

Missouri
Assessment Program

**Bookmark Standard Setting
Technical Report 2008**

for

**Missouri Achievement Level Setting
Grades 5, 8, and 11
Science**

Submitted to
Missouri Department of Elementary and Secondary Education
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Section A

Executive Summary

Executive Summary

Staff from CTB/McGraw-Hill conducted the Missouri Achievement Level Setting (ALS) in Columbia, Missouri, on July 15-18, 2008. A modification of the Bookmark Standard Setting Procedure (MBSSP; Lewis, Mitzel, & Green, 1996) was used to establish achievement level cut scores for the three grades of the Missouri Assessment Program (MAP) for Science: Grades 5, 8, and 11. The participants in each grade group participated in three rounds of activities in which they recommended three cut scores (*Basic*, *Proficient*, and *Advanced*) that defined four achievement levels: *Below Basic*, *Basic*, *Proficient*, and *Advanced*.

Participants were recruited from across Missouri to recommend the cut scores. Each grade had approximately 15 participants. The Missouri Department of Elementary and Secondary Education (DESE) balanced the standard setting committee in terms of relevant demographic characteristics (e.g., geographic location, school size).

Table 1 summarizes the cut scores recommended by participants and the associated impact data in each grade after the final round (Round 3) of discussion and voting. These results were also confirmed by the Table Leaders during a discussion of vertical articulation.

The impact data in Table 1 reflect the data that were shown to participants at the time of the workshop. The impact data are based on the data from 80% of the students in each grade from the Spring 2008 administration of the MAP Science tests.

Table 1. Participant-recommended Cut Scores and Associated Impact Data Based on Final Round

Grade	Cut Score			Impact Data				
	<i>Basic</i>	<i>Proficient</i>	<i>Advanced</i>	<i>Below Basic</i>	<i>Basic</i>	<i>Proficient</i>	<i>Advanced</i>	<i>Proficient & above</i>
5	626	669	692	11.5%	44.1%	29.4%	15.0%	44.4%
8	671	703	735	19.5%	37.1%	36.8%	6.6%	43.4%
11	702	729	770	25.4%	27.1%	38.5%	9.0%	47.6%

This report summarizes the results of the Missouri Achievement Level Setting. A detailed report of the standard setting is included in Section B. The master agenda is included in Section C. The overheads presented to Table Leaders and participants during training and orientation are included in Section D. Section E contains the training materials provided to participants. Section F contains detailed results of participant votes. Section G contains information related to the standard error estimates. Section H contains graphical representations of participants' judgments. Section I contains the results of the participant evaluation of the Missouri Achievement Level Setting. Section J contains the NAEP policy definitions and achievement level descriptions. Section K contains the achievement level descriptors finalized after the workshop. Section L contains the nomination forms and guidelines used by DESE to recruit participants.

Section B

Round-by-round Synopsis

Round-by-round Synopsis

Staff from CTB/McGraw-Hill conducted the Missouri Achievement Level Setting (ALS) in Columbia, Missouri, on July 15-18, 2008. A modification of the Bookmark Standard Setting Procedure (MBSSP; Lewis, Mitzel, & Green, 1996) was used to set standards for the three grades of the Missouri Assessment Program (MAP) for Science: Grades 5, 8, and 11. The participants in each grade group participated in three rounds of activities in which they recommended three cut scores (*Basic*, *Proficient*, and *Advanced*) that defined four achievement levels: *Below Basic*, *Basic*, *Proficient*, and *Advanced*.

Participants were recruited from across Missouri to recommend cut scores. Each grade group had approximately 15 participants. Within each grade group, the Missouri Department of Elementary and Secondary Education (DESE) divided participants into three tables that were balanced in terms of relevant demographic characteristics (e.g., geographic location, school size). Each table also had a Table Leader who assisted with facilitation of the ALS but did not vote.

The Missouri ALS consisted of training, orientation, three rounds of judgments, vertical articulation, and achievement level descriptor writing. The Missouri ALS lasted three and one-half days, with the first half-day devoted to Table Leader training, and the other three days for the ALS and descriptor writing.

In this section, we overview the MBSSP, including the roles, materials, and day-by-day activities associated with the procedure. In addition, we provide evidence associated with internal validity and describe the quality control procedures used by CTB to check the materials and verify the results.

Modified Bookmark Standard Setting Procedure

A modification of the Bookmark Standard Setting Procedure (MBSSP; Lewis, Mitzel, & Green, 1996) was necessary because of the recently-passed Missouri Senate Bill 1080, which “amends certain policies with regard to MAP testing by stating that, no later than June 30, 2006, the State Board of Education shall:

- 1) Align the performance standards of the MAP so that such indicators meet, but do not exceed, the performance standards of the National Assessment of Educational Progress (NAEP) exam; and
- 2) Administer any other adjustments necessary in order to aid the state in conforming to federal standards, including the institution of yearly examination of students in the required subject areas where compelled by federal regulations.” (Missouri National Education Association, 2004).

This bill was passed so that “Missouri schools are judged according to an appropriate national standard when determining Adequate Yearly Progress” (Missouri National Education Association, 2004) under the federal NCLB Act.

This law has been interpreted such that the *Proficient* achievement level will meet, but not exceed, the NAEP performance standards. In other words, the percent of students who attain *Proficient* on MAP should be similar to or slightly higher than the percent attaining *Proficient* on NAEP. The percentage of students in the other three achievement levels may be allowed to vary between NAEP and MAP.

The Missouri “TAC recommends that proficient be set to yield percent proficient or better at levels comparable to the national sample for NAEP” (Memorandum from Andrew Porter, July 7, 2004). Moreover, “these performance standards should be set such that the percent in each labeled [performance] group is fairly ‘smooth’ across grade levels” (Memorandum from Andrew Porter, July 7, 2004).

Bookmark Roles

CTB Staff

Karla Egan, Ph.D., is the CTB Research Scientist for the Missouri contract. Dr. Egan designed the ALS collaboratively with Michael Muenks and Andrea Wood, Ph.D., of DESE. Adele Brandstrom is a CTB Standard Setting Specialist who prepared the workshop materials, entered the results into a database, performed the data analyses, and tracked the secure materials during the workshop.

Anita Benson, the CTB Program Manager for the Missouri contract, attended the ALS and arranged the logistics for the workshop. Gabriel Martinez, the CTB Development Project Manager for the Missouri contract, attended the workshop and assisted the Group Leaders with facilitating the ALS activities in their breakout rooms.

Group Leaders

Group Leaders facilitated the ALS for those major portions in which participants were working. For each grade, the Group Leader served as a facilitator and was in charge of time management, focusing the participants on the task at hand, and interacting with the participants. The Group Leader also facilitated large-group discussions, was in charge of security and data management, collected the rating forms from participants, and communicated with CTB Research and DESE staff. The Group Leaders were content experts from CTB’s Development staff and did not vote. The Group Leaders are listed in Table 1.

Table 1. Group Leader for Each Grade

Grade	Group Leader
5	Kris Paulsen-Hands
8	Bevin Flaherty
11	Deedra Pell

Table Leaders

Each grade group had three tables and a Table Leaders for each table. Table Leaders were non-voting participants because they were Regional Facilitators for DESE. Their primary role was to monitor the group discourse, which included keeping their groups focused on the tasks, facilitating discussions, and helping maintain the schedule.

Participants

DESE invited approximately 15 participants per grade from across Missouri to recommend cut scores for MAP Science. Participants drew upon their expertise and insight to help recommend achievement standards and were full, voting members of their ALS grade groups. Table 2 shows the number of participants in each grade group.

Table 2. Number of Participants in Each Grade Group

Grade	Number of Participants
5	13
8	15
11	15
Total	43

Within each grade group, DESE divided participants into three tables that were balanced in terms of relevant demographic characteristics (e.g., geographic location, school size).

Participant Nomination/Selection Process

DESE sent nomination materials to the following groups:

- All district superintendents
- All Regional Professional Development Center Directors
- Professional educator organizations, including:
 - AFT Missouri
 - Gifted Association of Missouri
 - MCSA Outreach
 - Missouri Association for Supervision and Curriculum Development
 - Missouri Association of Colleges for Teacher Education
 - Missouri Association of Elementary School Principals
 - Missouri Association of Rural Education
 - Missouri Association of School Administrators
 - Missouri Association of School Business Officials
 - Missouri Association of Secondary School Principals
 - Missouri Community College Association
 - Missouri Council of Administrators of Special Education
 - Missouri Council of Career and Technical Administrators
 - Missouri K-8 Schools Association
 - Missouri Middle School Association
 - Missouri National Education Association
 - Missouri PTA
 - Missouri School Boards' Association
 - Missouri State Teachers Association
 - Missouri Unit Association of Teacher Educators
 - MPACT–Missouri Parents Act
 - Science Teachers of Missouri
 - Show-Me Curriculum Administrators Association
- A sampling of Chambers of Commerce throughout the state

In addition to the nomination forms, which allowed DESE to collect demographic data and information regarding experience of nominees, each of these groups also received guidelines for nominating classroom teachers, non-teacher educators (e.g., administrators, post-secondary educators, curriculum specialists), and non-school employees (e.g., business professionals). Section L contains the nomination forms and guidelines used by DESE to recruit participants.

From the pool of nominations, DESE curriculum and assessment staff selected 15 participants per grade range (elementary, middle, and high school) to participate in the ALS. At least 50 percent of each panel was composed of classroom teachers. The remaining participants were primarily non-teacher educators; however, each panel included at least two representatives from the business/professional community. Within each panel, DESE attempted to include representatives from rural, suburban, and urban school districts from each of the nine regions of the state. Across the panels, DESE also attempted, as much as possible given the pool of nominees, to include individuals with experience with English-language learners or special education. Although DESE collected demographic data for all nominees and attempted to create panels that reflected Missouri’s population, very few minority nominations were received. Of the minority participants selected, one declined to participate too late in the process to secure a replacement.

