independence Assessments

MI-Access Science Assessment Blueprint (Number of Core Items per Standard)				
Strand	Standard	Elementary	Middle	High
Constructing New and Reflecting on Scientific Knowledge				
C	CN	2	2	2
R	RO	2	2	2
Subtotal		4	4	4
Using Life Science Knowledge (1 ITEM RELEASED FROM STRAND)				
L	CE	0	1	2
L	OR	7	7	8
L	HE	2	0	0
L	EV	1	2	0
L	EC	3	4	4
Subtotal		13	14	14
Using Physical Science Knowledge (1 ITEM RELEASED FROM STRAND)				
P	ME	3	7	7
P	CM	4	3	3
P	MO	2	3	2
P	WV	3	1	3
Subtotal		12	14	15
Using Earth Science Knowledge (1 ITEM RELEASED FROM STRAND)				
E	GE	2	2	5
E	HY	2	2	3
E	AW	2	2	3
E	SS	0	2	1
Subtotal		6	8	12
CORE TOTAL		35	40	45
FIELD TEST ITEMS		8	10	10
TOTAL ITEMS		43	50	55
RELEASED ITEMS	3 (ONE FROM EACH OF EARTH, LIFE, AND PHYSICAL SCIENCE)			

Figure 2.6 indicates the number of core items on the assessment, as well as the number of field-test items that will be embedded on the operational assessment at each grade level. The embedded items will be distributed in a manner similar to the core items, that is, approximately 6% will come from Strand I, 6% will come from Strand II, 37% will come from Strand III, 34% from Strand IV, and 17% from Strand V.

Student scores will be based on their performance on the core items. Data will be collected about student performance on the embedded field test items, but will not count toward student's overall performance scores used for accountability purposes.

Figure 2.6
Number of Core Items and Embedded Field-Test Items on the Functional Independence Assessments

Science Assessment	Number of Core Items	Number of Embedded Field Test Items	Total Number of Items on Assessment	Number of Items Released each Year
Elementary	35	8	43	3
Middle	40	10	50	3
High	45	10	55	3

2.4 Spring 2007 Pilot

Form Development

Implementation booklets were constructed for the Spring 2007 Pilot administration of MI-Access Science assessments. Four forms were developed at each grade for Participation and Supported Independence, and five forms were developed for Functional Independence. The TAC reviewed the assessment blueprints.

Implementation

In spring 2007, the MI-Access coordinators received the Coordinator and Assessment Administrator Manual for the Spring 2007 Science Pilot for Participation, Supported Independence, and Functional Independence. The manual provided information regarding the purpose of the Pilot, students to be assessed, information about eligible accommodations, and specific administration information.

Tables 2.1 through 2.9 contain summary information regarding demographics of Pilot participants for all three levels of MI-Access, including the number of students assessed at each grade level on each form, as well as gender and race breakdowns by grade and form. Table 2.10 shows the percent of students by racial/ethnic group across all grades and assessment levels.

Table 2.1
Spring 2007 Pilot Participation by Grade and Form
Participation Science

Grade	Form				Total
	1	2	3	4	
5	36	89	83	61	269
8	41	79	84	66	270
11	45	61	68	58	232
Total	122	229	235	185	771

Table 2.2
Spring 2007 Pilot Participation by Grade and Form
Supported Independence Science

Grade	Form				Total
	1	2	3	4	
5	104	104	109	131	448
8	147	128	142	140	557
11	139	162	110	136	547
Total	390	394	361	407	1552

Table 2.3
Spring 2007 Pilot Participation by Grade and Form
Functional Independence Science

Grade	Form					Total
	1	2	3	4	5	
5	475	310	273	225	328	1611
8	563	268	260	308	286	1685
11	507	237	283	286	248	1561
Total	1545	815	816	819	862	4857

Table 2.4
Spring 2007 Pilot Participation by Grade, Form, and Gender
Participation Science

Grade	Form	Gender			Total
		Missing	Female	Male	
5	1	3	14	19	36
	2	2	37	50	89
	3	1	37	45	83
	4	1	22	38	61
8	1	0	20	21	41
	2	3	30	46	79
	3	9	32	43	84
	4	3	27	36	66
11	1	3	16	26	45
	2	1	18	42	61
	3	2	28	38	68
	4	0	24	34	58

Table 2.5
Spring 2007 Pilot Participation by Grade, Form, and Gender
Supported Independence Science

Grade	Form	Gender			Total
		Missing	Female	Male	
5	1	4	31	69	104
	2	12	35	57	104
	3	9	26	74	109
	4	4	46	81	131
8	1	13	44	90	147
	2	15	41	72	128
	3	3	45	94	142
	4	10	57	73	140
11	1	9	39	91	139
	2	8	67	87	162
	3	0	44	66	110
	4	11	56	69	136

Table 2.6

Spring 2007 Pilot Participation by Grade, Form, and Gender
Functional Independence Science

Grade	Form	Gender			Total
		Missing	Female	Male	
5	1	0	179	328	507
	2	0	84	153	237
	3	0	90	193	283
	4	0	117	169	286
	5	0	84	164	248
8	1	0	192	371	563
	2	0	97	171	268
	3	0	97	163	260
	4	0	106	202	308
	5	0	108	178	286
11	1	0	179	296	475
	2	0	105	205	310
	3	0	100	173	273
	4	0	94	131	225
	5	0	117	211	328

Table 2.7

Spring 2007 Pilot Participation by Grade, Form, and Ethnicity
Participation Science

Grade	Form	Ethnicity									Total
		American Indian or Alaskan Native	Asian or Pacific Islander	Black, Not of Hispanic Origin	Hispanic	White, Not of Hispanic Origin	Multi-racial	Other	Unknown	Missing	
5	1	0	2	10	0	20	1	0	0	3	36
	2	0	0	28	4	50	0	4	1	2	89
	3	0	2	24	3	51	0	0	2	1	83
	4	0	3	10	1	42	1	3	0	1	61
8	1	1	1	8	0	30	0	1	0	0	41
	2	0	2	18	1	53	2	0	0	3	79
	3	1	2	33	0	34	1	1	3	9	84
	4	1	1	13	3	44	1	0	0	3	66
11	1	1	0	10	2	28	0	0	1	3	45
	2	0	3	26	2	29	0	0	0	1	61
	3	1	3	19	0	43	0	0	0	2	68
	4	0	0	18	1	38	1	0	0	0	58

Table 2.8

Spring 2007 Pilot Participation by Grade, Form, and Ethnicity
Supported Independence Science

Grade	Form	Ethnicity									Total
		American Indian or Alaskan Native	Asian or Pacific Islander	Black, Not of Hispanic Origin	Hispanic	White, Not of Hispanic Origin	Multi-racial	Other	Unknown	Missing	
5	1	1	1	26	3	64	0	1	4	4	104
	2	2	2	28	6	53	1	0	0	12	104
	3	0	2	23	5	67	2	1	0	9	109
	4	2	8	35	7	71	2	2	0	4	131
8	1	0	2	37	6	86	0	0	3	13	147
	2	0	2	25	4	79	0	3	0	15	128
	3	0	2	37	6	92	1	1	0	3	142
	4	1	4	41	3	80	0	1	0	10	140
11	1	1	6	56	3	64	0	0	0	9	139
	2	1	1	51	8	91	2	0	0	8	162
	3	0	2	9	2	97	0	0	0	0	110
	4	1	3	23	3	93	2	0	0	11	136

Table 2.9

Spring 2007 Pilot Participation by Grade, Form, and Ethnicity
Functional Independence-Science

Grade	Form	Ethnicity									Total
		American Indian or Alaskan Native	Asian or Pacific Islander	Black, Not of Hispanic Origin	Hispanic	White, Not of Hispanic Origin	Multi-racial	Other	Unknown	Missing	
5	1	4	6	126	20	342	5	1	3	0	507
	2	2	4	54	13	159	3	1	1	0	237
	3	4	2	76	8	188	5	0	0	0	283
	4	2	1	110	10	160	2	1	0	0	286
	5	4	5	54	8	171	3	3	0	0	248
8	1	14	6	186	18	336	2	1	0	0	563
	2	5	5	69	16	170	2	0	1	0	268
	3	7	6	73	13	160	0	1	0	0	260
	4	3	2	62	8	228	3	2	0	0	308
	5	2	1	78	9	193	2	0	1	0	286
11	1	5	5	86	14	363	2	0	0	0	475
	2	1	1	76	12	210	10	0	0	0	310
	3	1	2	58	6	205	1	0	0	0	273
	4	2	1	38	13	170	1	0	0	0	225
	5	4	2	78	8	234	1	0	1	0	328

Table 2.10
Spring 2007 Pilot Participation by Ethnicity Across Grades and Assessments

Ethnicity	Percent
White	65.3
Black	25.5
Hispanic	3.5
Multiracial	0.8
All Other	4.9
Total	100.0

Data Preparation

For Participation, Supported Independence, and Functional Independence, the total number of scanned documents across forms and grades was 815, 1584, and 5534, respectively. Prior to analysis, the responses for each form were reviewed for form, grade, and non-response sets (missing item responses). Students were deleted from the analysis with missing form, grade, form-grade mismatch, or where responses to all items were blank. This resulted in 44, 32, and, 677 students deleted from the Participation, Supported Independence, and Functional Independence databases, respectively, yielding 771, 1552, and 4857 students used in the analyses.

Distractor and Item Analysis

Table 2.11 provides a summary of the item analysis results for the science pilot. The table shows the minimum, maximum, mean, and standard deviation of the item means and item-total correlations across all items within each grade for each assessment level.

Table 2.11
Spring 2007 Pilot Item Statistic Summaries

Grade	Statistic	N	Minimum	Maximum	Mean	SD
Participation						
5	item mean	80	0.80	3.69	2.10	0.55
	r-pbs	80	0.50	0.81	0.69	0.08
8	item mean	80	1.43	3.66	2.48	0.55
	r-pbs	80	0.41	0.84	0.70	0.09
11	item mean	80	1.41	3.55	2.26	0.53
	r-pbs	80	0.59	0.85	0.73	0.07
Supported Independence						
5	item mean	100	1.37	3.54	2.65	0.49
	r-pbs	100	0.27	0.73	0.56	0.11
8	item mean	100	1.30	3.55	2.45	0.51
	r-pbs	100	0.20	0.73	0.52	0.11
11	item mean	100	1.13	3.66	2.73	0.52
	r-pbs	100	0.19	0.78	0.53	0.13
Functional Independence						
5	p-value	188	0.21	0.98	0.66	0.20
	r-pbs	188	-0.13	0.49	0.28	0.12
8	p-value	222	0.21	0.97	0.63	0.19
	r-pbs	222	-0.12	0.52	0.26	0.12
11	p-value	230	0.15	0.97	0.64	0.19
	r-pbs	230	-0.20	0.56	0.29	0.13

Subgroup Analysis

Item analyses were also completed based on subgroup membership for gender and ethnicity. Because of the small number of students in most ethnic groups, only results for White and Black students were reviewed. Tables 2.12, 2.14, and 2.16 contain results by gender; Tables 2.13, 2.15, and 2.17 contain results by race.