Participant Demographics

Following the ALS, participants completed evaluations from which self-reported demographic information has been summarized. Table 3 shows the gender of the participants in each grade group, and Table 4 shows their ethnicity. Table 5 shows the educational background of participants in each grade group, Table 6 shows their work experience, and Table 7 shows their work experience in years. Portions of the evaluation results are presented in this section. Section I contains the complete results of the participant evaluation of the Missouri ALS.

Prior to the ALS, DESE compiled demographic information from participants’ nomination forms. From these data, participants were categorized by rural, suburban, or urban setting. Table 8 shows the type of setting in which the participants either worked (in the case of teachers and administrators) or lived (in the case of non-educators). From the nomination forms, information was also collected regarding the types of teaching experience held by the educators. Table 9 shows the other types of teaching experience reported by the participants during the nomination process. It should be noted that the participants were also asked in the evaluation following the ALS whether they had experience teaching special education and English-language learners (ELL). No participant indicated experience with these two groups; however, the evaluation question specified experience within the last five years.

Table 3. Gender of Participants in Each Grade Group

Grade	N	Male	Female
5	13	30.8%	69.2%
8	15	40.0%	60.0%
11	15	40.0%	60.0%

Table 4. Ethnicity of Participants in Each Grade Group

Grade	N	Asian/Pacific Islander	African American	American Indian	Hispanic	White	Other
5	13	0.0%	0.0%	0.0%	0.0%	92.3%	7.7%
8	15	0.0%	0.0%	6.7%	0.0%	93.3%	0.0%
11	15	6.7%	13.3%	0.0%	0.0%	80.0%	0.0%

Table 5. Educational Background of Participants in Each Grade Group

Grade	N	High School	Bachelor's	Master's	Doctorate
5	13	7.7%	30.8%	53.8%	7.7%
8	15	0.0%	20.0%	73.3%	6.7%
11	15	0.0%	33.3%	60.0%	6.7%

Table 6. Work Experience of Participants in Each Grade Group

Grade	N	Teacher	Administrator	Other
5	13	61.5%	0.0%	38.5%
8	15	53.3%	13.3%	33.3%
11	15	53.3%	13.3%	33.3%

Table 7. Work Experience in Years of Participants in Each Grade Group

Grade	N	1-5 Years	6-10 Years	11-15 Years	16-20 Years	21+ Years
5	13	30.8%	7.7%	30.8%	7.7%	23.1%
8	15	13.3%	26.7%	6.7%	13.3%	40.0%
11	15	13.3%	13.3%	6.7%	6.7%	60.0%

Table 8. Geographic Area of Participants in Each Grade Group

Grade	N	Rural	Suburban	Urban
5	13	38.5%	46.2%	15.4%
8	15	26.7%	60.0%	13.3%
11	15	26.7%	46.7%	26.7%

Table 9. Number of Participants with Other Types of Teaching Experience in Each Grade Group

Grade	N	Gifted	English-language Learners	Special Education
5	13		1	
8	15	1		1
11	15			

Bookmark Materials

Security at the Workshop

Security was of paramount importance throughout the workshop. Participants received secure test materials based upon operational items. The secure materials were printed on colored paper. The secure test materials used during the workshop were numbered and assembled into packets. Each participant signed out a specific packet and signed his or her name on each piece of secure material in the packet. CTB staff monitored the breakout rooms to prevent the removal of secure materials. At the end of each day, each participant's materials were collected and audited. The secure materials were stored overnight in a secure room. At the conclusion of the workshop, the secure materials were collected, audited, and confirmed against the sign-out lists.

Ordered Item Booklets

Each ordered item booklet (OIB) comprised items from the Spring 2008 MAP in Science. Only items that mapped to the MAP Grade-level Expectations (GLEs) were included in the OIB. Table 10 shows the number of items in each grade that did not map to the MAP GLEs. These items were from the *TerraNova*® portion of the MAP (i.e., the norm-referenced test portion). Because these items did not contribute to the student criterion-referenced test scores, they were not included in the OIBs. The items and constructed-response points included in each OIB were ordered according to their scale locations using a response probability (RP) of 0.55 (RP55) after removing guessing. Table 11 lists the number of score points in each OIB by grade.

The choice of RP55 represents a deviation from the traditional implementation of the Bookmark Standard Setting Procedure, in which RP67 is used. The choice of the RP value may be thought of as a methodological one. The RP value affects the distribution of items in the OIB across the scale continuum. In the BSSP, it is important that items are well-distributed across the scale continuum. For the MAP tests, the use of RP55 resulted in the best distribution of items across the continuum for the grades in Science. The use of the traditional RP67 would have resulted in no items or few items distributed towards the low end of the scale for each grade.

Table 10. Number of Items that Did Not Map to the MAP GLEs by Grade

Grade	Number of Items
5	3
8	1
11	2

Table 11. Number of Score Points in Ordered Item Booklets by Grade

Grade	Number of Score Points in OIB
5	80
8	87
11	92

Item Maps

The item maps summarize the material in the OIBs. Figure 1 shows part of an item map. The item maps had nine columns: the first column indicated the item's order of difficulty, the second indicated the location, the third column indicated the session number, the fourth indicated the item number on the test, the fifth column specified the item type (MC for a multiple-choice item, CR for a constructed-response item), the sixth column showed the score key (correct response for an MC item and score points for a CR item), and the seventh column reported the MAP GLE that the item measured. Participants filled in the final two columns as they studied the items in the OIB. The first of these columns asks, "What does this item measure? That is, what do you know about a student who can respond successfully to this item/score point?" The second of these columns asks "Why is this item more difficult than the preceding items?"

To comply with Missouri law, the MAP performance standards must mirror the performance standards of NAEP, specifically *Proficient*. Thus, DESE established a range of possible *Proficient* cut points for each grade of Science. The range of preliminary *Proficient* cut points was printed directly on the item maps to provide guidance to the ALS participants. Participants were allowed to place their *Proficient* bookmark anywhere within the specified range.

The range of cut points was based on the percentage of students classified as *Proficient* or above on the NAEP and MAP tests. The same range of percentages was used for all grade/content areas. The percentages were translated to cut points by CTB. A description follows of the criteria used to define the ends of the range.

- The high end of the range (in terms of scale score points) was based on the NAEP results. This upper cut score was set for each grade/content area such that approximately 27% of students were at or above the cut score. This was the lowest percentage of students classified as *Proficient* or *Advanced* on the NAEP tests for Grades 4 and 8 Reading, Mathematics, and Science using both national and state data.
- The low end of the range (in terms of scale score points) was based on the current MAP results. The lower cut score was set for each grade/content area such that approximately 48% of students were at or above the cut score. This is the highest percentage of students classified as *Proficient* or *Advanced* on the MAP tests for Grades 3-8 and 10 Mathematics and/or Grades 3-8 and 11 Communication Arts. The Communication Arts and Mathematics test results were used as a starting point because this is the first year for the Science MAPs.

The range of cut points allowed participants to use some discretion in placing the cut scores, yet restricted the cut scores so they would be in compliance with the Missouri law. Cut point ranges were not provided for the *Basic* and *Advanced* cut scores.

Bars were used to indicate the *Proficient* cut point ranges on the item maps and were set to capture as many items as possible. Because items on the item map do not occur at every possible scale score location, the cut score necessary for the appropriate impact data sometimes fell between the bar and the next item on the item map. When this occurred, the cut point bars were placed to capture the maximum number of possible items on the item map. If the cut score necessary for the appropriate impact fell between the bar and the next item on the map, this cut score was used instead of the location associated with the next item on the map.

Figure 1. Part of an Item Map

Order of Difficulty	Location	Session	Item No.	Item Type	Score Key	GLE	What does this item measure? That is, what do you know about a student who can respond successfully to this item/score point?	Why is this item more difficult than the preceding items?
1	547	S1	2	CR	1 of 2	5.1.B.5a		
2	557	S2 P2	26	CR	1 of 2	2.2.D.4d		
3	579	S3 PE	6	CR	1 of 1	7.1.B.5e		
4	582	S2 P1	1	MC		7.1.B		

Day-by-day Activities
Achievement Level Setting: Afternoon of Day 1

Table Leader Training

Table Leaders were trained on the afternoon of the first day of the Missouri ALS. During the training session, which lasted about four hours, Table Leaders were given an overview of the reasons for ALS and were trained specifically on the BSSP. Table Leaders were given a synopsis of each day’s activities as well as their responsibilities each day. The master agenda is included in Section C, and the presentation handouts provided to the Table Leaders are included in Section D.

The Table Leaders then participated in a mock ALS using a sample OIB. The sample OIB is included in Section E. During the mock ALS, the Table Leaders practiced all activities that would occur in each round of the MBSSP. The Group Leaders acted as Table Leaders to demonstrate the type of behavior expected of Table Leaders. All training materials are included in Section E.

Draft Target Student Definitions

Following the mock ALS, the Table Leaders for each grade group drafted definitions of Target Students for the *Basic*, *Proficient*, and *Advanced* achievement levels. A Target Student is defined as a student whose performance is equivalent to the minimum score required for entry into a particular achievement level, for example, the “just” *Proficient* student. To create these definitions, Table Leaders were directed to use the NAEP policy definitions of performance in each achievement level, the NAEP achievement level descriptions (ALDs), and the Missouri GLEs, as well as their own expertise with the content area and student performance. The NAEP policy definitions and ALDs are included in Section J.

The NAEP policy definitions provide participants with a brief description of the general type of student in each achievement level. The NAEP policy definitions and ALDs provided a contextual reference for the NAEP cut scores. The NAEP ALDs were provided as guidance because Senate Bill 1080 specifies a link between the cut scores for MAP and NAEP. The Missouri GLEs delineate the knowledge, skills, and abilities expected of students at each grade. Table Leaders were directed to parse out what the students who just enter each achievement level (i.e., the Target Students) should know and be able to do.

By the end of the discussion, the Table Leaders had parsed out the knowledge, skills, and abilities that the Target Students in each achievement level should know and be able to do. Table Leaders were instructed that they would guide a discussion of the Target Student definitions with the participants at their tables the following day.

Achievement Level Setting: Day 2

Orientation

Staff from DESE and CTB welcomed the participants to the Missouri ALS. Michael Muenks, Coordinator of Curriculum and Assessment for DESE, welcomed participants and gave an introduction to the workshop's activities, explaining the role of participants in the ALS process. Mr. Muenks' presentation is included in Section D. Dr. Egan from CTB provided an overview of the ALS and introduced the BSSP to all participants. The participants were trained on the use of their OIBs and item maps. The item map training included an explanation of the *Proficient* cut point ranges and the rationale for these ranges, including an explanation of Senate Bill 1080. The presentation handouts provided to participants for the orientation are included in Section D.

Proceed to Breakout Rooms

Participants then moved into their breakout rooms. Each grade group was facilitated by a Group Leader and met in a separate room. Within each breakout room, participants were divided into three tables each having five to six participants. Each table was led by a Table Leader.

Each participant signed out their packet of secure materials and signed his or her name on each piece of secure material in the packet.

Take the Test

Participants spent approximately one hour taking the test for their respective grade.

Study Constructed-response Items

The Group Leader led an examination of the CR items, their scoring rubrics, and anchor papers. The purpose of this activity was to familiarize the participants with the materials associated with the CR items.

Discuss Target Student Definitions

Participants examined the NAEP policy definitions, NAEP ALDs, and Missouri GLEs. Using these materials, the Table Leaders led discussions within their tables of the knowledge, skills, and abilities expected of the Target Students for the *Basic*, *Proficient*, and *Advanced* achievement levels. During the table-level discussion, Table Leaders were instructed to lead their tables through a study of the Missouri GLEs and a discussion of the skills of the Target Students. The Table Leaders were directed to note any changes participants wanted to make to the Target Student definitions. After all tables had their initial table-level discussion, the Group Leader asked the Table Leaders for any changes their tables had discussed. A group-level discussion was then held about any changes suggested during the table-level conversations.

By the end of the discussion, each grade group had studied the Missouri GLEs, understood the type of student for whom each cut score was being set, and reached a common understanding of the types of skill that each Target Student should have. Table 12 shows the percentage of participants who agreed or disagreed that reviewing the Target Student definitions helped in placing bookmarks. In Grades 8 and 11, the majority of participants indicated they believed the Target Student discussion was useful when placing their bookmarks. In Grade 5, only half of the participants agreed that the Target Student review was a useful activity.

Table 12. Participants’ Agreement/Disagreement with the Statement, “Reviewing the Target Students helped me place my bookmarks.”

Grade	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5	12	0.0%	25.0%	25.0%	50.0%	0.0%
8	15	0.0%	6.7%	13.3%	53.3%	26.7%
11	15	0.0%	0.0%	20.0%	66.7%	13.3%

Begin Study of Items in the Ordered Item Booklets

Participants at each table began an examination of the items in the OIBs in terms of what each item measured and why it was more difficult than the items preceding it. Participants took notes on their item maps.

Achievement Level Setting: Day 3

Complete Study of Items in the Ordered Item Booklets

Participants at each table completed the examination of the items in the OIBs in terms of what each item measured and why it was more difficult than the items preceding it. Participants took notes on their item maps.

Bookmark Training

Before making their Round 1 ratings, Dr. Egan from CTB provided participants with training for making bookmark ratings. Participants were given training materials and three explanations of bookmark placement. The training materials titled “Bookmark Placement” and “Frequently Asked Questions about Bookmark Placement” were read aloud. The first explanation of bookmark placement demonstrated the mechanics: participants were instructed that all items preceding the bookmark define the knowledge, skills, and abilities that a “just” *Proficient* student, for example, is expected to know. The second explanation of bookmark placement was more conceptual in that participants were instructed to examine each item in terms of its content and to make a judgment about the type of content that a student would need to know in order to be considered “just” *Proficient*. The final explanation discussed the relationship between bookmarks and scale scores. The presentation handouts provided to participants for bookmark training are included in Section D, and the bookmark training materials are included in Section E.

Participants were reminded about the *Proficient* cut score ranges selected by DESE. Staff members from DESE recapitulated the rationale for this range as well as Senate Bill 1080.

The participants were tested on their understanding of bookmark placement with a short check set. The check set questions and results are presented in Table 13 and Table 14, respectively. Participants were given the correct answers for the check set questions, as well as explanations of the answers. Table 14, unlike the other tables in this section, includes results from some of the Table Leaders as well as the participants. Because CTB does not require names on the check sets, we could not discern which belonged to participants and which belonged to Table Leaders, so all are included in the results. The check set and its graphic are included in Section E.

Table 13. Questions in the Check Set that Followed Bookmark Training

	Question
1.	Which items does a student need to master to just make it into the <i>Proficient</i> achievement level?
2.	If a student mastered only items 1 through 5, in which achievement level would this student be?
3.	Suppose a student mastered items 1 through 9. Which achievement level is this student in?
4.	For students who are classified as <i>Proficient</i> , with at least what likelihood will they be able to answer item 8?
5.	Will the items BEFORE the <i>Proficient</i> bookmark be more or less difficult to answer than the items AFTER the bookmark or about the same?

Table 14. Results of the Check Set, Percent Correct by Grade Group

Grade	N	Question 1	Question 2	Question 3	Question 4	Question 5
5	17	94.1%	100%	88.2%	82.4%	100%
8	17	94.1%	94.1%	100%	88.2%	100%
11	18	94.4%	100%	94.4%	100%	94.4%

Effectiveness of Training

An indication of the effectiveness of training may be found in the participants' answers to statements and questions on the evaluations, which were completed following the ALS. Portions of the evaluation results are presented in this section. The evaluation and complete results are included in Section I. Table 15 shows the percentage of participants who agreed or disagreed that they understood how to place a bookmark. Almost all participants agreed or strongly agreed that they understood how to place their bookmarks. Table 16 summarizes the percentage of participants who agreed or disagreed that bookmark training made the task of bookmark placement clear. All participants agreed or strongly agreed that the task of bookmark placement was clear. Table 17 summarizes the percentage of participants who agreed or disagreed that the training materials were helpful. Almost all participants agreed or strongly agreed that the training materials were helpful. Table 18 shows the percentage of participants who agreed or disagreed that the Bookmark Procedure was described well. All participants agreed or strongly agreed that the Bookmark Procedure was well described. The percentage of participants who agreed or disagreed that the goals of the Bookmark Procedure were clear is summarized in Table 19. Almost all participants agreed or strongly agreed that the goals were clear.

Table 15. Participants' Agreement/Disagreement with the Statement, “I understood how to place my bookmarks.”

Grade	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5	12	0.0%	8.3%	0.0%	50.0%	41.7%
8	15	0.0%	0.0%	0.0%	6.7%	93.3%
11	15	0.0%	0.0%	0.0%	53.3%	46.7%

Table 16. Participants' Agreement/Disagreement with the Statement, “The training on Bookmark placement made the task clear to me.”

Grade	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5	13	0.0%	0.0%	0.0%	46.2%	53.8%
8	15	0.0%	0.0%	0.0%	46.7%	53.3%
11	15	0.0%	0.0%	0.0%	60.0%	40.0%

Table 17. Participants' Agreement/Disagreement with the Statement, “The training materials were helpful.”

Grade	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5	13	0.0%	0.0%	7.7%	38.5%	53.8%
8	15	0.0%	0.0%	0.0%	33.3%	66.7%
11	15	0.0%	0.0%	6.7%	60.0%	33.3%

Table 18. Participants' Agreement/Disagreement with the Statement, “The Bookmark Standard Setting Procedure was well described.”

Grade	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5	13	0.0%	0.0%	0.0%	38.5%	61.5%
8	15	0.0%	0.0%	0.0%	26.7%	73.3%
11	15	0.0%	0.0%	0.0%	53.3%	46.7%

Table 19. Participants' Agreement/Disagreement with the Statement, “The goals for this procedure were clear.”

Grade	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5	13	0.0%	7.7%	7.7%	38.5%	46.2%
8	15	0.0%	0.0%	0.0%	46.7%	53.3%
11	15	0.0%	6.7%	0.0%	46.7%	46.7%

Round 1

Once participants demonstrated that they understood bookmark placement, they placed their Round 1 bookmarks for *Basic*, *Proficient*, and *Advanced*, while keeping in mind their Target Student definitions and the Missouri GLEs. Participants were instructed that bookmark placement was always an individual activity.

During data entry, the *Proficient* bookmarks were checked to ensure that they were placed within the specified range. If a bookmark was placed outside the range, the participant was asked to re-set the bookmark so it was within the specified range.

Round 2

At the beginning of Round 2, Dr. Egan from CTB and Michael Muenks from DESE presented participants with impact data for their Round 1 bookmarks. Table 20 summarizes the impact data by grade. The participants were only shown the Round 1 results for their own grade group at the beginning of Round 2. The participants were advised that the impact data were based upon the calibration sample for the Spring 2008 tests, which comprised approximately 80% of the population. Impact data are the percentage of students who would be classified in each achievement level based on the median bookmarks. Dr. Egan answered process-related questions, and Mr. Muenks answered all policy-related questions concerning the impact data. It was emphasized to the participants that the impact data were being presented as a “reality check.”