Table 2.12

Spring 2007 Pilot Form Score Summaries by Gender and Test Form - Participation Science

TEST FORM	Grade	Male			Female		
		Mean	SD	N	Mean	SD	N
PP-S51	5	48.68	36.68	19	48.36	39.18	14
PP-S52	5	35.12	34.36	50	26.24	35.49	37
PP-S53	5	42.58	39.64	45	37.57	38.20	37
PP-S54	5	52.08	37.03	38	28.09	37.52	22
PP-S81	8	50.24	34.44	21	57.50	42.07	20
PP-S82	8	51.52	45.64	46	52.27	39.98	30
PP-S83	8	41.67	34.51	43	34.56	40.55	32
PP-S84	8	47.11	37.41	36	52.15	39.66	27
PP-S111	11	37.04	37.81	26	56.94	38.77	16
PP-S112	11	39.88	40.07	42	21.50	34.98	18
PP-S113	11	56.63	41.12	38	45.96	39.11	28
PP-S114	11	49.82	44.24	34	42.75	39.99	24

Table 2.13

Spring 2007 Pilot Form Score Summaries by Ethnicity and Test Form - Participation Science

TEST FORM	Grade	White			Black		
		Mean	SD	N	Mean	SD	N
PP-S51	5	53.85	36.13	20	31.40	39.07	10
PP-S52	5	32.94	33.97	50	27.68	36.30	28
PP-S53	5	35.94	36.49	51	48.58	44.56	24
PP-S54	5	44.98	38.35	42	43.40	43.50	10
PP-S81	8	62.63	33.98	30	35.25	45.24	8
PP-S82	8	51.02	40.61	53	62.67	51.44	18
PP-S83	8	33.32	36.53	34	41.30	37.97	33
PP-S84	8	50.02	38.57	44	5.67	9.81	13
PP-S111	11	42.46	40.35	28	61.60	35.00	10
PP-S112	11	36.62	36.66	29	31.69	42.53	26
PP-S113	11	46.19	41.10	43	63.37	39.53	19
PP-S114	11	50.11	41.87	38	41.22	45.09	18

Table 2.14

Spring 2007 Pilot Form Score Summaries by Gender and Test Form - Supported Independence Science

TEST FORM	Grade	Male			Female		
		Mean	SD	N	Mean	SD	N
PSI-S51	5	68.93	23.89	69	68.94	20.29	31
PSI-S52	5	62.96	28.45	57	65.29	27.28	35
PSI-S53	5	63.64	27.36	74	72.38	21.65	26
PSI-S54	5	64.94	27.61	81	63.20	25.99	46
PSI-S81	8	59.07	24.89	90	59.14	21.37	44
PSI-S82	8	63.25	25.73	72	52.05	25.74	41
PSI-S83	8	60.34	26.62	94	60.40	23.74	45
PSI-S84	8	64.47	24.49	73	69.44	21.02	57
PSI-S111	11	68.80	26.43	91	71.72	26.16	39
PSI-S112	11	63.71	21.18	87	64.42	20.57	67
PSI-S113	11	69.83	25.42	66	73.16	21.62	44
PSI-S114	11	69.74	22.11	69	66.07	21.90	56

Table 2.15

Spring 2007 Pilot Form Score Summaries by Ethnicity and Test Form - Supported Independence Science

TEST FORM	Grade	White			Black		
		Mean	SD	N	Mean	SD	N
PSI-S51	5	69.11	22.72	64	69.85	23.26	26
PSI-S52	5	66.92	26.12	53	61.39	29.22	28
PSI-S53	5	67.94	22.80	67	64.83	31.88	23
PSI-S54	5	69.13	26.47	71	58.20	26.35	35
PSI-S81	8	59.09	24.67	86	60.22	21.41	37
PSI-S82	8	58.57	26.61	79	63.32	25.54	25
PSI-S83	8	62.72	25.37	92	52.32	25.85	37
PSI-S84	8	68.09	21.58	80	66.00	25.83	41
PSI-S111	11	74.80	22.54	64	63.84	29.60	56
PSI-S112	11	67.59	19.44	91	57.67	23.03	51
PSI-S113	11	71.78	22.20	97	*	*	*
PSI-S114	11	68.16	20.76	93	66.61	27.62	23

Table 2.16

Spring 2007 Pilot Form Score Summaries by Gender and Test Form - Functional Independence Science

TEST FORM	Grade	Male			Female		
		Mean	SD	N	Mean	SD	N
PFI-S51	5	32.9	7.6	329	32.2	6.4	180
PFI-S52	5	34.5	6.4	153	30.3	6.4	84
PFI-S53	5	33.5	7.5	193	31.2	6.4	90
PFI-S54	5	31.0	6.9	173	29.0	6.3	119
PFI-S55	5	31.0	6.1	170	30.9	5.9	84
PFI-S81	8	37.2	8.0	372	34.3	7.5	192
PFI-S82	8	34.3	7.3	172	33.4	7.4	97
PFI-S83	8	36.6	7.1	164	34.7	7.1	97
PFI-S84	8	32.8	8.3	208	30.1	7.2	109
PFI-S85	8	34.7	7.4	180	33.2	7.1	1105
PFI-S111	11	39.8	8.2	296	36.4	8.0	179
PFI-S112	11	39.4	9.8	205	37.5	8.1	105
PFI-S113	11	38.8	8.4	173	37.3	8.2	100
PFI-S114	11	37.8	9.2	132	38.4	7.8	94
PFI-S115	11	39.4	8.1	212	34.4	8.5	117

Table 2.17

Spring 2007 Pilot Form Score Summaries by Ethnicity and Test Form - Functional Independence Science

TEST FORM	Grade	White			Black		
		Mean	SD	N	Mean	SD	N
PFI-S51	5	33.6	6.9	343	30.1	7.5	127
PFI-S52	5	33.8	7.0	159	31.4	5.7	54
PFI-S53	5	34.1	6.9	188	29.3	7.5	76
PFI-S54	5	31.4	6.6	163	28.3	6.6	111
PFI-S55	5	31.6	6.0	174	28.9	5.5	57
PFI-S81	8	38.1	8.0	336	32.9	7.1	187
PFI-S82	8	35.5	7.3	170	29.7	6.1	70
PFI-S83	8	37.1	7.1	160	33.5	6.7	74
PFI-S84	8	33.1	7.9	228	27.8	6.9	69
PFI-S85	8	35.1	7.5	194	31.7	6.6	81
PFI-S111	11	39.5	8.0	363	34.6	8.0	86
PFI-S112	11	40.8	8.6	210	32.6	8.9	76
PFI-S113	11	39.3	8.3	205	33.8	7.3	58
PFI-S114	11	39.3	7.9	171	32.7	9.4	38
PFI-S115	11	38.7	8.2	235	34.2	9.0	78

FI DIF Analysis

Winsteps was used to conduct DIF analysis for FI Science items for gender (Female v. Male) and race (White v. Black). The DIF contrast values computed by Winsteps are an estimate of the Log-Odds of item performance conditioned on ability, which is equivalent to the Mantel-Haenzel DIF size. For each DIF contrast, a *t*-statistic was computed (DIF Contrast / SE) with an associated *p*-value, equivalent to the Mantel-Haenzel significance test.

Approximately 10% of the piloted items were flagged for potential race bias. Similar proportions of items were flagged for potential gender bias. As would be expected due to the Mantel-Haenzel procedure used, comparable numbers of items were flagged for potential bias for and against each analyzed group. A summary of DIF results is reported in Table 2.18.

Table 2.18

Number and Percent of Items Statistically Flagged for DIF in the Spring 2007 Pilot

Grade		No Statistical DIF	Group Statistically Favored			
			Female	Male	White	Black
Count						
5	Gender	176	6	6		
	Race	166			15	7
8	Gender	203	7	12		
	Race	196			15	11
11	Gender	201	13	16		
	Race	214			12	4
Percent						
5	Gender	94%	3%	3%		
	Race	88%			8%	4%
8	Gender	91%	3%	5%		
	Race	88%			7%	5%
11	Gender	87%	6%	7%		
	Race	93%			5%	2%

Item Review

In a process that paralleled the item review from previous item tryouts, item analysis results, distractor analyses, and DIF results were used to review item performance by Content Advisory Committees and Sensitivity Review Committees. These committees recorded their decisions about each item on forms like the examples provided in Figures 2.7 and 2.8 given at the end of this section. A summary of decisions based on these reviews is contained in Table 2.19.

Table 2.19
Summary of SRC and CAC Item Decisions for the Spring 2007 Pilot

	SRC			CAC		
	Participation	SI	FI	Participation	SI	FI
Used	209	251	645	176	195	525
Revised	9	0	0	38	37	105
Dropped	2	0	0	6	19	25

The Science Content Advisory Committee (CAC) used the following evaluation criteria in their review of items and activities:

1. Link to Extended Benchmarks (EB)
   - The item/activity measures the EB accurately.
   - The item/activity is accurately coded—EB and correct answer.
   - For observation activities, the focus for scoring is clearly linked to the EB.

2. Item Construction
   - Multiple Choice Items (Functional Independence and Supported Independence).
   - Multiple-choice items have only one correct answer.
   - The item stem/activity and answer choices/criteria are clearly stated.
   - Incorrect item choices (distracters) are plausible and attractive, but not tricky.

   Observation Activities (Participation and Supported Independence):
   - The activity is appropriate.
   - The activity is clearly worded.
   - The scoring focus is clearly worded.

3. Item Difficulty Level
   - The item is written at an appropriate level of difficulty for the population of students taking the assessment.
   - If students are given access to the content of the EB, the difficulty level of the item would be appropriate.

4. Artwork
   - Is the artwork needed to answer the question?

5. Adult Life Context
   - Is the adult life context for the item coded correctly?
     - Daily living skills (D) – refers to those activities that adults carry out every day such as making meals, carrying out financial transactions (making purchases) and responsibilities (paying bills), doing laundry, maintaining a home and personal hygiene, planning social activities, etc.
     - Community experience (C) – refers to the quality of interaction with his/her surroundings, including people, places, and things. These are activities that students engage in outside of school/home setting or in locations within their community, such as banking, shopping, accessing transportation, developing satisfying relationships with others, interacting with service providers, and participating in recreation and leisure activities.
     - Employment (E) – refers to skills and knowledge students must have to accomplish post-graduation goals, such as finding and maintaining paid employment to achieve economic independence. Also includes supporting activities that are carried out less frequently such as filing taxes, registering to vote, renting a home, accessing medical services, etc.

The Sensitivity Review Committee employed the following evaluative criteria in their review of items. A biasing element is any aspect of language content, verbal or non-verbal-*considered within the larger context in which it appears* – which might reasonably be assumed to create or reinforce in a student: (1) A prejudice against a group of people; (2) A gratuitous stereotype of a group of people; or (3) Values contrary to current notion of equality and equity among groups of people.

This procedure centers on an examination of materials for evidence of biasing elements. In order to make the procedure useful, types of bias and groups of people must be specified.

1. Stereotypes. These biasing elements which fail to take note of a wide range of differences among individual members of a group or, conversely, which express the notion that all or nearly all group members are the same in some way when they are not. Five kinds of stereotyping, including an *Other* category are:
   a. Occupational Roles. Examples include: female secretaries; male bosses; minority-group maids and janitors; white technicians; Chinese laundry-workers; white, male doctors; male barbers; female nurses; *man-sized job; women's work; fireman* instead of *fire-fighter* and *mailman* instead of *mail carrier*; and notions contrary to the fact that people with disabilities work in almost all job categories.
   b. Family/School Roles. Examples include expressions stating or implying: fathers are the breadwinners; mothers are the homemakers; all families have a father, mother, brother and little sister; boys play football while girls skip rope; old maid school teachers; principals are males; people with disabilities do not take part in fun and games at home or in school; etc.
   c. Personality Traits. Examples include notions that: fat men are jolly; blondes are dumb; Mexican people are lazy; Jewish people are stingy; women are flighty; men are steady; Asian people are studious; people with epilepsy are dangerous; little girls are sweet; little boys are ornery; and mentally impaired persons are disruptive.

d. Physical Characteristics/Appearance. Examples include: men are strong; women are weak; Chinese people are short; Jewish people have large noses; Black people have thick lips; All black people have the same skin color; All white people are blue-eyed; women wear dresses; visually impaired people are clumsy; farmers wear torn straw hats and chew on a stem of grass; fat people are unsuited for certain jobs when they are not; ugly people should not have jobs where they meet the public; all people with disabilities are in wheelchairs or need help getting from one place to another; lepers are sinners; and visually impaired people make good musicians.
e. Other Stereotypes. Some expressions may connect two groups in ways which tend to stereotype both. Examples include: Asian Indians are Hindus; and Southerners are Baptists.

No materials should reinforce stereotypes. The McGraw-Hill *Guidelines for Bias-free Publishing* defines a stereotype as "an image formed by ascribing certain characteristics – physical, cultural, personal, occupational, historical – to all members of a group. It is based on some custom or practice, which it isolates and exaggerates. Because it is a standardized image, a stereotype assimilates the individual to the group, making recognition of individuality difficult; it is inaccurate because it oversimplifies. It reinforces preconceived estimations of people, whether positive or negative, and insulates the reader or viewer from the real person or group."

When trying to decide whether text or illustrations rely on stereotypes in portraying people from minority groups, ask questions like the following:

a. Does the illustration or text isolate or exaggerate particular physical traits?
b. Does the dress of characters reinforce stereotypical perceptions?
c. Are particular personality traits emphasized as representative?
d. Is any group linked or associated with a single occupation, activity, or lifestyle?
e. Do historical discussions or discussion of cultural backgrounds oversimplify the beliefs and values of the people portrayed?

2. Erroneous Group Representation. This is a possible biasing element when two or more groups are implied or specified.
   a. Under-representation refers to the absence of a group when the context suggests it should be present, or to the group being present but treated as insignificant. Examples include: omission of a racial group when depicting the people of a large city; a picture showing a welding class of all males and a home economics class of all females; and omission of people with obvious disabilities from everyday activities (e.g., work, play, entertainment, church, and school).
   b. Segregation refers to describing in words or illustration an artificial separation of one group from another. Examples include: showing a classroom with equal numbers of black and white students, intermingled male and female students but with black students on one side of the group and white students on the other; or a group with the races intermingled but the males and females on opposite sides of the group (however, it would be natural to separate males and females in a choir because of the need to have voices grouped by range); people with disabilities in a group of specific seats; and signs or arrows, or both, directing people with disabilities around specific barriers such as steps, doorways, restrooms, (i.e., all physical facilities should be shown as accessible to them).

3. Controversial Material

   Highly controversial or emotionally charged material should be included in tests only when it is relevant to what is being tested; a balance of points of view on the subject is presented; and/or when students have the opportunity to respond to the material (as in an essay or constructed-response assessment). Highly controversial materials in a multiple-choice test may imply that there are "right answers" to the subject and do not provide an opportunity for students to respond to those materials in an interactive mode.
   If controversial materials are used, the questions and items should not trivialize the content. Students should have an opportunity to respond in a constructed response format, and the scoring rubrics should be designed in a way to honor diverse interpretations of the materials.