Table 20. Participant-recommended Cut Scores and Associated Impact Data Based on Round 1

Grade	Cut Score			Impact Data				
	<i>Basic</i>	<i>Proficient</i>	<i>Advanced</i>	<i>Below Basic</i>	<i>Basic</i>	<i>Proficient</i>	<i>Advanced</i>	<i>Proficient & above</i>
5	605	669	691	4.4%	51.2%	28.4%	16.0%	44.4%
8	675	706	737	22.8%	38.1%	33.6%	5.5%	39.1%
11	710	731	771	32.1%	22.6%	36.8%	8.5%	45.3%

Following the presentation of data, Table Leaders facilitated discussions of the bookmark placements at their tables. For each achievement level, participants were instructed to discuss those items for which there was disagreement within the table; thus, they discussed the items between the lowest and highest bookmarks. Participants were also told that they could discuss items outside of the range of their current bookmarks. After this discussion, participants again placed their bookmarks. Participants were reminded that bookmark placement was always an individual activity.

During data entry, the *Proficient* bookmarks were checked to ensure that they were placed within the specified range. If a bookmark was placed outside the range, the participant was asked to re-set the bookmark so it was within the specified range.

Achievement Level Setting: Day 4

Round 3

At the beginning of Day 4, participants were convened as a large, cross-grade group. Dr. Egan and Mr. Muenks presented participants with cross-grade cut scores and impact data based on their Round 2 bookmark placements, similar to the presentations after Round 1. Table 21 summarizes the cut scores and associated impact data based on Round 2. Participants were reminded that CTB would answer any process-related questions and DESE would answer policy-related questions.

Table 21. Participant-recommended Cut Scores and Associated Impact Data Based on Round 2

Grade	Cut Score			Impact Data				
	Basic	Proficient	Advanced	Below Basic	Basic	Proficient	Advanced	Proficient & above
5	622	669	691	9.5%	46.0%	28.4%	16.0%	44.4%
8	671	703	735	19.5%	37.1%	36.8%	6.6%	43.4%
11	703	729	764	26.1%	26.4%	35.0%	12.5%	47.6%

Participants returned to their breakout rooms. Within each grade group, the Group Leader facilitated a large-group discussion among the participants about their bookmark placements. After discussion, participants again placed bookmarks. Participants were reminded that bookmark placement was always an individual activity.

During data entry, the *Proficient* bookmarks were checked to ensure that they were placed within the specified range. If a bookmark was placed outside the range, the participant was asked to re-set the bookmark so it was within the specified range.

Round 3 Results

Participants were shown their final median bookmarks and associated impact data. Table 22 shows the final participant-recommended cut scores and associated impact data.

Section F contains round-by-round reports of the participant bookmark placements. Section G contains standard error tables based on the participants' final round bookmark placements. Standard errors are reported for one, two, and three standard errors of the cut scores, the standard error of measurement of the tests, and the combination thereof. Section H presents graphs of the participants' bookmark placements for the three rounds.

Table 22. Final Participant-recommended Cut Scores and Associated Impact Data

Grade	Cut Score			Impact Data				
	Basic	Proficient	Advanced	Below Basic	Basic	Proficient	Advanced	Proficient & above
5	626	669	692	11.5%	44.1%	29.4%	15.0%	44.4%
8	671	703	735	19.5%	37.1%	36.8%	6.6%	43.4%
11	702	729	770	25.4%	27.1%	38.5%	9.0%	47.6%

Evaluation of the Missouri Achievement Level Setting

Following the presentation of final results, participants were asked to complete an evaluation of the Missouri ALS. The evaluation and complete results are included in Section I. Portions of the evaluation results are presented in this section.

Participants were generally pleased with their final bookmark placements. Table 23 shows each grade group's satisfaction with its final bookmarks. As shown in Table 23, the majority of participants in all grades indicated satisfaction with their group's final bookmarks. Furthermore, participants indicated that they perceived the Bookmark Procedure to be a valid and fair process. Table 24 shows each group's perception of the fairness of the ALS procedure. As shown in Table 24, the majority of participants in all grade groups indicated that they believed the procedure was fair. Table 25 shows each group's confidence that the Bookmark Procedure produced valid standards. As shown in Table 25, the majority of participants in all grade levels indicated confidence that the Bookmark Procedure produced valid standards

Table 23. Participants' Agreement/Disagreement with the Statement, "Overall, I was satisfied with my group's final bookmarks."

Grade	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5	13	0.0%	7.7%	0.0%	84.6%	7.7%
8	15	0.0%	0.0%	0.0%	46.7%	53.3%
11	15	0.0%	6.7%	6.7%	60.0%	26.7%

Table 24. Participants' Agreement/Disagreement with the Statement, "I felt that this procedure was fair."

Grade	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5	13	0.0%	0.0%	15.4%	69.2%	15.4%
8	15	0.0%	0.0%	0.0%	40.0%	60.0%
11	15	0.0%	6.7%	13.3%	40.0%	40.0%

Table 25. Participants' Agreement/Disagreement with the Statement, "I am confident that the Bookmark Procedure produced valid standards."

Grade	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
5	12	0.0%	0.0%	25.0%	66.7%	8.3%
8	15	0.0%	0.0%	0.0%	53.3%	46.7%
11	15	0.0%	13.3%	26.7%	33.3%	26.7%

Descriptor Writing

Throughout the Bookmark Standard Setting Procedure, participants discussed and defined the Target Students. The Target Student definitions drafted by Table Leaders and reviewed and discussed by all participants in a grade group were based only on participant expertise and the Missouri GLEs. Throughout the BSSP, participants gained new knowledge and insights that helped them refine their Target Student definitions. For example, when participants' studied the OIBs, they actively discussed the skills of the Target Students. During this time, they may have discovered that a particular skill was more difficult for students than they originally thought, or they may have found the opposite to be true. They further refined their Target Student definitions when they placed and discussed their bookmarks and when they saw impact data. The descriptor writing portion of the ALS workshop represents the culmination of the discussions about Target Students.

In descriptor writing, participants create draft descriptors based on their final recommended cut scores. The knowledge, skills, and abilities of the Target Students are described from the content of the items. Unlike the original Target Student definitions that participants discussed at the beginning of the workshop, these descriptors reflect student performance and participant input on what it means to be classified in each achievement level.

Orientation to Descriptor Writing

Group Leaders trained all their participants on the steps to follow to draft achievement level descriptors. The training materials for descriptor writing given to participants are included in Section K.

Following the ALS, when the final cut scores were approved by DESE, the CTB Group Leaders made any necessary adjustments to the achievement level descriptors to reflect the final cut scores. The descriptors were also edited for consistency in format and wording across the grades. From these long descriptors, short descriptors were created. The short descriptors will be printed on student score reports to provide parents with an explanation of the types of skills their children possess. The final descriptors are included in Section K.

Vertical Articulation Panel

Following the orientation to descriptor writing, the Table Leaders were convened to discuss the vertical articulation of the data. The purpose was to recommend a system of cut scores that was well-articulated and, at the same time, considerate of the participants' final recommendations.

Dr. Egan from CTB facilitated this discussion. To begin the discussion, the Table Leaders were shown the cross-grade results based on the final participant recommendations. The Table Leaders were asked whether the impact data were consistent with the expected progression of the average student across years.

The Table Leaders indicated that they were generally satisfied with the results and the process. They elected not to change the participant recommendations.

Evidence of Internal Validity

Evidence that supports internal validity examines the consistency of the achievement level setting results, “in particular the consistency of the participants in translating the performance standard into a cutscore” (Kane, 2001, p. 73). This is particularly important because it allows us “to evaluate the claim that the cutscore reflects the performance standard” (Kane, 2001, p.70). In this section, we examine three sources of evidence of internal validity (Hambleton & Pitoniak, 2006): (1) within-method consistency; (2) intrapanelist consistency; and (3) interpanelist consistency.

Within-method Consistency

This evidence examines what happens when the ALS method is replicated across groups, which is indicated by the standard error of the cut score (SE_{cut}). Calculation of the SE_{cut} is described in Section G. Table 26 summarizes the SE_{cut} for each grade and achievement level. Table 26 shows that the resulting standard errors are relatively small, indicating that the groups of panelists were relatively consistent in their recommendations.

Table 26. Standard Errors of Cut Scores at each Achievement Level

Grade	<i>Basic</i>	<i>Proficient</i>	<i>Advanced</i>
5	3.84	1.02	1.76
8	2.56	2.58	5.30
11	5.19	1.62	6.64

Intrapanelist Consistency

This type of consistency examines the judgments made by the panelist across rounds. It is expected that participants will adjust their recommendations across the rounds as new information is introduced. For example, participants engage in small-group discussions in Round 2 that may influence their decision-making process and thus their cut score recommendations. If panelists did not adjust their recommendations across rounds, then this might indicate that the ALS process was not understood by participants or that the participants were not fully engaged in the ALS process.

The graphics presented in Section H track participants’ judgments across rounds. As an example, Figure 2 shows each Grade 5 participant’s recommendation for the *Advanced* cut score tracked across rounds. From Figure 2, we can observe more variability in participants’ recommendations in Round 1 than in Round 3. From Figure 2, we can see that panelists adjusted their recommendations across the rounds. Figure 2 indicates less variability between Rounds 2 and 3 than between Rounds 1 and 2. This suggests that participants were comfortable with their Round 2 decisions and that the new information (cross-grade impact data and large-group discussions) introduced in Round 3 did not sway their opinions.

Because participants were restricted in the recommendations they could make for the *Proficient* cut score, we expected that there would not be much movement for these cuts. The graphics in Section H show that participants did not make large adjustments in their cuts across rounds.

They do show that some participants adjusted their cuts, which indicates that they were influenced by new information introduced in the process. Although the graphics in Section H for Grade 11 show the least amount of consensus across the group, they also show that participants adjusted their recommendations across the rounds.

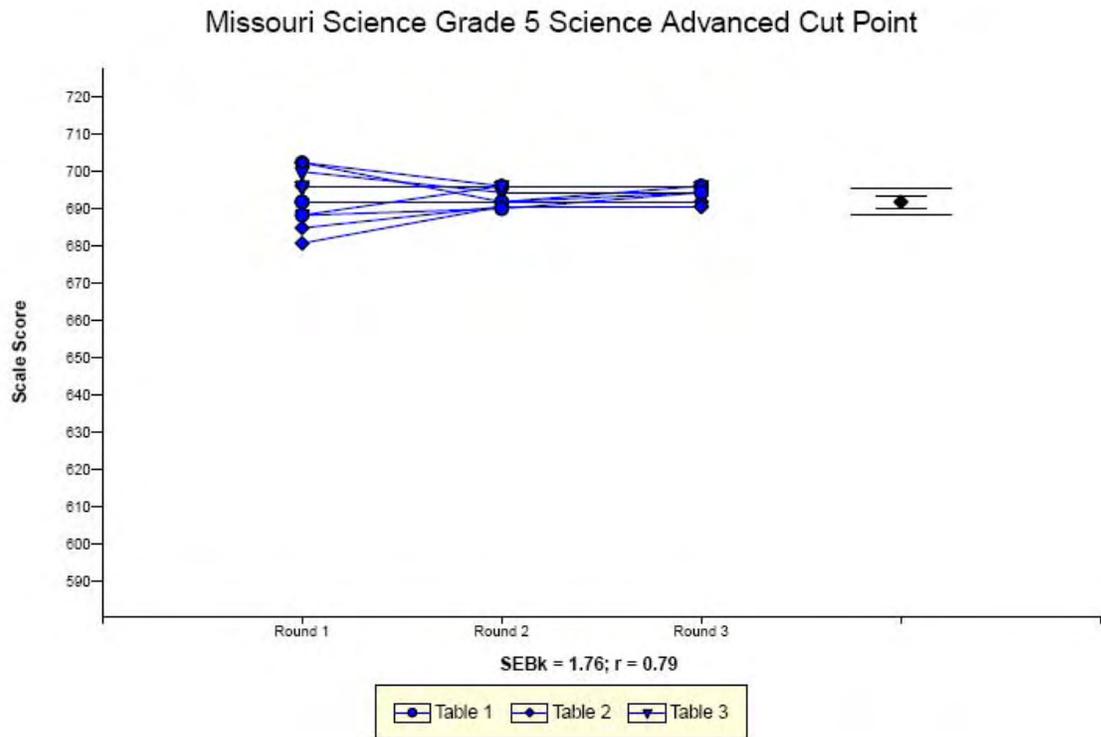


Figure 2. Cross-round Graphic of Participant Cut Scores

Interpanelist Consistency

This evidence examines the consistency of judgments across panelists. CTB routinely examines the interpanelist consistency when implementing Bookmark. The BSSP is a consensus-building activity, in which participants are expected to engage in structured dialogues about their expectations of student performance. Although panelists are never asked to come to perfect agreement, they are asked to be open-minded about the opinions of their colleagues. It is expected that bookmark placement will converge across rounds, and the graphics in Section H support this. As discussed previously, the Grade 11 participants came to the least consensus.

To further investigate the degree of interpanelist consistency, CTB computed the standard deviation of the bookmark following each round of voting. In other words, the standard deviation was calculated using the page numbers of the bookmark placements rather than the cut scores associated with the bookmark placements. If the bookmark placements converge across rounds, then we expect the size of the standard deviation to decrease across rounds. Table 27 shows the standard deviations by round and grade for all three Bookmark placements. For both Grades 5 and 8, the size of the standard deviation decreases across the rounds. In Grade 11, the

standard deviation of the bookmark decreases from Round 1 to Round 2 and is consistent between Round 2 and Round 3. The results in Table 27 provide further evidence that participants were building consensus across the rounds.

Table 27. Standard Deviations of Bookmark Placements by Round

Grade	Round	<i>Basic</i>	<i>Proficient</i>	<i>Advanced</i>
5	1	3.71	1.01	5.67
	2	2.14	0.69	1.85
	3	1.91	0.55	1.61
8	1	5.91	3.42	9.14
	2	1.55	2.05	5.29
	3	1.22	1.75	2.58
11	1	5.63	6.11	9.30
	2	4.31	2.75	7.32
	3	4.17	2.79	7.34

Quality Control Procedures

The CTB Standard Setting Team adheres to many quality control procedures to foster the accuracy of the materials used and the results presented during the ALS. Prior to the workshop, the CTB Standard Setting Team cross-checked the ordering of items in the ordered item booklets, the accuracy of the information in the item maps, and the accuracy of the Microsoft Excel macros and Bookmark Pro software used to generate results and impact data. During the workshop, all data were scanned. Any results that appear to be questionable are further investigated in consultation with CTB Research staff.

References

Hambleton, R. K., & Pitoniak, M. J. (2006). Setting performance standards. In R. L. Brennan (Ed.), *Educational measurement* (4th ed., pp. 433–470). Westport, CT: American Council on Education/Praeger.

Kane, M. (2001). So much remains the same: Conception and status of validation in setting standards. In G. J. Cizek (Ed.), *Setting performance standards: Concepts, methods, and perspectives* (pp. 53–88). Mahwah, NJ: Lawrence Erlbaum.

Lewis, D.M., Mitzel, H.C., & Green, D.R. (1996). Standard Setting: A bookmark approach. In D.R. Green (Chair), *IRT-based standard-setting procedures utilizing behavioral anchoring*. Symposium conducted at the Council of Chief State School Officers National Conference on Large-Scale Assessment, Phoenix, AZ.

Missouri National Education Association. (2004, April). *Legislative Update 2004*. Retrieved July 18, 2005, from <http://www.mnea.org/publications/legislative/lu04-Apr23.htm>

Missouri National Education Association. (2004). *2004 MNEA Bills of Interest*. Retrieved July 18, 2005, from <http://www.mnea.org/capitol/BillSummSenate.htm>

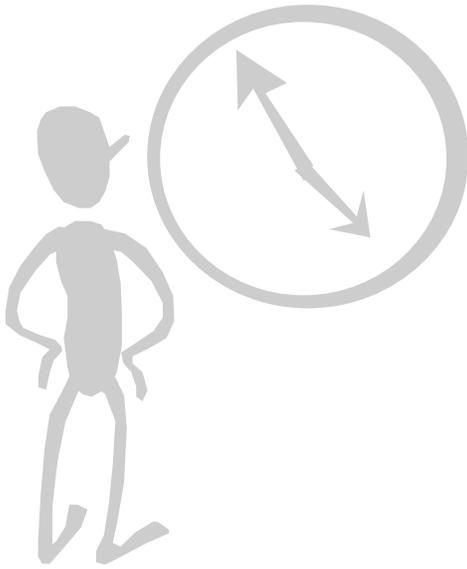
Porter, A. (July 7, 2004). *Memorandum: Advice to DESE based on meeting of June 18, 2004*.

Section C
Master Agenda

Master Agenda

**Missouri Assessment Program
Grades 5, 8, and 11 Science**

Bookmark Standard Setting Workshop



Welcome to the Bookmark Standard Setting Workshop for the Missouri Assessment Program for Grades 5, 8, and 11 Science!

The Missouri Department of Elementary and Secondary Education and CTB/McGraw-Hill would like to thank you for your time and expertise during this important process.

Please use this agenda to orient yourself during the workshop. If you have any questions or concerns, please do not hesitate to contact a member of the CTB Standard Setting Team.

Tuesday, July 15
Welcome!

- 11:45 AM** **Table Leader Registration**
Table Leaders register at the reception table, sign a non-disclosure agreement, and collect nametags and other information.
- 12:00 PM** **Lunch**
Table Leaders will have lunch with the DESE and CTB Staff.
- 1:00 PM** **Table Leader Training**
You will receive an overview of the standard setting workshop, learn how the Bookmark Standard Setting Procedure works, and discuss your role and responsibilities during the workshop.
- 3:30 PM** **Target Student Discussion**
Table Leaders will discuss the NAEP achievement level descriptions for Grades 4, 8, and 12. Following this, Table Leaders will engage in structured discussions about the knowledge, skills, and abilities they expect to be demonstrated by students in Grades 5, 8, and 11 in each achievement level. Table Leaders will draft Target Student descriptors for each achievement level in Grades 5, 8, and 11.
- 5:00 PM** **Dismissal**

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A 15-minute break is scheduled for the morning and afternoon each day.

- 7:30 AM Registration and Continental Breakfast**
Participants register at the reception table, sign a non-disclosure agreement, and collect nametags and other information. Table Leaders need not register again. Continental breakfast is served.
- 8:30 AM Opening Session**
All participants are formally welcomed and receive an overview of the standard setting workshop. Participants will be introduced to the Bookmark Standard Setting Procedure.
- 10:15 AM Dismissal to Pre-assigned Breakout Rooms**
The Group Leader welcomes participants and distributes secure materials.
- Table Leaders, ensure that all participants at your table write their name on each piece of their secure materials. Secure materials are printed on colored paper.
- 10:30 AM Take the Operational Test**
Participants take the test under conditions similar to those experienced by students.
- Although some discussion about individual test items is normal, focus your participants away from prolonged debate and toward taking the test.
 - Participants use provided index cards to record comments about test items.
- 12:00 PM Lunch**
The groups stop work for a one-hour lunch.
- 1:00 PM Overview Materials for the Constructed-Response Items**
- The Table Leader leads an examination of each constructed-response item, its scoring rubric, and anchor papers.
- 2:00 PM Target Student Discussion**
- Participants will study the NAEP achievement level descriptions for Grades 4, 8, and 12 and the Target Student descriptors for Grades 5, 8, and 11 that were drafted by the Table Leaders.
- 3:30 PM Begin Discussion of Each Item in the Ordered Item Booklet (OIB)**
The Group Leader introduces this exercise by instructing participants to find the Item Map in their secure materials, then reviewing the purpose of each column.
- Facilitate a discussion among everyone at your table about each of the items in the OIB. Discuss each item in turn, focusing on what each item measures and what makes it harder than the previous items. All participants record these details on their Item Maps.
 - Assign a scribe to take a master set of notes for your table.
 - Remember to use the index cards, as necessary.
 - Ensure that each participant at your table has a chance to speak.