   A social studies or history test may need to include potentially controversial materials that are relevant to what is being assessed; a reading test can usually achieve its objectives without using such materials (see "contextual concerns," below).

4. Contextual Concerns

   Potentially sensitive materials must sometimes be used to achieve the purpose of the assessment, as in the following situations.

   a. Historical Context: In testing students' knowledge of history or in a reading test based on a historical reading selection, it is often desirable to use authentic documents written during a time when social values were very different from those today. Or, a test may need to contain a passage dealing with a historical event or one written during an earlier period. The McGraw-Hill Guidelines state, "In materials dealing with history, accuracy should be the goal, and assumptions about present-day society and politics should not be imposed upon the past. Situation involving members of minority groups should be accurately portrayed."
   b. Literary Context: Again, it is often desirable to use selections from authentic literature to assess student's reading abilities. Such works may have problems, ranging from the use of the word *man* to represent all people to the use of words considered offensive to modern readers (Mark Twain's use of the word *nigger* in *The Adventures of Huckleberry Finn,* for example). As the McGraw-Hill Guidelines state, "We realize that the language of literature cannot be prescribed." Materials must, therefore, be evaluated in light of the overall purpose of the test and the Assessment Frameworks specifications. It may be possible to deal with certain problems in terms of a framing statement, a footnote, or even an open-ended question asking the student to recognize and respond to the problem.
   c. Legal Domain: Materials drawn from legal sources may sometimes deal with sensitive areas. For example, real estate tests may contain references to federal, state, or local laws governing discrimination in the mortgage rights of EEO classes.
   d. Health and Social Sciences Domain: Certain examinations in these domains (including health professions, social work, and civil service) require knowledge of information that may be considered sensitive in other contexts. For example, in nursing tests it may be necessary to test one's knowledge of the predominance of sickle-cell anemia among black people or Tay-Sachs disease among Jewish families. Social work and civil service require knowledge of how to approach problems and/or counsel people in a wide variety of social and cultural contexts. Inclusion of potentially sensitive material depends on

the content of the entire test. Given an appropriate context, use of certain material may be justifiable. It is important to recognize that many subject-matter tests must include information and concepts that have a great potential for raising sensitivity issues. The test assembler and the sensitivity reviewers are responsible for working together to develop test material that covers the necessary subject matter (such as slavery, the Japanese internment during World War II, ethnic components of social problems) in a theoretically balanced, sensitive, and objective manner.

5. Elitism, Ethnocentricity, and Related Problems

To eliminate concepts, words, phrases, and or examples that may upset or otherwise disadvantage a test taker, every effort is made not to include expressions that might be more familiar to members of a particular social class or ethnic group than the general population, such as "soul food," and "trust fund," unless they are defined or knowledge of them is relevant to the purpose of the test. Words and sentence constructions that could have different meaning to different ethnic or geographic groups must be avoided. Care must also be taken to assess the appropriateness of dialect, slang, and non-English words and phrases such as "bairn," "stickball," and "maven," which tends to be more familiar to certain ethnic, geographic, or other subgroups of English speakers.

MI Access
Michigan's Alternate Assessment Program

MICHIGAN Department of Education

MI-Access Functional Independence Content Advisory Committee
Science Item Review Meeting
July 19-20, 2006

REVIEWER NAME: _____ **DATE** _____

ASSESSMENT TYPE (P, SI, or FI) _____ **GRADE LEVEL (E, M, or H)** _____

DIRECTIONS:
Please use the review sheets to rate each item according to the following 5 criteria and then make a final recommendation to use (U) revise (R), or do not use (DNU) each item. Please refer to the *Item Evaluation Criteria* document for an explanation of the rating criteria.

	#1 Accurate Link to EB/ Correct Code	#2 Accurate Item Construction	#3 Appropriate Item Difficulty Level	#4 Artwork is needed	#5 Correct Adult Life Context Code	Final Recommendation: Use U, Revise R, or DNU?	Comments
TASA ID#							
33074	yes no	yes no	yes no	yes no	yes no	U R DNU	L.OR.e.FI.EB01.A
	yes no	yes no	yes no	yes no	yes no	U R DNU	
	yes no	yes no	yes no	yes no	yes no	U R DNU	
	yes no	yes no	yes no	yes no	yes no	U R DNU	
	yes no	yes no	yes no	yes no	yes no	U R DNU	
	yes no	yes no	yes no	yes no	yes no	U R DNU	
	yes no	yes no	yes no	yes no	yes no	U R DNU	
	yes no	yes no	yes no	yes no	yes no	U R DNU	

1

Figure 2.7. Content Advisory Committee Rating Form

MI Access
Michigan's Alternate Assessment Program

MICHIGAN Department of Education

MI Access Michigan's Alternate Assessment Program

MI-Access Functional Independence Sensitivity Review Committee
Science Item Review Meeting
July 17-18, 2006

REVIEWER NAME: _____ **DATE** _____

ASSESSMENT TYPE (P/SI or FI) P Earth Science – Elementary

DIRECTIONS:

Please use the review sheets to rate each item according to the following 8 criteria and then make a final recommendation to use (U) revise (R), or do not use (DNU) each item. Please refer to the *Sensitivity Review Criteria?* document for an explanation of the rating criteria.

	#1 Stereotypes?	#2 Erroneous Group Representation?	#3 Controversial Material?	#4 Contextual Concerns?	#5 Elitism, Ethnocentrism, Etc.?	#6 Appropriate Artwork?	#7A Appropriate for Accommodated Versions?	#7B Need Braille Companion Item?	Final Recommendation: Use U, Revise R, or DNU?	Comments
TASA ID#										
11131	yes no	yes no	yes no	yes no	yes no	yes no	yes no	yes no	U R DNU	
11132	yes no	yes no	yes no	yes no	yes no	yes no	yes no	yes no	U R DNU	
11133	yes no	yes no	yes no	yes no	yes no	yes no	yes no	yes no	U R DNU	
11101	yes no	yes no	yes no	yes no	yes no	yes no	yes no	yes no	U R DNU	
11102	yes no	yes no	yes no	yes no	yes no	yes no	yes no	yes no	U R DNU	
11134	yes no	yes no	yes no	yes no	yes no	yes no	yes no	yes no	U R DNU	
11135	yes no	yes no	yes no	yes no	yes no	yes no	yes no	yes no	U R DNU	

1

Figure 2.8. Sensitivity Review Committee Rating Form

MICHIGAN Department of Education

2.5 2007-2008 Operational Administration

Form Design

Based on the results of the spring 2007 Pilot Administration, several modifications were made to the booklet blueprints. Core items were selected based on the review of Sensitivity Review Committees and Content Advisory Committees. Items that best reflected the item specifications and the intent of the extended grade-level content expectations (EGLCEs) assessable at the state level were selected. Selected core items:

1. are free of racial/gender bias;
2. are of average difficulty for items that assess a particular EGLCE based on *p*-value (.50+) and point biserial (.30+);
3. reflect a range of item difficulty;
4. are free of biasing elements as outlined by the OEAA;
5. meet sensitivity criteria as outlined by the OEAA;
6. meet APH guidelines for the visually impaired; and
7. reflect a balance of item and activity content and format.

The forms were built so that the overall difficulty and average point biserial values across forms within a grade were equal. Each form has designated field-test item positions.

Emergency forms for each subject at each grade were also designed in the event that test administration may have to be repeated outside the standard assessment window or to accommodate potential security breaches. Horizontal linking items were used in the designated field-test item positions for the Emergency forms to facilitate equated scaling (raw score to scale score conversion tables) under the condition that Emergency forms may never be administered or may be administered to very small numbers of students.

The booklet blueprints were reviewed by the TAC and are presented in Tables 2.20 to 2.22.

Table 2.20
Science Blueprint for Participation

Participation Science Blueprint: Grades 5, 8, and 11		Grade 5		Grade 8		Grade 11	
Strand (# of Items)	Standard	Number Core Items	Number Embedded Field Test Items	Number Core Items	Number Embedded Field Test Items	Number Core Items	Number Embedded Field Test Items
Constructing & Reflecting	Constructing	1	0	1	0	1	0
	Reflecting	1	0	1	0	1	0
Life Science	Cells	1	0	1	0	1	0
	Organization	4	0	4	4	4	4
	Heredity	0	0	0	0	0	0
	Evolution	0	0	0	0	0	0
	Ecosystems	0	0	0	0	0	0
Physical Science	Matter & Energy	1	6	1	4	1	5
	Changes in Matter	0	0	0	0	0	0
	Motion of Objects	2	2	2	1	2	1
	Waves	2	1	2	2	2	0
Earth Science	Geosphere	1	0	1	2	1	2
	Hydrosphere	1	3	1	2	1	2
	Atmosphere	1	3	1	0	1	1
	Solar System	0	0	0	0	0	0
TOTAL		15	15	15	15	15	15
			5 per form		5 per form		5 per form

Table 2.21

Science Blueprint for Supported Independence

Participation Science Blueprint: Grades 5, 8, and 11		Grade 5		Grade 8		Grade 11	
Strand (# of Items)	Standard	Number Core Items	Number Embedded Field Test Items	Number Core Items	Number Embedded Field Test Items	Number Core Items	Number Embedded Field Test Items
Constructing & Reflecting	Constructing	1	0	1	0	1	0
	Reflecting	1	0	1	0	1	0
Life Science	Cells	1	0	1	0	1	0
	Organization	5	2	5	3	5	2
	Heredity	0	0	0	0	0	0
	Evolution	0	0	0	0	0	0
	Ecosystems	1	1	1	0	1	1
Physical Science	Matter & Energy	1	3	1	3	1	3
	Changes in Matter	0	0	0	0	0	0
	Motion of Objects	1	3	1	3	1	3
	Waves	1	3	1	3	1	0
Earth Science	Geosphere	1	0	1	0	1	2
	Hydrosphere	2	3	2	3	2	2
	Atmosphere	1	0	1	0	1	2
	Solar System	1	0	1	0	1	0
TOTAL		17	15	17	15	17	15
			5 per form		5 per form		5 per form

Table 2.22

Science Blueprint for Functional Independence

Participation Science Blueprint: Grades 5, 8, and 11		Grade 5		Grade 8		Grade 11	
Strand (# of Items)	Standard	Number Core Items	Number Embedded Field Test Items	Number Core Items	Number Embedded Field Test Items	Number Core Items	Number Embedded Field Test Items
Constructing & Reflecting	Constructing	2	0	2	0	2	0
	Reflecting	2	0	2	0	2	0
Life Science	Cells	0	0	1	0	2	0
	Organization	7	4	7	3	8	4
	Heredity	2	0	0	0	0	0
	Evolution	1	2	2	3	0	0
	Ecosystems	3	2	4	3	4	4
Physical Science	Matter & Energy	3	2	7	0	7	5
	Changes in Matter	4	3	3	3	3	0
	Motion of Objects	2	2	3	3	2	4
	Waves	3	0	1	5	3	4
Earth Science	Geosphere	2	9	2	4	5	3
	Hydrosphere	2	0	2	2	3	2
	Atmosphere	2	0	2	1	3	1
	Solar System	0	0	2	3	1	3
TOTAL		35	24	40	30	45	30
			5 per form		5 per form		5 per form

Results

Following the completion of the first full statewide administration of MI-Access, analyses of statewide performance were conducted. Table 2.23 shows the total number of students at each grade and the percent of students at each of the three performance levels and at Attained or above. Table 2.24 contains the participation counts by gender and special population, and Table 2.25 contains the participation counts by race/ethnicity. Raw score summary statistics are given in Table 2.26 for gender and in Table 2.27 for White, Black, and Other.