4:45 PM Secure Materials Collection

The Group Leader facilitates collection of the secure materials from all participants. A listing of secure materials to be collected is displayed in the room.

- Table Leaders, supervise the collection of secure materials at your tables. See the “Secure Materials” page in this agenda for more information.

5:00 PM Participant Dismissal

5:00 PM Secure Materials Audit

The Group Leader asks the Table Leaders to audit the secure materials at one other table.

- Order materials numerically by packet number within each table.
- Verify that each packet of secure materials is present.
- Stack materials at each table neatly into one pile with the table tent on top, under the top packet’s rubber band.
- Place the separate stacks on one table. Do not combine the tables’ stacks.

5:15 PM Table Leader Debriefing

Table Leaders discuss the events of the day and plans for the next day.

5:30 PM Table Leader Dismissal

7:30 AM Continental Breakfast

8:30 AM Continue Discussion of Each Item in the Ordered Item Booklet (OIB)

Continue the discussion of each of the items in the OIB.

- Remember to use the index cards, as necessary.
- Table Leaders, ensure that each participant at your table has a chance to speak.

10:30 AM Orientation to Bookmark Placement and Round 1 ratings

A member of the CTB Standard Setting Team introduces bookmark placement, explaining how bookmarks are placed and what bookmarks mean. After this brief presentation, a short check set is given, followed immediately by Round 1 bookmark placement.

- See the handouts “Bookmark Placement” and “Frequently Asked Questions about Bookmark Placement” for more info.
- Remind participants that bookmark placement is always an individual activity.
- Collect your participants’ rating forms as they complete them, ensuring that each participant has made a single, unambiguous rating for each bookmark.
- Fill out an orange form with each participant’s bookmarks.
- Give your participants’ completed rating forms to the Group Leader.

12:00 PM Lunch

The groups stop work for a one-hour lunch.

1:00 PM Round 2 Discussion

Round 1 results will be presented within each content area. Table Leaders, lead a discussion surrounding the ratings made at your table.

2:00 PM Round 2 Ratings

After discussion, begin Round 2 bookmark placement.

- Remind participants that bookmark placement is always an individual activity.
- Collect your participants’ Rating Forms as they complete them.
- You do *not* need to fill out an orange form.
- Give your participants’ completed rating forms to the Group Leader.

3:00 PM Round 3 Discussion

Cross-grade Round 2 results will be presented within each grade level. CTB and DESE staff will facilitate a discussion of the cross-grade results.

4:15 PM Round 3 Ratings

The Group Leader directs all participants to place their Round 3 bookmarks.

- Remind participants that bookmark placement is always an individual activity.
- Collect your participants’ rating forms as they complete them.
- Give your participants’ completed rating forms to the Group Leader.

4:45 PM Secure Materials Collection

The Group Leader facilitates collection of the secure materials from all participants. A listing of secure materials to be collected is displayed in the room.

- Table Leaders, supervise the collection of secure materials at your tables. See the “Secure Materials” page in this agenda for more information.

5:00 PM Participant Dismissal

5:00 PM Secure Materials Audit

The Group Leader asks the Table Leaders to audit the secure materials at one other table.

- Order materials numerically by packet number within each table.
- Verify that each packet of secure materials is present.
- Stack materials at each table neatly into one pile with the table tent on top, under the top packet’s rubber band.
- Place the separate stacks on one table. Do not combine the tables’ stacks.

5:15 PM Table Leader Debriefing

Table Leaders discuss the events of the day and plans for the next day.

5:30 PM Table Leader Dismissal

7:30 AM Continental Breakfast

8:30 AM Presentation of Final Recommendations

A member of the CTB Standard Setting Team presents the group with a summary of the Round 3 results. Table Leaders will collect their participants' comments about the results to take to the cross-grade discussion for Table Leaders.

9:30 AM Evaluations

Each participant completes an evaluation of the standard setting.

9:45 AM Orientation to Descriptor Writing

A member of CTB Content Development leads an orientation to descriptor writing.

10:30 AM Vertical Articulation Panel for TABLE LEADERS ONLY

Table Leaders from all grade levels will gather together to discuss their groups' bookmarks and impact data. During these discussions, Table Leaders will discuss the knowledge, skills, and abilities they expect of students in each achievement level.

- As a group, the Table Leaders will examine the bookmarks and impact data as a multi-grade system of performance standards. If needed, Table Leaders may make recommendations to adjust some bookmarks.
 - When the cross-grade discussion is complete, Table Leaders return to their groups and join the descriptor writing.
-

10:30 AM Achievement Level Descriptors, First Draft

The Group Leader presents instructions for writing a first draft of the long achievement level descriptors.

- Your group's descriptors synthesize the knowledge, skills, and abilities needed to respond successfully to each item in each achievement level.
- You will receive a listing of the items in the achievement levels.

12:00 PM Lunch

The groups stop work for a one-hour lunch.

1:00 PM Finalize Achievement Level Descriptors

- Discuss the first draft of the achievement level descriptors as a group
- Comment on the draft descriptors written at other tables
- Revise the draft achievement level descriptors incorporating the comments

4:45 PM Secure Materials Collection

4:50 PM Secure Materials Audit

5:00 PM Dismissal

A 15-minute break is scheduled for the morning and afternoon each day.

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Why do we do Secure Materials Collection?

A thorough collection of secure test materials protects both the reliability of the testing program and the substantial monetary investment in the assessment. A structured method of collection has been established to gather effectively all of the secure material at the workshop. Each day as you facilitate secure materials collection at your table, refer to this guide for instructions and suggestions.

During the collection, participants should place each secure item, one at a time, in a pile on the table in front of them. After the process, each participant will have a single stack of materials, each stacked in the same way as everyone else in the room. Please follow these steps to facilitate the process.

How do I conduct Secure Materials Collection?

1. Get the attention of all the participants at your table. Discourage any side conversations or inattention.
2. Using the list provided, call out each item, one at a time, and watch participants place that item in their stack. Discourage participants from moving ahead. Ensure that participants have placed the item in their stack before moving on.
3. Proceed through the list until each piece of secure material has been collected. Direct participants to place a rubber band around their stack when completed.
4. If any participants wish to leave additional items with their materials overnight, encourage them to place them beneath their stack, inside the rubber band.
5. Table Leaders will audit the secure materials at one other table.
6. Once you have supervised the collection of secure materials and are satisfied that all items have been collected, inform the Group Leader.
7. The collected materials will be stored overnight and available in the morning.

What should I expect from Secure Materials Collection?

Generally, secure materials collection goes smoothly. If you have any questions about the collection process, or if you have a concern about test security at the standard setting workshop, please contact your Group Leader or a member of the CTB Standard Setting Team.

Section D

Training Overheads

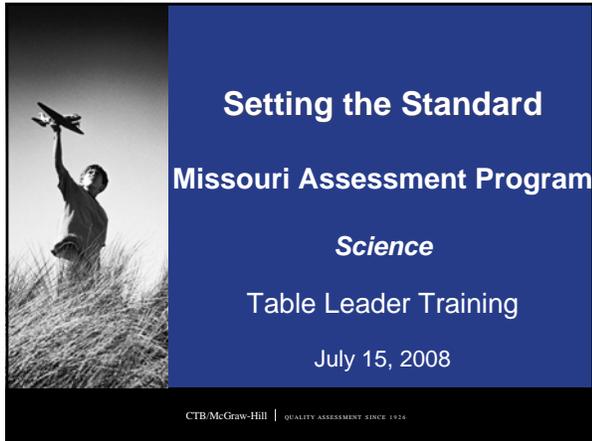
Table Leader Training

Opening Session

Bookmark Training

DESE Training

Table Leader Training



Setting the Standard
Missouri Assessment Program
Science
Table Leader Training
July 15, 2008

CTB/McGraw-Hill | QUALITY ASSESSMENT SINCE 1924

CTB Standard Setting Team

- Karla Egan
- Adele Brandstrom
- Anita Benson
- Gabe Martinez
- Kris Paulsen-Hands
- Bevin Flaherty
- Deedra Pell

CTB McGraw-Hill

Table Leader Training

- Overview standard setting
- Discuss committee roles
- Overview the Bookmark Procedure
 - Explain key features of the Bookmark Procedure
 - Overview the agenda
 - Participate in a mock Bookmark
- Discuss Target Students
- Overview the Vertical Articulation Panel
- Review grade-specific Bookmark materials

CTB McGraw-Hill

Table Leader Training

Standard Setting Overview

- *What is standard setting?*
 - A process that lets experts make judgments about the content that the *Proficient* student should know and be able to do.
 - Also, *Advanced*, *Basic*, and *Below Basic* students.

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Standard Setting Overview

- *Why do standard setting?*
 - The Missouri Grade-Level Expectations define what students are tested on.
 - These are things students *should* be able to do.
 - Missouri has established GLEs for grades 5, 8, and 11 in Science.
 - Achievement standards define what students *can do* in each achievement level.
 - You will actively discuss your expectations of the Target Student in each achievement level.

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Standard Setting Overview

- *Achievement Levels*
 - Specify the knowledge, skills, and abilities a student needs to know in order to be classified as *Below Basic*, *Basic*, *Proficient* and *Advanced*.

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Standard Setting Overview

- How do we set our standards?
 - ~~Percentages~~
 - Arbitrary
 - Test-specific
 - Do not consider content
 - Content
 - Uses pre-established Grade-Level Expectations
 - Considers educational objectives
 - Bookmark Standard Setting Procedure

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Standard Setting Overview

- Purpose of the Standard Setting
 - Allows cut scores to be set on the test scale
 - The test scale represents the ability of students

300 800

Below Basic Students Basic Students Proficient Students Advanced Students

Basic Cut Score Proficient Cut Score Advanced Cut Score

CTB McGraw-Hill

Standard Setting Overview

- Purpose of the standard setting
 - You will set a cut score on the test scale.
 - Students who meet or exceed the cut score will have enough knowledge, skills, and abilities to be classified in a given achievement level on the MAP Science tests.
 - Decisions will be based on the Missouri Grade-Level Expectations.