Table 2.23

2007-2008 Percent of Students at each Performance Level

Grade	Total N	Emerging	Attained	Surpassed	Attained or Above
Participation					
5	264	41.3	46.2	12.5	58.7
8	280	45.7	40.7	13.6	54.3
11	296	53.4	31.8	14.9	46.7
Supported Independence					
5	480	34.8	42.1	23.1	65.2
8	547	33.8	40.0	26.1	66.1
11	576	23.1	60.9	16.0	76.9
Functional Independence					
5	2127	46.3	27.2	26.5	53.7
8	2158	49.3	23.8	27.0	50.8
11	1875	37.1	33.8	29.1	62.9

Table 2.24

2007-2008 N-Counts by Gender and by Special Group

Grade	Male	Female	Missing	ELL	Standard Accommodations	Total
Participation						
5	158	106	0	NA	NA	264
8	177	103	0	NA	NA	280
11	183	113	0	NA	NA	296
Supported Independence						
5	326	154	0	NA	NA	480
8	380	167	0	NA	NA	547
11	353	223	0	NA	NA	576
Functional Independence						
5	1344	783	0	69	1709	2127
8	1383	775	0	48	1160	2158
11	1143	732	0	42	718	1875

NA = Data Not Available

Table 2.25

2007-2008 N-Counts by Ethnicity

Grade	American Indian or Alaskan Native	Asian or Pacific Islander	Black, Not of Hispanic Origin	Hispanic	White, Not of Hispanic Origin	Multi-racial	Other	Unknown	Missing	Total
Participation										
5	*	*	69	16	172	*	0	0	0	264
8	*	*	71	*	187	*	*	*	0	280
11	*	*	84	11	191	0	0	*	0	296
Supported Independence										
5	*	*	125	23	321	*	*	0	0	480
8	*	17	167	15	341	*	0	*	0	547
11	*	*	145	19	401	*	0	*	0	576
Functional Independence										
5	23	17	602	119	1340	21	*	*	0	2127
8	26	26	685	69	1334	17	*	0	0	2158
11	19	13	547	65	1218	*	*	*	0	1875

*<10 students assessed

Table 2.26

2007-2008 Operational Form Score Summaries by Gender

Grade	Female			Male		
	Mean	SD	N	Mean	SD	N
Participation						
5	33.48	30.57	106	38.41	28.75	158
8	34.95	31.92	103	35.84	29.06	177
11	38.01	31.85	113	46.4	31.14	183
Supported Independence						
5	44.93	18.17	154	43.60	19.58	326
8	44.49	16.58	167	43.34	16.89	380
11	45.34	17.42	223	45.11	16.76	353
Functional Independence						
5	19.73	5.14	783	20.38	5.39	1344
8	20.13	5.35	775	21.41	5.94	1383
11	22.39	6.24	732	24.49	7.53	1143

Table 2.27

2007-2008 Operational Form Score Summaries by Ethnicity

Grade	White			Black			Other		
	Mean	SD	N	Mean	SD	N	Mean	SD	N
Participation									
5	37.23	29.15	172	35.23	31.10	69	34.09	28.66	23
8	37.41	30.54	187	34.01	29.15	71	24.27	27.61	22
11	45.22	31.3	191	41.7	33.27	84	30.76	25.32	21
Supported Independence									
5	45.87	18.50	321	39.71	20.29	125	42.50	18.36	34
8	45.12	16.58	341	41.49	17.18	167	40.56	15.82	39
11	45.87	16.77	401	43.79	17.85	145	43.03	15.95	30
Functional Independence									
5	20.69	5.34	1340	18.97	5.13	602	19.92	5.04	185
8	22.06	5.77	1334	18.82	5.17	685	20.83	5.63	139
11	25.32	7.18	1218	20.18	5.83	547	22.66	5.83	110

Field Test Item Analysis

Item analysis, distractor analysis, and DIF analysis (for FI) were completed on all field-test items for each subject at each grade level. The field-test item analyses reports were generated in the same way as done following the Pilot analysis. The same set of analyses was completed on all operational core items to provide operational statistical information for the item bank. Summary of FI DIF analysis of field test items is reported in Table 2.28.

Table 2.28

Field Test DIF Summary by Grade

	Grade		
	5	8	11
Total Number of Items	46	70	74
Number of Field Test Items	11	30	29
Statistically Flagged for Gender DIF	4	5	3
Statistically Flagged for Race DIF	4	6	7

CHAPTER 3

TEST ADMINISTRATION, SCORING, SCALING & EQUATING

3.1 Background

Decision-making Tools

To help IEP Teams decide which state assessment a student should take, the MDE developed:

- *Draft Guidelines for Determining Participation in State Assessment for Students with Disabilities* (MDE, 2006a);
- a matrix matching student levels of independence, characteristics, curriculum, and instruction with possible state-level assessments;
- a decision-making flow chart (see Figure 3.1); and
- a decision-making checklist.

These materials—all of which were designed to ensure that students participate in the correct state-level assessment—are available online at www.mi.gov/mi-access. Some of the tools have also been made available in training materials and in *The Assist*, a newsletter published by the MI-Access staff.

Training

To ensure that the assessments are administered correctly, MI-Access hosts annual training conferences across the state. In the past, the conferences had typically included a full-day training of the trainers session, which relied on a 1½ hour training video (showing how to conduct observations) and a binder of written training materials. In recent years, the conferences have evolved to include more detailed concurrent sessions for those previously trained.

In addition, several online learning programs have been developed to train the field on eligibility requirements for participation in MI-Access assessments and how to administer MI-Access assessments effectively.

Additional Tools

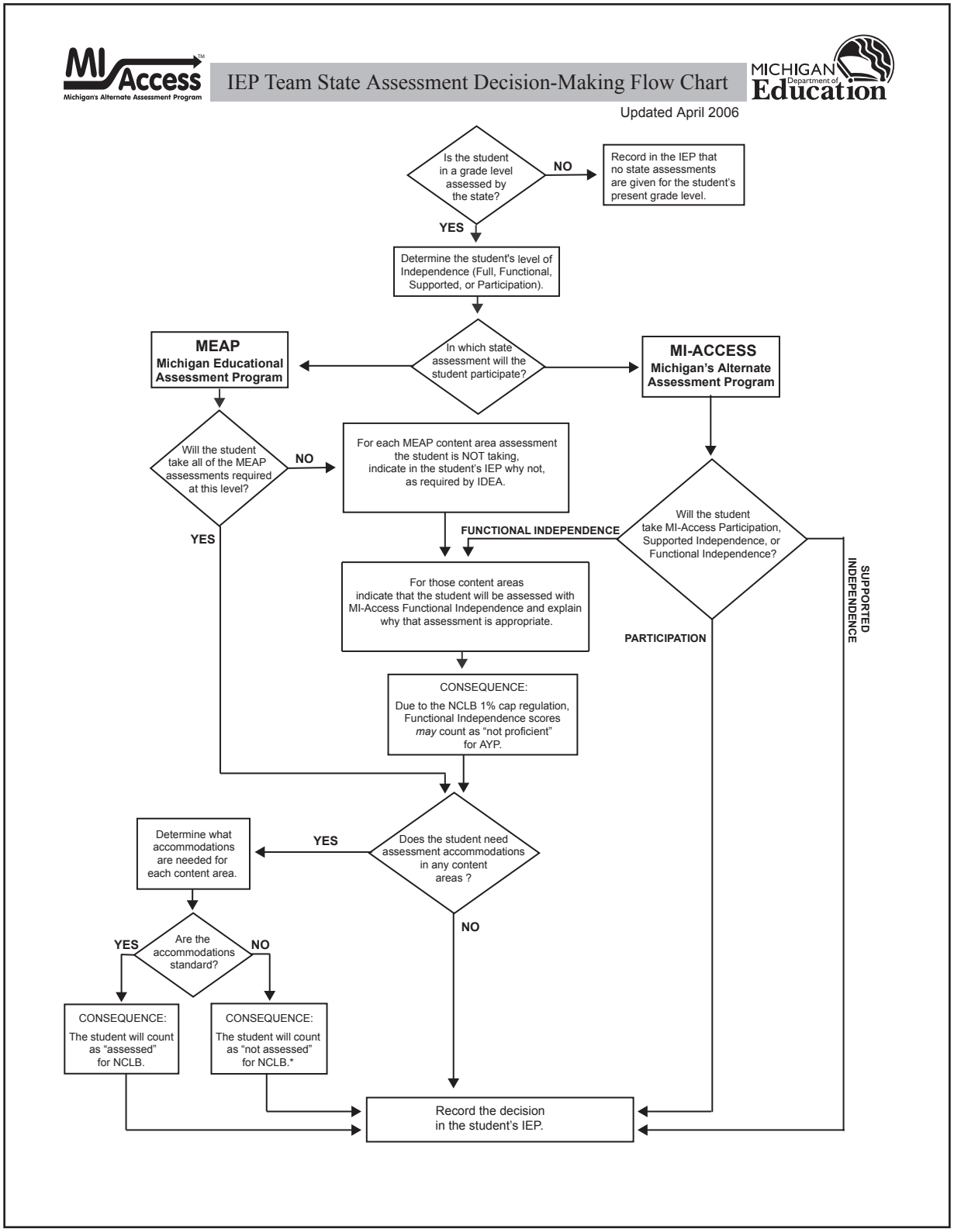
Furthermore, the MDE has

- helped revise and update the *Individualized Education Program Team Manual* to help special education teams make more informed decisions about MI-Access;
- published a bi-monthly newsletter called *The Assist*, which informs a wide audience about assessing students with disabilities at the state level;
- developed a District MI-Access Coordinator Listserv to distribute time-sensitive information on MI-Access;

- published an annual manual that provides detailed instructions on what to do before, during, and after administering the MI-Access assessments;
- produced calendars, brochures, and other communication tools to continue to inform those involved with the assessment program about proper administration; and
- published an annual handbook, which explains how to interpret and use MI-Access results.

Figure 3.1

IEP Team State Assessment Decision-Making Flow Chart



3.2 Determining Participation in MI-Access

During IEP Team meetings, team members work collaboratively to determine which state-level assessment their students should take. They begin by asking: How independently will the student function as an adult? The guidelines for determining participation in state assessments for students with disabilities[6] (MDE, 2006) include the following questions to help guide IEP Team deliberations.

1. Where will this student live and with what supports?
2. In what daily activities will this student be involved and with what supports?
3. In what community experiences will this student be involved and with what supports?
4. What post-secondary educational opportunities will this student have and with what supports?
5. In what environment will this student be employed and with what supports?

Students who are deemed eligible for MI-Access Participation have, or function as if they have, severe or profound cognitive impairment. "These students are expected to require extensive ongoing support in adulthood" (MDE, 2006, p.18).

Students who are deemed eligible for MI-Access Supported Independence have, or function as if they have, moderate cognitive impairment. "These students will require ongoing support in major life roles" (MDE, 2006, p. 18).

Students who are deemed eligible for MI-Access Functional Independence have, or function as if they have, mild cognitive impairment. "These students are capable of meeting their own needs and living successfully in their communities with minimal support from others" (MDE, 2006, p. 17).

3.3 Allowable Accommodations

The word "accommodation" is used to indicate that changes are made to what is considered the "standardized" test condition. Accommodations are tools and procedures that provide fair and reasonable instructional and assessment access for students with disabilities and ELLs in the areas of presentation, response, timing, scheduling, setting, and linguistics. According to Tindal and Fuchs (1999) a test change is considered an accommodation if it does not alter the construct being measured, is based on individual need, and is effective for students who need the change and not effective for others.

The Standards (AERA, APA, & NCME, 1999) require that "all examinees be given a comparable opportunity to demonstrate their standing on the construct(s) the test is intended to measure. Just treatment also requires such factors as appropriate testing conditions and equal opportunity to become familiar with the test format, practice materials, and so forth. Fairness also requires that all examinees be afforded appropriate testing conditions" (p.74).

The foundation of the MI-Access assessments were based on universal design principles; the premise that every child deserves to participate in assessment and that assessment results should not be affected by disability, gender, race, or English language ability. In addition, universally designed assessments aim to reduce the need for assessment accommodations by removing access barriers associated with the assessment themselves.

6 Standard 3.15. When using a standardized testing format to collect structured behavior samples, the domain, test design, test specifications, and materials should be documented as for any other test. Such documentation should include a clear definition of the behavior expected of the test takers, the nature of the expected responses, and any materials or directions that are necessary to carry out the testing.

The need for assessment accommodations can be reduced if assessments are developed thoughtfully and with the broad student assessment population clearly in mind. To that end, the APWT spent considerable time trying to define and understand the student population that would be participating in MI-Access FI. Furthermore, it recommended that barriers be removed whenever possible, such as (1) using graphs or pictures only when necessary and accompanying them with verbal/textual descriptions, (2) eliminating distracting or purely decorative pictures, (3) designing the assessments to be administered in multiple, short sessions to reduce the need for extra breaks or extended time, and (4) allowing multiple access and response modes to further reduce the need for assessment accommodations. At every turn, efforts to reduce barriers were explored to ensure that students would have every opportunity to participate fully and meaningfully in assessments (MDE, 2005b, p. 11).

Despite every effort to ensure that MI-Access assessments are accessible, it is understood that some students may still need assessment accommodations in order to participate fully and meaningfully in MI-Access. The use of allowable accommodations is based on individual student need and the students IEP indicates that they are appropriate for the student. In addition, allowable accommodations are used consistently by the student throughout curricular instruction during the school year – they reflect what the student routinely uses or how he or she routinely responds during instruction. Students who are deemed eligible for accommodations have their accommodations documented in the IEPs, 504 Service Plans, and student files.

Standard accommodations do not change what the specific assessment is measuring and therefore student's assessed using standard accommodations are counted as assessed when calculating NCLB participation rates. A nonstandard assessment accommodation does change what the assessment is measuring and results in an invalid score. Hence, a student using a nonstandard assessment accommodation will not count as being assessed when calculating NCLB participation rates. The following standard accommodations are used most often on the MI-Access Functional Independence assessments: audio versions, Braille and enlarged print, calculators, optional materials, readers, recording student responses, scribes, word processors, and time (MDE, 2005a).

In summer 2005, the SBE approved the "Assessment Accommodation Summary Table" which indicates what assessment accommodations are standard and nonstandard for MEAP and MI-Access. This summary table can be found on the MI-Access Web page (**www.mi.gov/mi-access**).

3.4 Scoring Rubrics for Participation and Supported Independence

Each Participation and Supported Independence assessment activity is scored by two assessment administrators observing the activity at the same time. The MI-Access Participation scoring rubric is a 3-point scoring rubric. The MI-Access Supported Independence scoring rubric is a 2-point rubric. In January 2006, the TAC recommended that the PAA and SAA score for each item be added together in order to get a total score. Condition codes would count as zeros.

During the administration of each activity, the PAA and the SAA are instructed to circle the appropriate observation score for each item while they are observing the student. Each activity contains a scoring focus that describes what the student is required to demonstrate. The possible observation scores are shown in Tables 3.1 and 3.2 below.

Table 3.1
Participation Rubric

Score Point	Definition
3	Responds correctly with no teacher assistance
2	Responds correctly after teacher provides verbal/physical cues
1	Responds correctly after teacher provides physical assistance and/or modeling, short of hand-over-hand assistance
Condition Code or Zero Score Points**	**Definition**
A	Incorrect Response
B	Resists/Refuses to participate
C	Assessment administrator provides hand-over-hand assistance and/or step-by-step directions

** All condition codes result in no points.

Table 3.2
Supported Independence Rubric

Score Point	Definition
2	Responds correctly with no teacher assistance
1	Responds correctly after teacher provides verbal/physical cues
Condition Code or Zero Score Points**	**Definition**
A	Incorrect Response
B	Resists/Refuses to participate
C	Assessment administrator provides hand-over-hand assistance and/or step-by-step directions

** All condition codes result in no points.

3.5 Reporting and Score Use

Several reports are generated that provide specific results of students and summaries of results across classrooms, schools, districts, and the state. These reports are presented in the *2007/2008 Handbook for Understanding, Interpreting, and Using MI-Access Results*. In addition, school, district, and state results are provided on the MI-Access Information Center. To maintain student anonymity, certain reports are not provided for units with fewer than ten students within a given grade. The following types of reports are provided at each level as presented in Table 3.3. Samples of each report are provided in the Handbook Addendum.

Table 3.3
MI-Access Reports by Level of Reporting

	State Results Online	District	School	Class	Online Only
Summary Reports	X	X	X		
Demographic Reports	X	X	X		
Item Analysis Reports	X	X	X		
Rosters		X	X	X	
Individual Student Reports				X	
Parent Reports			X		
District Comprehensive Reports*		X			
ISD Comprehensive Reports					X

*Available for Functional Independence assessments only.

3.6 Available Training and MI-Access Administrative Support

There are several resources and supporting materials for MI-Access.[7]

Each year, the MDE publishes a *MI-Access Coordinator and Assessment Administrator Manual* that provides general information about MI-Access as well as instructions for District and School MI-Access coordinators and assessment administrators.

Each fall and spring assessment window, the MDE delivers a Web cast to update the field on assessment administration procedures and other important MI-Access related issues.

The MI-Access contractor also staffs a hotline to which the field can direct questions and concerns regarding the assessments via email or phone.

Finally, the MDE has created various online learning tools to assist the field with MI-Access administration.

3.7 Scaling Background

Scoring, scaling, and equating are processes designed to improve score comparability and interpretation.[8] Scoring begins with test item responses that are assigned numeric values, a 0 or 1 for the typical multiple-choice item and 0 to 1, 2, or more points for constructed response items (e.g., essay scores). The item scores are combined as a summed total to obtain a raw score. Raw scores vary based on test length, item difficulty, etc. This requires a method to create scores that are more comparable.

7 Standard 6.9. Test documents should cite a representative set of the available studies pertaining to general and specific uses of the test.
8 Standard 4.1. Test documents should provide test users with clear explanations of the meaning and intended interpretation of derived score scales, as well as their limitations.

The process of placing scores from different forms of a test on a common scale is called equating. "The term *equating* is properly reserved only for score conversions derived for alternate forms of the same test. It is often useful, however, to compare scores from tests that cannot, in theory, be equated." (AERA, APA, NCME, 1999, p. 52).

At the current time, only the FI assessment is employing a formal scaling and equating design.

3.8 Scaling and Equating

Winsteps 3.65 is used to complete all calibration tasks.

Scaling

MDE determined that the appropriate scales for MI-Access would be to locate the attained cut score at 2500 for grade 5, 2800 for grade 8 and 3100 for grade 11; each with a standard deviation of 25. This was accomplished through a linear conversion of the theta distribution to the scale score distribution (e.g., for grade 5, the theta associated with attained performance level was set to 2500). Once this conversion was completed, a raw score to scale score (through theta) conversion table was developed.

Calibrating Field-Test Items

Finally, the operational forms contained field-test items for which analysis was needed to facilitate item review. A Winsteps control file combined response files across forms by organizing items such that core items appear in the first set of item columns and all field test items follow, where the core items are anchored based on the previous analyses for scaling core-item total scores. Results were reviewed for consistency with classical test statistics results and item data-review tables were created with distractor analyses for the CAC and SRC item review meeting (identical to those used following the spring 2007 Pilot).

Future Equating

All test forms were designed to facilitate horizontal equating across forms within grade over time. This is facilitated by employing common item anchoring, following the test blueprint to achieve content representation within the anchor items.[9] There are 8 common items at grade 5, and 10 common items at grades 8 and 11.

9 Standard 4.13. In equating studies that employ an anchor test design, the characteristics of the anchor test and its similarity to the forms being equated should be presented, including both content specifications and empirically determined relationships among test scores. If anchor items are used, as in some IRT-based and classical equating studies, the representativeness and psychometric characteristics of anchor items should be presented.

CHAPTER 4

STANDARD SETTING

4.1 Background

Standard setting is an essential component in the design of a statewide assessment program, which is part of a broader educational accountability system. Accountability systems hold educational programs accountable for increasing the number of students whose test scores meet or exceed prescribed standards.

Standards exist in many forms, but most fall into two broad categories of content standards and performance standards. For MI-Access, the content standards are the Performance Expectations (PEs) described in *Addressing Unique Educational Needs of Students with Disabilities* (AUEN), including those PEs that have been identified as appropriate for statewide assessment (section 2.2), and those found in the Model Content Standards contained in the *Michigan Curriculum Framework*.

The Michigan Curriculum Framework was used as the basis for content standards relevant for students at the FI level. The Michigan Curriculum Framework's model content standards, benchmarks, and grade-level content expectations (GLCEs) were reviewed for appropriateness for the FI population. In addition, benchmarks and GLCEs were modified or extended when possible with respect to the accessibility or enabling skills needed to achieve the content standard. The complete process was described in the *Mi Access Assessment Plan Science* (2008).

The performance standards describe what constitutes satisfactory performance of the content standards. These are typically described as the cut scores or decision rules that identify how well students must perform on the assessments to be considered proficient. The Technical Advisory Committee (TAC) considered several models of standard setting before recommending the final model. They also considered numerous aspects of the MI-Access model that would need to be included in the decision-making framework for the standard setting process to be consistent with the intent of the MI-Access and provide a parallel system of standards to the MEAP.

The results of the standard setting process have been documented elsewhere (Questar Assessment, Inc., 2008) and will be summarized here.[10]

4.2 Initial Considerations

Planning for the standard setting activities began in the winter of 2007-2008 with discussions among professional staff of OEAA and the state's contractor to MDE for *MI-Access* support services, Questar Assessment, Inc. (formerly BETA/TASA). These discussions led to two iterations of written outlines for the process to be followed for establishing the student performance standards. These draft plans were discussed with the OEAA TAC April 2008, during which revisions were proposed and the plans ultimately approved. Based on the draft plans and TAC counsel, the implementation process was finalized. The TAC-approved version of the implementation plan is available from OEAA. The subsequent implementation of the standard-setting process was carried out consistent with the OEAA- and TAC-approved

10 Standard 4.19. When proposed score interpretations involve one or more cut scores, the rationale and procedures used for establishing cut scores should be clearly documented.

plan. Essentially identical procedures were followed for the sessions summarized in this report as were carried out for the several earlier *MI-Access* standard-setting sessions, including those for the Science assessments in Grades 5 and 8. Conduct of the Science sessions and subsequent data analyses and state standards-adoption processes were parallel for all three levels of the assessments.

4.3 Levels of Performance and Performance Categories

A critical step in a performance standard setting process is the selection of performance labels. Early on, TAC recommended, with advice from MI-Access staff, to select performance labels that were distinct from the labels used by MEAP. This was important to discourage inappropriate comparisons between performance levels on MEAP and MI-Access. Because the two systems are based on qualitatively different content (while linked, they are based on fundamentally different levels of performance), the same performance labels might inappropriately imply equivalent levels of performance on the same content standards.

OEAA developed, with input from a range of relevant stakeholders in the process, three "achievement labels" and corresponding draft performance-level descriptors (PLDs) to describe student performance on MI-Access. The chosen labels and PLDs were shared with the TAC for their input and counsel. Three performance categories were used for each level of MI-Access; the number of categories was chosen to be consistent with the MEAP, which also has 3 performance levels. The final PLDs are presented in the final Standard Setting Reports.

4.4 The Standard Setting Process

The standard setting process was designed and carried out by Questar in consultation with TAC and MI-Access staff. Questar facilitated the process which occurred on December 5 and 6, 2007, for grades 5 and 8, and April 29 and 30, for grade 11. Standard-setting participants were chosen from nominees made to the OEAA from MI-Access district coordinators, the state's Special Education Advisory Committee, and from various professional organizations. In addition, the call for panelists was posted on the MDE web site. The final panel was comprised of Michigan special education stakeholders, including parents, classroom teachers (both special and general education), building-level administrators, special education directors, and school counselors and psychologists.

On the recommendation of the OEAA contractor and Questar, and approved by OEAA and the state's TAC, the general methodology selected for all standard setting sessions was "item mapping," more commonly referred to as the "Bookmark Procedure™." This procedure was adopted for several reasons: (i) it is currently the most widely used method for setting performance standards on high-stakes educational assessments; (ii) the method is widely understood and researched by measurement professionals; (iii) the method is well-suited for assessments predominately consisting of multiple-choice questions; and (iv) the item-mapping procedure was used for establishing standards for the majority of the MEAP (general education) assessments.

A Questar facilitator presented a general introduction of the standard setting procedure and the three performance labels to be used. The panelists then broke out into smaller, separate panels to begin their work. These groups were assembled based on the age groups and MI-Access levels (P, SI, FI) for which the assessments were developed. Facilitators of these smaller panels followed the same agenda and used identical overhead transparency sequence and notes to lead their individual sessions. MDE/OEAA

personnel were present for all sessions, but served only as resource personnel and observers; they were not allowed to participate in the judgment process. The agendas for the standard setting sessions are provided in the standard setting report (Questar Assessment, Inc., 2008).

Each panel made three separate rounds of judgments of the standards. The training encouraged participants to focus on their professional experience-based judgments as a basis for decision-making throughout the process.[11] As described in the standard setting report, each panelist judged the minimum score a student should receive to be deemed having attained the performance standard. They made separate judgments regarding the minimum score a student should receive to have surpassed the performance standard. Extensive discussions by the panelists of their interim ratings took place following the first and second rounds. They were instructed to explain their ratings and seek clarification for any questions. During these interim periods, each panelist had available their own ratings and a summary of their peers' ratings for comparison.

After the second round of judgments, panelists were provided with impact data, illustrating the expected percentages of students who would likely be in each of the three performance categories. After some discussion about the limitations of the impact data, panelists made their final judgments. Upon completion, each panelist filled out an evaluation questionnaire regarding their comfort with the standard setting process and results. (Questar Assessment, Inc., 2008).

All panel recommendations were shared with the state's national TAC for their counsel. Small adjustments to a small number of the panels' recommendations were made by OEAA to smooth the grade-to-grade percents of student scoring in each performance category. Of the 48 panel recommended cut scores, OEAA smoothed a total of 14 of them. With the TAC input, the final OEAA recommendations were presented to, and were subsequently approved by, the State Board of Education.

4.5 Standard Setting Results

For Participation, the percentage of students by performance category is given in Table 4.1 and the item mapping test booklet cuts, as adopted by the State Board of Education, are given in Table 4.2.

Table 4.1

Summary of Panel Recommendations for MI-Access Participation Science Test: Percentage of Students by Performance Category

	Grade 5	Grade 8	Grade 11
Emerging	42	45	54
Attained	46	42	34
Surpassed	13	14	13

11 Standard 4.21. When cut scores defining pass-fail or proficiency categories are based on direct judgments about the adequacy of item or test performances or performance levels, the judgmental process should be designed so that judges can bring their knowledge and experience to bear in a reasonable way.