CTB McGraw-Hill

Table Leader Training

Committee Roles

- Group Leaders
- Table Leaders
- Participants
- DESE
- CTB

Standard Setting Committee



CTB McGraw-Hill

Committee Roles

- Group Leader
 - Facilitator
 - Participants stay focused on task
 - Participants interact with their own group
 - Participants finish in a timely manner
 - Leads discussion
 - Materials collection
 - Secure materials

Standard Setting Committee



CTB McGraw-Hill

Committee Roles

- Table Leaders
 - Lead discussion at the table
- Participants
 - Standard setters

Standard Setting Committee



CTB McGraw-Hill

Table Leader Training

Bookmark Standard Setting Procedure

- Content-based method
- Round 1
 - Study test items
 - Make ratings without discussion
- Round 2
 - View within-grade results
 - Discuss ratings in small group
- Round 3
 - View cross-grade results
 - Discuss ratings as a large group

CTB McGraw-Hill

Bookmark Standard Setting Procedure

- Key features
 - Target Student
 - Ordered Item Booklet
 - Item map with proficiency ranges
 - Bookmarks
 - Impact data

CTB McGraw-Hill

Bookmark Standard Setting Procedure

- Target Student
 - The student who has just made it into an achievement level
 - This is the student for whom cut scores are being established

CTB McGraw-Hill

Table Leader Training

Bookmark Standard Setting Procedure

- You will develop descriptors of the Target Student for each achievement level.
 - Missouri GLEs
 - Just Proficient, Just Advanced, Just Basic

CTB McGraw-Hill

Bookmark Standard Setting Procedure

- Ordered Item Booklet
 - Items ordered based on student performance
 - Easiest item is first
 - Most difficult item is last

CTB McGraw-Hill

Item Map

SAMPLE Mathematics Item Map

Print Name: _____ Table Number: _____

Order of Items to Apply to SMB	Location	Form	Item No.	Item Type	Score Key	Content Area	What does this item measure? That is, what do you know about it that you can respond successfully to this item/booklet page?	Why is this item more difficult than the preceding one?
1	220	12	1	MC	2	1		NA
2	225	9	4	MC	5	4		
3	229	9	3	MC	2	5		
4	240	12	2	MC	4	1		
5	241	12	4	MC	2	4		
Proficient item range begins on Page 6 (Bookmark range begins on Page 7)								
6	256	12	7	CR	1/2	1		
7	262	9	5	MC	1	1		
8	262	12	7	CR	3/3	1		
Proficient item range ends on Page 8 (Bookmark range ends on Page 9)								
9	303	9	6	MC	2	2		
10	321	9	8	MC	2	2		
11	336	12	9	CR	4/4	4		
12	401	9	9	MC	3	4		

1 = Number Sense, Properties, & Operations; 2 = Measurement; 3 = Geometry; 4 = Data Analysis, Statistics, & Probability; 5 = Algebra & Functions

CTB McGraw-Hill

Table Leader Training

Proficiency Range

- Demarcates the range in which the *Proficient* bookmark may be placed
 - The *Proficient* bookmark encompasses *all* of the items that precede it.
 - Missouri Senate Bill 1080

Ordered Item 1

1

1. Kitty is taking a trip on which she plans to drive 300 miles each day. Her trip is 1,723 miles long. She has already driven 849 miles. How much farther must she drive?
- 574 miles
 - 874 miles
 - 1,423 miles
 - 2,872 miles

Item M *Subtraction, operations, eliminate extra info*

Order of delivery items to be scored	Location	Form Item No.	Form Code	Score	Content Weight*	What does this item measure? (What is the primary focus of a student who can respond successfully to this benchmark question?)	Why is this item more difficult than the previous item?
1	250	12	1	MC	2	1	N/A
2	225	9	4	MC	3	4	
3	229	9	3	MC	2	5	
4	240	12	2	MC	4	1	
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8	263	12	7	CR	12	1	
Proficient item range ends on Page 8 (bookmark range ends on Page 8)							
9	303	9	6	MC	2	2	
10	321	9	6	MC	2	2	
11	330	12	9	CR	44	4	
12	401	9	9	MC	3	4	

Table Leader Training

Ordered Item 2

2

CARTONS OF EGGS SOLD LAST MONTH

Farm A ○ ○ ○ ○

Farm B ○ ○ ○ ○ ○ ○

Farm C ○ ○ ○

Each ○ = 100 Cartons

4. According to the graph how many cartons of eggs were sold altogether by farms A, B, and C last month?

A. 13
B. 130
C. 1,300
D. 13,000

CTB McGraw-Hill

6
Score Point
1 of 2

7. Sam can purchase his lunch at school. Each day he wants to have juice that costs 50¢, a sandwich that costs 90¢, and fruit that costs 35¢. His mother has only \$1.00 bills. What is the least number of \$1.00 bills that his mother should give him so he will have enough money to buy lunch for 5 days?

CTB McGraw-Hill

6 scoring guide

SOLUTION:

For one day, the sum is \$1.75. For 5 days, the sum is \$8.75. Therefore, he should ask his mother for nine one-dollar bills (or 1 \$5 bill and 4 \$1 bills).

Answer may be given pictorially.

Note: No explanation is asked for, so paper could have small error, such as copying a number incorrectly and still get a score of 2, provided method and answer are correct.

SCORING GUIDE:

0 Incorrect response -- includes \$1.75 or \$2; also \$975 or \$875.00

① \$8.75 or 875
OR
One day is \$1.75 so he needs \$2 each day, so \$10 for a week (picture of \$10 bill is acceptable)
OR
correct method but rounded down to \$8 (this requires work to be shown)
OR
correct method but small error and incorrect response of \$7 to \$11, inclusive

2 Correct response

CTB McGraw-Hill

Table Leader Training

6 anchor

7. Sam can purchase his lunch at school. Each day he wants to have juice that costs 50¢, a sandwich that costs 90¢, and fruit that costs 35¢. His mother has only \$1.00 bills. What is the least number of \$1.00 bills that his mother should give him so he will have enough money to buy lunch for 5 days? **\$8.75**

CTB McGraw-Hill

8
Score Point
2 of 2

7. Sam can purchase his lunch at school. Each day he wants to have juice that costs 50¢, a sandwich that costs 90¢, and fruit that costs 35¢. His mother has only \$1.00 bills. What is the least number of \$1.00 bills that his mother should give him so he will have enough money to buy lunch for 5 days?

CTB McGraw-Hill

Bookmark Standard Setting Procedure

- **Bookmark**
 - Separates the content the Just *Proficient* student is expected to master from the content that is more than enough.

Increasing difficulty

CTB McGraw-Hill

Table Leader Training

Bookmark Standard Setting Procedure

- Impact data
 - Percent of students in each achievement level
 - Presented in Rounds 2 and 3

<i>Below Basic</i>	<i>Basic</i>	<i>Proficient</i>	<i>Advanced</i>
0.0%	0.0%	0.0%	0.0%

CTB McGraw-Hill

Bookmark Standard Setting Procedure

Day 1: Table Leader Training

- Table Leaders
 - Participants who receive extra training to help facilitate the process in the breakout rooms
- Training
 - Mock Bookmark
 - Target Student descriptors
 - Student who has just entered a particular achievement level
 - Based on GLEs and NAEP achievement level descriptors
 - Purpose: Focus you on the type of student for whom you will be setting a cut score.

CTB McGraw-Hill

Bookmark Standard Setting Procedure

Day 2: Orientation, Round 1 Activities

- Orientation
 - Welcome and introduction by DESE
 - CTB will overview process
- Round 1 Activities
 - Take the test
 - Target Student discussions
 - Overview anchor papers/scoring guides
 - Study items in Ordered Item Booklet

CTB McGraw-Hill

Table Leader Training

Bookmark Standard Setting Procedure

Day 3: Bookmark Training, Rounds 2 & 3

- Bookmark Training
 - Participants will spend 1 hour learning how to set a Bookmark
 - Round 1 Bookmark placement
- Round 2
 - Participants shown within-grade impact data
 - Participants will discuss Round 1 Bookmark placements in tables
 - Round 2 Bookmark placement



Bookmark Standard Setting Procedure

Day 3: Bookmark Training, Rounds 2 & 3 (cont.)

- Round 3
 - Participants will be shown cross-grade impact data
 - Participants will discuss Round 2 Bookmark placements as a large group
 - Round 3 Bookmark placement



Bookmark Standard Setting Procedure

Day 4: Descriptor Writing

- Descriptor Writing
 - Participants will summarize the knowledge, skills, and abilities demonstrated by students in each achievement level
- Vertical Articulation Panel
 - Table Leaders will engage in a cross-grade discussion to smooth data



Table Leader Training

Mock Standard Setting

- 2 Achievement levels
 - *Proficient*
 - *Not Proficient*
- 11-Item Test
 - Grade 4 Mathematics



Target Student

- We want to describe the skills held in *common* by *all* these students
 - These are the skills of the Just *Proficient* student



Bookmark Placement

- Items preceding the Bookmark reflect content that all *Proficient* students should master
 - MC item: *Proficient* students should most likely know the correct response
 - CR item: *Proficient* students should most likely obtain that score point



Table Leader Training

Bookmark Placement

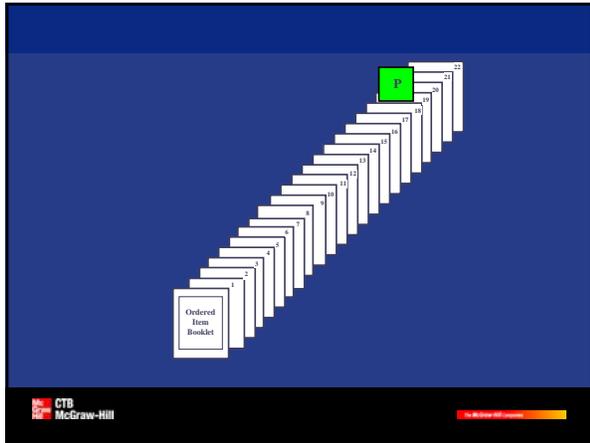
- Find a range of items in which you think the Bookmark falls.
- Locate the point where you believe the Bookmark should be placed.
- Bookmark meaning:
 - The items before the bookmark have been mastered by the Target students.
 - The Target students have demonstrated sufficient skills to infer that they are *Proficient*.