Table 4.2

Summary of Panel Recommendations for MI-Access Participation Science Test: Item Mapping Test Booklet Cuts, Median Scores (Standard Errors)

	Grade 5	Grade 8	Grade 11
Attained	24 (0.7)	25 (0.7)	49 (1.4)
Surpassed	75 (0.5)	78 (0.5)	81 (0.5)

Note: Maximum score = 90 at each grade.

For Supported Independence, the percentage of students by performance category is given in Table 4.3 and the item mapping test booklet cuts, as adopted by the State Board of Education, are given in Table 4.4.

Table 4.3

Summary of Panel Recommendations for MI-Access Supported Independence Science Test: Percentage of Students by Performance Category

	Grade 5	Grade 8	Grade 11
Emerging	35	34	23
Attained	43	40	61
Surpassed	22	26	16

Table 4.4

Summary of Panel Recommendations for MI-Access Supported Independence Science Test: Item Mapping Test Booklet Cuts, Median Scores (Standard Errors)

	Grade 5	Grade 8	Grade 11
Attained	38 (2.0)	39 (2.4)	34 (1.2)
Surpassed	62 (1.2)	58 (1.0)	61 (1.1)

Note: Maximum score = 68 at each grade.

For Functional Independence, the percentage of students by performance category is given in Table 4.5 and the item mapping test booklet cuts, as adopted by the State Board of Education, are given in Table 4.6.

Table 4.5

Summary of Panel Recommendations for MI-Access Functional Independence Science Test: Percentage of Students by Performance Category

	Grade 5	Grade 8	Grade 11
Emerging	46	50	37
Attained	27	23	37
Surpassed	27	27	26

Table 4.6

Summary of Panel Recommendations for MI-Access Functional Independence Science Test: Item Mapping Test Booklet Cuts, Median Scores (Standard Errors).

	Grade 5	Grade 8	Grade 11
Attained	18 (0.6)	20 (0.8)	19 (1.5)
Surpassed	28 (0.7)	33 (0.6)	38 (0.6)

Note: Maximum score = 35 at Grade5, 40 at Grade 8, and 45 at grade 11.

CHAPTER 5

RELIABILITY EVIDENCE

5.1 Background

The reliability of scores refers to the consistency or degree of stability of scores under conditions where the measurement is repeated on a population of individuals. "The usefulness of behavioral measurements presupposes that individuals and groups exhibit some degree of stability in their behavior" (AERA, APA, NCME, 1999, p. 25). Variability in scores over successive measurements that is unrelated to the intended measurement is called measurement error. The *Standards* also state "because of subjectivity in the scoring process, an individual's obtained score and the average score of a group will always reflect at least a small amount of measurement error" (AERA, APA, NCME, 1999, p. 25).

The *Standards* clarify the summary requirements for reliability data, critical information that should include the identification of the major sources of error, summary statistics describing the size of resulting errors, the degree of generalizability of scores across relevant aspects of the assessment procedure, and a description of the population on which the reliability evidence is based. It is important to note that reliability data is typically sample-specific, so comparisons to other populations must be tempered by evaluation of the degree of similarity in relevant characteristics between the population and the sample.[12]

Information about decision consistency is also available for MI-Access. Decision consistency estimates are useful for judging stability when scores are used to determine whether an individual student has met the standard.

5.2 Internal Consistency and Standard Errors of Measurement of Spring 2007 Pilot Forms

Internal consistency estimates were computed as coefficient alpha for each pilot form. Coefficient Alpha and the Standard Error of Estimate (SEM) are reported in Table 5.1 for Participation, Table 5.2 for Supported Independence, and Table 5.3 for Functional Independence. The N, mean, standard deviation and minimum and maximum are also reported in these tables.

12 Standard 2.1 For each total score, subscore, or combination of scores that is to be interpreted, estimates of relevant reliabilities and standard errors of measurement or test information functions should be reported.

Table 5.1

Spring 2007 Pilot Form Summaries, including Score Statistics, Sample Size, Coefficient Alpha, and SEM by Form - Participation Science

Test Form	Grade	Mean	SD	Minimum	Maximum	N	Alpha	SEM
PP-S51	5	51.75	37.27	0	102	36	0.94	9.3
PP-S52	5	32.66	35.89	0	120	89	0.95	7.7
PP-S53	5	40.34	38.60	0	120	83	0.96	8.0
PP-S54	5	42.89	38.49	0	118	61	0.96	8.1
PP-S81	8	53.78	38.04	0	120	41	0.94	9.3
PP-S82	8	52.63	43.43	0	120	79	0.97	7.8
PP-S83	8	42.70	38.25	0	120	84	0.96	7.8
PP-S84	8	49.55	38.14	0	118	66	0.95	8.7
PP-S111	11	43.98	38.24	0	120	45	0.96	8.0
PP-S112	11	35.77	40.44	0	120	61	0.97	7.2
PP-S113	11	54.01	41.23	0	120	68	0.96	8.2
PP-S114	11	46.90	42.32	0	120	58	0.96	8.0

Table 5.2

Spring 2007 Pilot Form Summaries, including Score Statistics, Sample Size, Coefficient Alpha, and SEM by Form - Supported Independence Science

Test Form	Grade	Mean	SD	Minimum	Maximum	N	Alpha	SEM
PSI-S51	5	69.06	22.55	0	100	104	0.90	7.0
PSI-S52	5	65.51	26.91	0	100	104	0.93	6.9
PSI-S53	5	65.70	25.55	0	100	109	0.92	7.2
PSI-S54	5	64.69	26.78	0	100	131	0.94	6.6
PSI-S81	8	58.15	23.46	0	96	147	0.90	7.6
PSI-S82	8	58.89	26.57	0	100	128	0.93	7.2
PSI-S83	8	60.18	25.47	0	100	142	0.92	7.4
PSI-S84	8	67.50	22.71	0	100	140	0.90	7.2
PSI-S111	11	68.63	27.89	0	100	139	0.95	6.2
PSI-S112	11	64.46	20.77	8	100	162	0.87	7.5
PSI-S113	11	71.16	23.92	0	100	110	0.92	6.6
PSI-S114	11	69.14	21.91	0	100	136	0.89	7.2

Table 5.3

Spring 2007 Pilot Form Summaries, including Score Statistics, Sample Size, Coefficient Alpha, and SEM by Form - Functional Independence Science

Test Form	Grade	Mean	SD	Minimum	Maximum	N	Alpha	SEM
PFI-S51	5	32.50	7.02	10	47	585	0.84	2.8
PFI-S52	5	33.00	6.48	16	47	294	0.82	2.7
PFI-S53	5	32.63	7.25	13	47	303	0.85	2.8
PFI-S54	5	30.45	6.74	4	45	318	0.81	2.9
PFI-S55	5	31.06	5.93	0	46	286	0.77	2.8
PFI-S81	8	36.11	7.92	0	54	666	0.84	3.1
PFI-S82	8	34.05	7.24	15	50	304	0.81	3.2
PFI-S83	8	35.54	7.28	16	52	297	0.81	3.2
PFI-S84	8	31.71	7.99	9	53	338	0.83	3.3
PFI-S85	8	33.99	7.30	14	52	313	0.81	3.2
PFI-S111	11	38.45	8.33	12	60	489	0.85	3.2
PFI-S112	11	38.56	9.41	15	58	326	0.88	3.2
PFI-S113	11	38.31	8.36	11	55	289	0.85	3.3
PFI-S114	11	38.07	8.61	16	56	241	0.85	3.3
PFI-S115	11	37.55	8.63	13	56	337	0.85	3.3

5.3 Internal Consistency and Standard Errors of Measurement of 2007-2008 Operational Assessments

Internal consistency estimates were computed as coefficient alpha for the operational forms. Coefficient Alpha and the SEM are reported in Table 5.4 for Participation, Table 5.5 for Supported Independence, and Table 5.6 for Functional Independence. The raw score mean and standard deviation along with the N are also reported in these tables.

Rash model reliabilities are included as part of the Winsteps calibration of core items in the FI science assessment. These model reliabilities provide further evidence of score reliability and are reported in Table 5.6 along with the scale score mean and standard deviation.

Table 5.4

2007-2008 Operational Form Summaries, including Sample Size, Raw Score Statistics, Coefficient Alpha, and SEM - Participation

Grade	N	Mean	SD	Cronbach's Alpha	SEM
5	264	36.43	29.54	0.94	7.2
8	280	35.51	30.09	0.94	7.3
11	296	43.20	31.63	0.96	6.1

Table 5.5

2007-2008 Operational Form Summaries, including Sample Size, Raw Score Statistics, Coefficient Alpha, and SEM - Supported Independence

Grade	N	Mean	SD	Cronbach's Alpha	SEM
5	480	44.03	19.13	0.91	5.8
8	547	43.69	16.79	0.88	5.9
11	576	45.20	17.01	0.91	5.2

Table 5.6

2007-2008 Operational Form Summaries, including Sample Size, Raw Score Statistics, Coefficient Alpha, SEM and Scale Score Statistics - Functional Independence

Grade	N	Raw Score		Cronbach's Alpha	SEM	Scale Score		Model Reliability
		Mean	SD			Mean	SD	
5	2127	20.14	5.31	0.76	2.6	2501.80	25.05	0.77
8	2158	20.95	5.77	0.74	2.9	2800.37	25.06	0.75
11	1875	23.67	7.12	0.81	3.1	3109.09	24.99	0.82

5.4 Standard Errors of Measurement

The standard error of measurement (SEM) is another method of considering reliability of scores. For raw scores, it is estimated as the portion of the raw score standard deviation that is measurement error. It allows one to compute a confidence interval with respect to the precision of the raw score. One might also use it to compute a confidence interval with respect to the true score, if a true-score is estimated. The SEM for each pilot form and operational test at each grade are reported above in Tables 5.1 to 5.6.

In the context of the MI-Access science assessments, the SEM is most critical regarding the precision of the cut-score points on the scale score distribution. The SEM for each cut-point at each grade and subject was estimated and is reported in Table 5.7. These SEM values provide information regarding the precision of the score at the cut-points.

Table 5.7

Standard Error of Measurement of Cut-Points for FI Science

Grade	Attained	SEM	Surpassed	SEM
5	2500	11	2517	12
8	2800	12	2816	12
11	3100	10	3122	10

5.5 Classification Consistency

Classification accuracy and consistency are indices of agreement for performance-level classification as a score. Classification accuracy is a way to estimate the difference between true classification and observed classification due to measurement error. Classification consistency is a way to estimate the difference between the observed classification and the classification on a parallel form. The MI-Access Functional Independence classification accuracy and consistency indices were calculated by applying procedures given in Livingston and Lewis (1995) via the BB-CLASS computer program (Brennan, 2004). These indices are presented in the following table, Table 5.8. The accuracy indices can be interpreted as the proportion of examinees that would be classified accurately into the performance-level score categories given infinite replications of identical conditions. The consistency indices can be interpreted as the proportion of examinees that would be classified accurately (consistently) into the performance-level score categories on the assessment and a parallel form of the assessment.

Table 5.8

Estimated Classification Accuracy and Consistency - Science

	2 Categories Emerging vs. Attained plus Surpassed		3 Categories Emerging vs. Attained vs. Surpassed	
Grade	Accuracy	Consistency	Accuracy	Consistency
Participation				
5	0.95	0.92	0.85	0.80
8	0.94	0.92	0.86	0.81
11	0.95	0.93	0.83	0.79
Supported Independence				
5	0.92	0.89	0.81	0.74
8	0.91	0.88	0.77	0.69
11	0.94	0.91	0.78	0.71
Functional Independence				
5	0.84	0.78	0.73	0.65
8	0.84	0.78	0.73	0.65
11	0.86	0.80	0.76	0.67

Across all three grades and across the three levels of MI-Access, the classification accuracy when categorizing students into the basic NCLB categories of proficient (attained and surpassed) and not proficient (emerging) ranges from 84% to 95% with a median of 92%, and the classification consistency ranges from 78% to 92% with a median of 89%. When categorizing the students into three categories, the classification accuracy ranges from 73% to 86% with a median of 78%, and the classification consistency ranges from 65% to 81% with a median of 71%. The accuracy indices will be higher than the

consistency indices because the former estimates accuracy between observed scores containing measurement error and true scores with no error, whereas the latter estimates accuracy between observed scores on parallel forms of the assessment where both scores contain measurement error.

These estimates represent strong proportions of students classified accurately for an assessment appropriate for students with disabilities such as those who take the MI-Access Participation, Supported Independence, and Functional Independence assessments.

5.6 Rater Consistency

Each item of the Participation and Supported Independence assessments is scored based on a rubric. There is a 3-point rubric with 3 condition codes at the Participation level and a 2-point rubric with the same 3 condition codes at the Supported Independence level. (See Tables 3.1 and 3.2 for the two rubrics.) Each activity has two raters—Primary Assessment Administrator (PAA) and the Shadow Assessment Administrator (SAA). A student's score is the sum of the item scores across both raters. The Primary rater must be a professional school staff person (i.e. classroom teacher, teacher consultant, school psychologist) and is often the classroom teacher. The Shadow rater can be another teacher, related service provider (i.e. school psychologist, speech and language pathologist), or a paraprofessional.

For the spring 2007 pilot, the percent perfect agreement rates are given in Table 5.9 for Participation and in Table 5.10 for Supported Independence. For Participation, across the 80 grade 5 items, the percent perfect agreement rates ranged from 90% to 100% with a median of 96%; across the 80 grade 8 items the percents ranged from 89% to 100% with a median of 96%; and finally, across the 80 grade 11 items the percents ranged from 84% to 99% with a median of 93%. For Supported Independence, across the 100 grade 5 items, the percent perfect agreement rates ranged from 91% to 100% with a median of 95%; across the 100 grade 8 items, the percents ranged from 91% to 98% with a median of 95%; and finally, across the 100 grade 11 items the percents ranged from 90% to 99% with a median of 95%.

For the 2007-2008 operational forms the percent perfect agreement rates are given in Table 5.11 for Participation and in Table 5.12 for Supported Independence. For Participation, across the 15 grade 5 items, the percent perfect agreement rates ranged from 92% to 97% with a median of 95%; across the 15 grade 8 items, the percents ranged from 94% to 99% with a median of 96%; and finally, across the 15 grade 11 items, the percents ranged from 96% to 99% with a median of 97%. For Supported Independence, across the 15 grade 5 items the percent perfect agreement rates ranged from 95% to 98% with a median of 96%; across the 15 grade 8 items the percents ranged from 95% to 98% with a median of 97%; and finally, across the 15 grade 11 items, the percents ranged from 94% to 99% with a median of 97%.

Table 5.9

Spring 2007 Pilot Form Percent Perfect Interrater Agreement Rates—Participation Science

Item Number	Grade 5				Grade 8				Grade 11			
	PP-S51	PP-S52	PP-S53	PP-S54	PP-S81	PP-S82	PP-S83	PP-S84	PP-S111	PP-S112	PP-S113	PP-S114
	N = 36	N = 89	N = 83	N = 61	N = 41	N = 79	N = 84	N = 66	N = 45	N = 61	N = 68	N = 58
1	97	96	96	90	100	99	98	95	87	92	97	98
2	100	98	94	97	100	99	95	94	89	92	96	95
3	97	96	94	98	98	97	95	97	89	92	91	95
4	94	96	94	98	100	97	93	92	87	90	94	97
5	94	98	98	92	98	97	94	91	84	93	96	97
6	97	99	95	97	100	96	95	95	87	92	93	97
7	100	96	96	98	95	96	94	89	87	92	96	97
8	97	97	96	97	100	100	94	95	89	93	91	93
9	94	96	98	97	98	99	98	94	89	90	96	97
10	97	97	96	92	100	99	95	94	89	93	96	97
11	94	94	95	95	100	95	98	95	89	90	91	97
12	100	98	96	95	100	99	94	95	89	93	94	97
13	97	96	99	97	100	99	94	94	84	89	96	95
14	97	96	96	93	100	97	96	94	87	92	97	97
15	92	97	96	95	98	96	95	100	91	90	94	91
16	97	97	96	92	100	99	94	95	84	90	93	91
17	94	97	95	93	95	99	95	92	91	95	99	97
18	97	98	98	93	100	100	92	94	89	87	90	95
19	97	97	92	95	100	96	95	92	89	93	93	95
20	94	99	94	93	100	96	95	92	89	92	96	97

Table 5.10

Spring 2007 Pilot Form Percent Perfect Interrater Agreement Rates—Supported Independence Science

Item Number	Grade 5				Grade 8				Grade 11			
	PSI-S51	PSI-S52	PSI-S53	PSI-S54	PSI-S81	PSI-S82	PSI-S83	PSI-S94	PSI-S111	PSI-S112	PSI-S113	PSI-S114
	N = 104	N = 104	N = 109	N = 131	N = 147	N = 128	N = 142	N = 140	N = 139	N = 162	N = 110	N = 136
1	94	94	98	92	94	95	96	96	94	93	94	98
2	96	97	97	95	96	95	96	97	95	93	95	96
3	96	93	100	93	93	94	96	96	94	93	93	96
4	96	92	99	94	95	92	96	96	96	94	92	96
5	94	92	96	97	95	96	92	97	94	90	95	95
6	96	95	96	91	94	92	97	94	93	96	95	97
7	97	96	99	92	94	95	93	98	94	94	94	98
8	97	93	99	93	93	94	94	97	94	93	94	96
9	97	93	99	94	94	96	96	95	94	96	94	96
10	97	93	99	95	95	91	96	97	94	95	95	97
11	96	95	100	95	96	94	96	96	94	94	94	96
12	96	94	95	95	94	96	95	96	94	92	92	96
13	94	93	98	95	93	94	94	98	94	93	93	95
14	96	97	99	92	92	94	95	97	96	92	95	97
15	97	94	98	94	95	95	94	94	96	94	95	98
16	96	98	98	95	94	97	94	95	96	93	95	99
17	98	95	98	92	94	91	94	94	94	94	94	96
18	96	95	98	92	95	95	95	96	94	93	95	97
19	94	92	98	93	95	93	94	94	97	94	95	97
20	96	93	97	95	95	97	93	96	97	90	94	95
21	97	91	98	95	95	95	94	95	95	91	92	97
22	98	95	99	92	95	91	94	96	95	94	95	94
23	95	93	99	95	93	95	94	95	96	93	94	97
24	95	95	98	92	95	96	96	97	94	95	95	95
25	95	94	99	96	94	96	94	98	95	94	94	97

Table 5.11

2007-2008 Operational Form Percent Perfect Interrater Agreement Rates—Participation Science

Grade 5		Grade 8		Grade 11	
Item #	N = 264	Item #	N = 280	Item #	N = 296
1	97	1	96	1	97
2	95	2	96	2	96
3	97	3	95	3	96
4	96	4	98	4	98
5	96	5	96	5	97
6	94	6	96	6	96
7	95	7	95	8	98
9	96	9	94	9	99
10	96	10	99	10	97
12	93	11	96	11	96
14	95	14	96	14	97
15	92	15	99	15	98
16	95	16	97	16	97
17	94	19	96	19	99
20	92	20	98	20	98

Table 5.12

2007-2008 Operational Form Percent Perfect Interrater Agreement Rates—Supported Independence Science

Grade 5		Grade 8		Grade 11	
Item #	N = 480	Item #	N = 547	Item #	N = 576
1	97	1	97	1	98
2	97	2	97	2	95
3	95	3	97	3	97
4	96	4	97	4	95
5	97	5	96	5	96
6	96	6	96	6	98
7	98	7	97	7	96
8	96	8	98	8	99
10	97	10	97	10	98
12	96	12	97	12	98
14	96	14	97	14	95
15	97	15	97	15	97
17	97	17	98	17	94
18	96	18	95	18	97
19	95	19	97	19	95
21	97	21	96	21	97
22	96	22	97	22	96

CHAPTER 6

VALIDITY EVIDENCE

6.1 Background

Validity is the most important consideration for the development and evaluation of an assessment. "Validity refers to the degree to which evidence and theory support the interpretations of test scores entailed by proposed uses of tests" (AERA, APA, NCME, 1999, p. 9). Validation begins with a clarification of the appropriate interpretations of scores. The evidence that is gathered to support such interpretations should be linked to proposed uses of the scores that result from the assessment.

Related to this is construct-irrelevant variance or variance in scores that is introduced systematically by influences not related to the characteristic being measured. "Validation involves careful attention to possible distortions in meaning arising from inadequate representation of the construct and also to aspects of measurement such as test format, administration conditions, or language level that may materially limit or qualify the interpretation of test scores" (AERA, APA, NCME, 1999, p. 10).

In addition to the evidence presented below, the documentation of the development of MI-Access provided in Chapters 1 and 2 provides additional evidence regarding the meaning and usefulness of the assessment results while Chapter 3 presents training and resources available to improve the observation and rating process. Furthermore, the reliability analyses in Chapter 5 provide evidence of the limited influence of irrelevant variance (e.g., variance introduced because of inconsistent raters or rater bias).

6.2 Relevance of Content (Test Blueprint)

The heart of MI-Access is embodied in the set of EGLCEs for elementary and middle school and the EHSCEs for high school along with the corresponding Scoring Focus for each assessment item. These documents lead to the subject matter areas typically found in standard assessments; namely ELA and mathematics. The current set of EGLCEs and EHSCEs and corresponding Scoring Foci were developed through an inclusive process, involving teachers, school administrators, parents, advocates, and adult service agency personnel. This process has been documented in Chapters 1 and 2 and provides clear evidence of the general agreement from key stakeholders and experts regarding their appropriateness, comprehensiveness, and completeness.

6.3 Field Review of the MI-Access Science Assessment Plan

Once the draft of the MI-Access Science Assessment Plan was completed, an online evaluation form was provided for feedback from the field. The results of this feedback were considered in the development of the final assessment plan as implemented.

6.4 Results of Item Review Processes

SRC & CAC review of Newly Developed Items

The Sensitivity Review Committees (SRC) and the Content Advisory Committees (CAC) meetings were held on July 17-20, 2006 at the East Lansing Marriott. The purpose of these meetings was to convene the SRC and CAC to review the newly developed science items for Functional Independence, Supported Independence, and Participation. A copy of the agenda for these meetings can be found in the *Science SRC-CAC Summary Report* (2006).

Table 6.1 shows the number of new science development items that the SRC committee reviewed, and how many of those were accepted, rejected, or revised.

Table 6.1

New Development Item Status: SRC Recommendations

Committee	Total Items	Accepted	Rejected	Revised
SRC-Functional Independence Science	689	576	4	109
SRC-Participation and Supported Independence Science	881	610	8	208

Table 6.2 shows the number of new science development items that the CAC committees reviewed, and how many items were accepted, rejected, or revised.

Table 6.2
New Development Item Status: CAC Recommendations

Committee	Total Items	Accepted	Rejected	Revised
CAC Functional Independence Science - Elementary	252	177	20	55
CAC Functional Independence Science - Middle School	234	126	6	102
CAC Functional Independence Science - High School	203	122	3	83
CAC Supported Independence Science - Elementary	188	80	5	103
CAC Supported Independence Science - Middle School	210	54	25	131
CAC Supported Independence Science - High School	185	71	21	93
CAC Participation Science-Elementary	99	32	7	60
CAC Participation Science-Middle School	99	33	9	57
CAC Participation Science-High School	100	15	9	76

Item review participants completed an evaluation of the process and their experience. The results of this evaluation are provided in Table 6.3.

Table 6.3

Participant Evaluation of the 2006 New Item and Data Review

Opening Session

Item	SA	A	U	D	SD	NA	TOTAL
I would characterize the facilitation of the general session (charge to the committee) as appropriate and clear.	40	22	3	0	0	0	65
My role as a CAC or SRC member was made clear.	51	13	1	0	0	0	65
I would characterize the presentation of the use of data as appropriate and clear.	42	18	2	0	0	2	64
The presentation and handouts regarding the use of data were helpful in my review of items and data.	37	16	1	2	0	2	58

Facilitation

Item	SA	A	U	D	SD	NA	TOTAL
The instructions given by my CAC/SRC facilitator were clear and understandable.	45	17	0	0	0	2	64
The facilitation of my group was good.	45	14	1	3	0	2	65
The facilitator listened to my comments and valued my input.	49	10	1	2	0	2	64

Comfort Level

Item	SA	A	U	D	SD	NA	TOTAL
I felt comfortable with the process that was used to review the items.	47	17	0	0	0	0	64
I felt comfortable using the item review forms.	50	14	0	0	0	0	64
I was comfortable using the resources (EGLCE/EB documents, item specifications, etc.).	46	18	0	0	0	1	65

Spring 2007 Pilot

Following the Spring 2007 Pilot, Content Advisory Committees (CAC) and Sensitivity Review Committees (SRC) were convened to review items and resulting statistics. The following questions were addressed during the CAC review:

1. Does the item measure the content standard?
2. Does the item measure the extended GLCE/Benchmark?
3. Is the item simply and clearly stated?
4. Does the item measure a functional and familiar word?
5. Is the item difficulty appropriate?
6. Is the artwork appropriate?
7. Does the item meet the specifications?

Item and data review participants completed an evaluation of the process and their experience. The results of this evaluation are provided in Table 6.4.

Table 6.4

Participant Evaluation of the Spring 2007 Pilot Item and Data Review

Opening Session

Item	SA	A	U	D	SD	NA	TOTAL
I would characterize the facilitation of the general session (charge to the committee) as appropriate and clear.	27	5	0	0	0	0	32
My role as a SRC or CAC member was made clear.	28	4	0	0	0	0	32
The "Overview on How to Use Item Data" presentation was clear and informative.	25	4	2	1	0	0	32

Facilitation

Item	SA	A	U	D	SD	NA	TOTAL
The instructions given by my SRC/CAC facilitator were clear and understandable.	25	6	0	0	0	1	32
I would characterize the facilitation of my committee as very good.	24	5	2	0	0	0	32
I felt that the facilitator listened to my comments and valued my input.	28	3	0	0	0	1	32

Comfort Level

Item	SA	A	U	D	SD	NA	TOTAL
I felt comfortable with the process that was used to review the items.	26	5	0	1	0	0	32
I felt the item review forms were well organized and user-friendly.	26	4	1	1	0	0	32
I felt the resources (EB documents, item specifications, etc.) provided to the committee were adequate.	23	5	1	2	1	0	32
I felt my input was taken into account when reviewing the items.	26	3	2	0	0	1	32

6.5 Evaluation of Standard-Setting Training, Process, and Outcomes

Following each standard setting session, panelists completed an evaluation of the process and outcomes. Participants were instructed to "Please share with us your feedback about the standards-setting process, activities and outcomes. Your feedback will help OEAA evaluate the training, methods, materials, and results of the sessions." The evaluations are summarized in Table 6.5 for the December, 2007 grades 5 and 8 standard setting sessions and in Table 6.6 for the April, 2008 grade 11 standard setting sessions.

Table 6.5

Panelist Evaluation of the Fall 2007 Standard Setting Process and Outcomes

1. Indicate the level of success of various components of the standard-setting session in which you participated.

Component	Not Very Successful	Partially Successful	Successful	Very Successful
a) Introduction to the MI-Access Assessments		1 (3%)	22 (52%)	19 (45%)
b) Standard-setting process intro. – Large group		1 (3%)	21 (51%)	19 (46%)
c) Performance Level Descriptor review			24 (57%)	18 (43%)
d) Standard-setting orientation – Small group		3 (7%)	23 (56%)	15 (37%)
e) Group discussions of the panel		3 (7%)	18 (43%)	21 (50%)
f) Data presentations before Rounds 2 & 3			20 (48%)	22 (52%)

2. Indicate the importance of each of these factors in making your cut-score recommendations.

Component	Not Very Important	Somewhat Important	Important	Very Important
a) Performance Level Descriptors		8 (20%)	14 (34%)	19 (46%)
b) Your perception of the assessment's difficulty		5 (12%)	19 (45%)	18 (43%)
c) Your own professional experiences		4 (10%)	12 (29%)	25 (61%)
d) Your initial judgments (Round 1)	1 (2%)	17 (40%)	16 (37%)	9 (21%)
e) Group discussions of the panel		3 (7%)	16 (38%)	23 (55%)
f) Feedback data provided to the panel			14 (34%)	27 (66%)
g) Policy environment in the state	4 (10%)	13 (32%)	11 (27%)	13 (32%)
h) What students would vs. should be able to do		1 (2%)	10 (24%)	30 (73%)

3. I understood the task of recommending performance standards when I did my work for:

	Not Very Well	Moderately Well	Very Well
a) Round 1	5 (12%)	23 (55%)	14 (33%)
b) Round 2		6 (14%)	36 (86%)
c) Round 3		1 (3%)	39 (97%)

4. I understood the data that were provided to the panel prior to:

	Not Very Well	Moderately Well	Very Well
a) Round 2	1 (2%)	10 (24%)	30 (73%)
b) Round 3		4 (10%)	37 (90%)

5. How confident are you with your personal classification of students at each level of proficiency?

Performance Level	Not Confident	Somewhat Confident	Confident	Very Confident
a) Surpassed the Standard		1 (2%)	18 (43%)	23 (55%)
b) Attained the Standard		2 (5%)	22 (52%)	18 (43%)
c) Emerging Towards the Standard		2 (5%)	22 (52%)	18 (43%)

Table 6.6

Panelist Evaluation of the Spring 2008 Standard Setting Process and Outcomes

1. Indicate the level of success of various components of the standard-setting session in which you participated.

Component	Not Very Successful	Partially Successful	Successful	Very Successful
a) Introduction to the MI-Access Assessments		1 (3%)	22 (52%)	19 (45%)
b) Standard-setting process intro. – Large group		1 (3%)	21 (51%)	19 (46%)
c) Performance Level Descriptor review			24 (57%)	18 (43%)
d) Standard-setting orientation – Small group		3 (7%)	23 (56%)	15 (37%)
e) Group discussions of the panel		3 (7%)	18 (43%)	21 (50%)
f) Data presentations before Rounds 2 & 3			20 (48%)	22 (52%)

2. Indicate the importance of each of these factors in making your cut-score recommendations.

Component	Not Very Important	Somewhat Important	Important	Very Important
a) Performance Level Descriptors		8 (20%)	14 (34%)	19 (46%)
b) Your perception of the assessment's difficulty		5 (12%)	19 (45%)	18 (43%)
c) Your own professional experiences		4 (10%)	12 (29%)	25 (61%)
d) Your initial judgments (Round 1)	1 (2%)	17 (40%)	16 (37%)	9 (21%)
e) Group discussions of the panel		3 (7%)	16 (38%)	23 (55%)
f) Feedback data provided to the panel			14 (34%)	27 (66%)
g) Policy environment in the state	4 (10%)	13 (32%)	11 (27%)	13 (32%)
h) What students would vs. should be able to do		1 (2%)	10 (24%)	30 (73%)

3. I understood the task of recommending performance standards when I did my work for:

	Not Very Well	Moderately Well	Very Well
a) Round 1	5 (12%)	23 (55%)	14 (33%)
b) Round 2		6 (14%)	36 (86%)
c) Round 3		1 (3%)	39 (97%)

4. I understood the data that were provided to the panel prior to:

	Not Very Well	Moderately Well	Very Well
a) Round 2	1 (2%)	10 (24%)	30 (73%)
b) Round 3		4 (10%)	37 (90%)

5. How confident are you with your personal classification of students at each level of proficiency?

Performance Level	Not Confi-dent	Somewhat Confident	Confident	Very Confi-dent
a) Surpassed the Standard		1 (2%)	18 (43%)	23 (55%)
b) Attained the Standard		2 (5%)	22 (52%)	18 (43%)
c) Emerging Towards the Standard		2 (5%)	22 (52%)	18 (43%)

6.6 Intercorrelations Within Tests (section observed scores)

Intercorrelations within tests provide a picture of the internal structure of a test, indicating the extent to which item types of content areas "hang together." To some extent, these correlations should be relatively high, indicating a set of items that contribute to a common measure. Moreover, when these intercorrelation structures are consistent across grades, it provides additional support for the similarity of test construction across grades as well.

Correlations between sections scores by grade are given in Table 6.7 for Participation, in Table 6.8 for Supported Independence, and in Table 6.9 for Functional Independence. These section scores are based on the 4 science strands: Constructing & Reflecting, Life Science, Physical Science, and Earth Science. For Participation, the intercorrelations are high; in the .70s and .80s at grades 5 and 8 and typically in the .60s and .70s at grade 8. For Supported Independence, the intercorrelations are also high but lower than those for Participation. Supported Independence has far fewer points than Participation; 68 total points versus 90. The intercorrelations for Functional Independence are moderately high, but lower than those for Supported Independence. Again, Functional Independence has far fewer points than Supported Independence with total points of 35 at grade 5, 40 at grade 8, and 45 at grade 11 versus 68 for Supported Independence. Constructing and Reflecting has the lowest intercorrelations for the Functional Independence assessments, but this subsection only has 4 items at each grade.

Finally, the Ns, means, and standard deviations along with the minimum and maximum score for subsections by grade are also provided in Tables 6.10 to 6.12.

Table 6.7
2007-2008 Operational Form Intercorrelations Between Section Scores by Grade
Participation Science

Grade		Constructing & Reflecting	Life Science	Physical Science	Earth Science
5	Constructing & Reflecting	1	0.796	0.734	0.724
	Life Science	0.796	1	0.809	0.788
	Physical Science	0.734	0.809	1	0.737
	Earth Science	0.724	0.788	0.737	1
	N	264	264	264	264
8	Constructing & Reflecting	1	0.781	0.645	0.718
	Life Science	0.781	1	0.698	0.828
	Physical Science	0.645	0.698	1	0.726
	Earth Science	0.718	0.828	0.726	1
	N	280	280	280	280
11	Constructing & Reflecting	1	0.809	0.772	0.754
	Life Science	0.809	1	0.873	0.816
	Physical Science	0.772	0.873	1	0.792
	Earth Science	0.754	0.816	0.792	1
	N	296	296	296	296

Table 6.8

2007-2008 Operational Form Intercorrelations Between Section Scores by Grade
Supported Independence Science

Grade		Constructing & Reflecting	Life Science	Physical Science	Earth Science
5	Constructing & Reflecting	1	0.652	0.657	0.587
	Life Science	0.652	1	0.728	0.697
	Physical Science	0.657	0.728	1	0.717
	Earth Science	0.587	0.697	0.717	1
	N	480	480	480	480
8	Constructing & Reflecting	1	0.463	0.451	0.355
	Life Science	0.463	1	0.690	0.607
	Physical Science	0.451	0.690	1	0.669
	Earth Science	0.355	0.607	0.669	1
	N	547	547	547	547
11	Constructing & Reflecting	1	0.586	0.507	0.498
	Life Science	0.586	1	0.656	0.657
	Physical Science	0.507	0.656	1	0.635
	Earth Science	0.498	0.657	0.635	1
	N	576	576	576	576

Table 6.9

2007-2008 Operational Form Intercorrelations Between Section Scores by Grade
Functional Independence Science

Grade		Constructing & Reflecting	Life Science	Physical Science	Earth Science
5	Constructing & Reflecting	1	0.294	0.313	0.343
	Life Science	0.294	1	0.510	0.438
	Physical Science	0.313	0.510	1	0.418
	Earth Science	0.343	0.438	0.418	1
	N	2127	2127	2127	2127
8	Constructing & Reflecting	1	0.317	0.266	0.215
	Life Science	0.317	1	0.520	0.334
	Physical Science	0.266	0.520	1	0.325
	Earth Science	0.215	0.334	0.325	1
	N	2158	2158	2158	2158
11	Constructing & Reflecting	1	0.404	0.381	0.395
	Life Science	0.404	1	0.542	0.543
	Physical Science	0.381	0.542	1	0.530
	Earth Science	0.395	0.543	0.530	1
	N	1875	1875	1875	1875

Table 6.10

2007-2008 Operational Form Summary Statistics for Section Scores by Grade
Participation Science

Grade		N	Minimum Score	Maximum Score	Mean	Standard Deviation	Alpha
5	Constructing and Reflecting	264	0	12	4.62	4.81	0.78
	Life Science	264	0	30	12.69	10.71	0.85
	Physical Science	264	0	18	6.45	6.09	0.90
	Earth Science	264	0	30	12.67	10.72	0.83
8	Constructing and Reflecting	280	0	12	4.43	4.78	0.74
	Life Science	280	0	30	12.74	10.95	0.88
	Physical Science	280	0	18	6.78	6.35	0.91
	Earth Science	280	0	30	11.56	11.12	0.83
11	Constructing and Reflecting	296	0	12	5.38	5.04	0.76
	Life Science	296	0	30	14.95	11.46	0.82
	Physical Science	296	0	30	14.23	10.65	0.83
	Earth Science	296	0	18	8.64	6.82	0.79

Table 6.11

2007-2008 Operational Form Summary Statistics for Section Scores by Grade
Supported Independence Science

Grade		N	Minimum Score	Maximum Score	Mean	Standard Deviation	Alpha
5	Constructing and Reflecting	480	0	8	5.02	2.98	0.54
	Life Science	480	0	28	18.47	8.10	0.82
	Physical Science	480	0	20	12.51	6.59	0.75
	Earth Science	480	0	12	8.04	4.00	0.80
8	Constructing and Reflecting	547	0	8	3.44	2.77	0.26
	Life Science	547	0	28	18.68	7.49	0.78
	Physical Science	547	0	20	13.22	5.96	0.76
	Earth Science	547	0	12	8.34	3.80	0.77
11	Constructing and Reflecting	576	0	8	4.79	2.95	0.44
	Life Science	576	0	28	20.21	7.52	0.78
	Physical Science	576	0	12	7.75	3.95	0.62
	Earth Science	576	0	20	12.45	5.61	0.65

Table 6.12

2007-2008 Operational Form Summary Statistics for Section Scores by Grade
Functional Independence Science

Grade		N	Minimum Score	Maximum Score	Mean	Standard Deviation	Alpha
5	Constructing and Reflecting	2127	0	4	2.36	0.91	0.17
	Life Science	2127	0	13	7.46	2.45	0.56
	Physical Science	2127	0	12	6.03	2.26	0.48
	Earth Science	2127	0	6	4.29	1.34	0.49
8	Constructing and Reflecting	2158	0	4	2.01	1.01	0.17
	Life Science	2158	0	14	8.45	2.63	0.60
	Physical Science	2158	0	14	6.85	2.60	0.54
	Earth Science	2158	0	8	3.64	1.54	0.24
11	Constructing and Reflecting	1875	0	4	2.11	1.11	0.31
	Life Science	1875	0	14	7.42	2.74	0.61
	Physical Science	1875	0	15	7.86	2.78	0.57
	Earth Science	1875	0	12	6.28	2.32	0.52

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