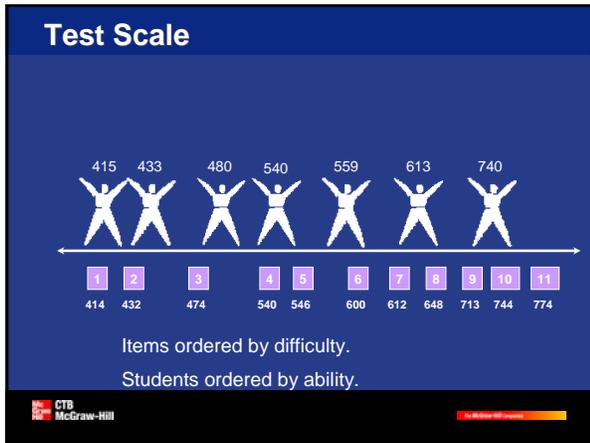
CTB McGraw-Hill

This diagram illustrates an 'Ordered Item Booklet' consisting of 22 numbered pages. A green bookmark is placed between page 10 and page 11. Three callout boxes provide context: one above the bookmark states 'These are items that are measuring skills beyond what students must be able to do to qualify as Proficient'; one to the left of the bookmark states 'These are items that define what the student should know and be able to do to qualify as Proficient'; and one to the right of the bookmark states 'Some students who are Proficient may be able to do some of these items'. A larger callout at the bottom states 'Students who are Proficient are expected to demonstrate mastery of the set of items in front of the bookmark'. The CTB McGraw-Hill logo is in the bottom left.

This diagram shows the same 'Ordered Item Booklet' with 22 numbered pages and a green bookmark placed between page 10 and page 11. The CTB McGraw-Hill logo is in the bottom left.

Table Leader Training





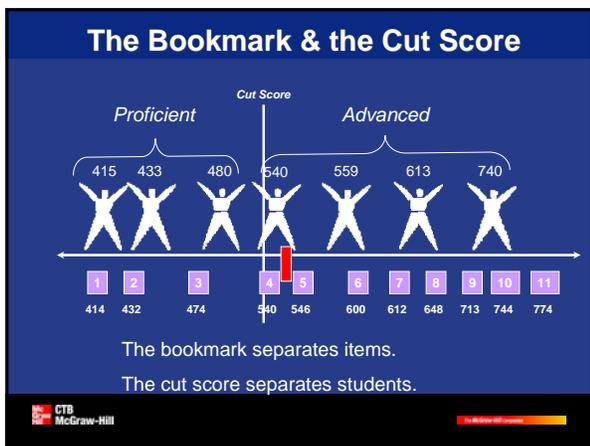


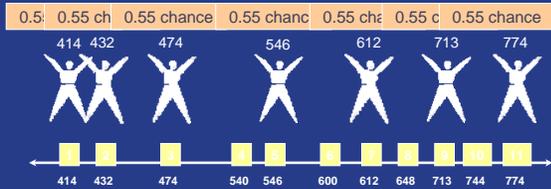
Table Leader Training

Mastery

- Students show mastery when they have at least a .55 probability of answering an item correctly.



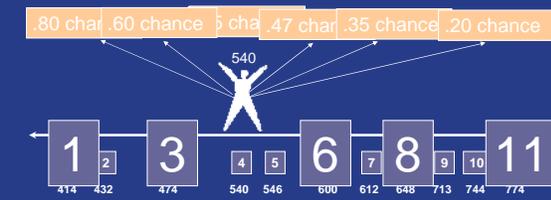
Item Location



Location is an indication of difficulty.
Location represents the ability level necessary to have a .55 chance of answering the item correctly.



Mastery and the Target Student



A student right at the cut score will have at least a .55 chance of answering the items correctly at and below the cut score.



Table Leader Training

Rating Form

Print Name _____ 2008 Missouri MAP Science Standard Setting Rating Form

Proficient Bookmark must be between 40 and 50

Grade	Round 1	Basic		Proficient		Advanced	
		1	2	1	2	1	2
<input type="radio"/> 5		1	1	1	1	1	1
<input type="radio"/> 8		1	1	1	1	1	1
<input type="radio"/> 11		1	1	1	1	1	1
Content Area		1	1	1	1	1	1
	<input type="radio"/> Science	1	1	1	1	1	1
		1	1	1	1	1	1
Table		1	1	1	1	1	1
	<input type="radio"/> 1	1	1	1	1	1	1
	<input type="radio"/> 2	1	1	1	1	1	1
<input type="radio"/> 3		1	1	1	1	1	1

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Make your mark heavy and dark...

Print Name _____ 2008 Missouri MAP Science Standard Setting Rating Form

Proficient Bookmark must be between 40 and 50

Grade	Round 1	Basic		Proficient		Advanced	
		1	2	1	2	1	2
<input type="radio"/> 5		1	1	4	7	7	3
<input type="radio"/> 8		1	1	1	1	1	1
<input type="radio"/> 11		1	1	1	1	1	1
Content Area		1	1	1	1	1	1
	<input type="radio"/> Science	1	1	1	1	1	1
		1	1	1	1	1	1
Table		1	1	1	1	1	1
	<input type="radio"/> 1	1	1	1	1	1	1
	<input type="radio"/> 2	1	1	1	1	1	1
<input type="radio"/> 3		1	1	1	1	1	1

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Rating Form

Your packet number is located in the upper right hand corner of your secure materials.

Packet Number

1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9

CTB McGraw-Hill

Table Leader Training

Sample Results

	Basic Bookmark	Proficient Bookmark	Advanced Bookmark
Table 1	3	11	34
Table 2	5	17	37
Table 3	3	14	34
Median	4	14	34

Impact Data: Estimated percent of students in each achievement level based on the current large group median

Below Basic	Basic	Proficient	Advanced
0.0%	0.0%	0.0%	0.0%

CTB McGraw-Hill

Target Student Discussion

- The student who has just made it into an achievement level
 - Just Basic, Just Proficient, and Just Advanced students
- Refer to the Missouri Grade-Level Expectations

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Standard 1: Students will read, write, listen, and speak for information and understanding.

- ^B • Locate and use library media resources to acquire information, with assistance
- ^A • Read unfamiliar texts to collect data, facts, and ideas
- ^P • Read and understand written directions
- ^B • Locate information in a text that is needed to solve a problem
- ^P • Identify main ideas and supporting details in informational texts
- ^B • Recognize and use organizational features, such as table of contents, indexes, page numbers, and chapter headings/subheadings, to locate information, with assistance

CTB McGraw-Hill

Table Leader Training

Vertical Articulation Panel

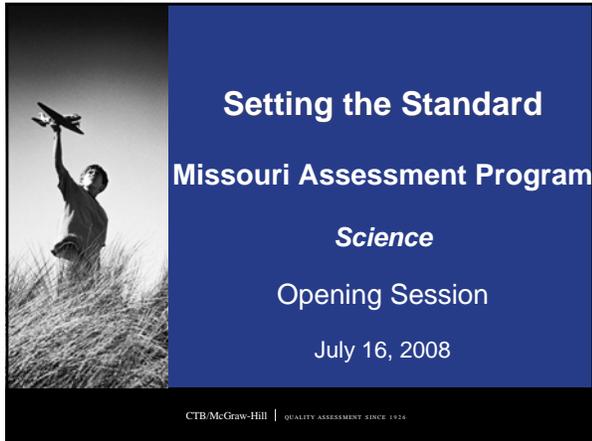
- Purpose
 - Table Leaders will
 - Discuss the final recommendations from the standard setting
 - Examine the impact data for logical progression from grade to grade
 - Adjust the cut scores to allow for logical progression of the impact data across the grades



Questions?

- Thank you for your participation!





Setting the Standard
Missouri Assessment Program
Science
Opening Session
July 16, 2008

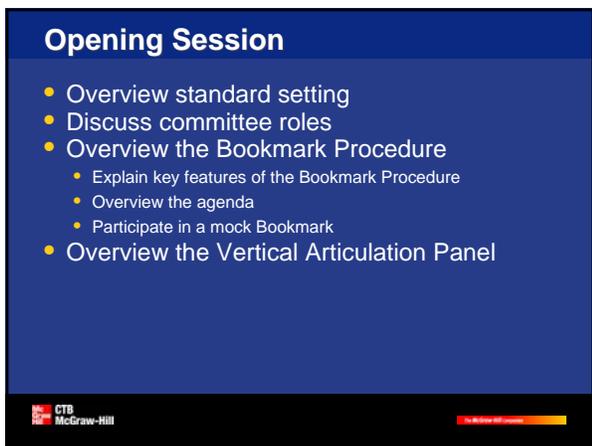
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CTB Standard Setting Team

- Karla Egan
- Adele Brandstrom
- Anita Benson
- Gabe Martinez
- Kris Paulsen-Hands
- Bevin Flaherty
- Deedra Pell

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Opening Session

- Overview standard setting
- Discuss committee roles
- Overview the Bookmark Procedure
 - Explain key features of the Bookmark Procedure
 - Overview the agenda
 - Participate in a mock Bookmark
- Overview the Vertical Articulation Panel

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Standard Setting Overview

- *What is standard setting?*
 - A process that lets experts make judgments about the content that the *Proficient* student should know and be able to do.
 - Also, *Advanced*, *Basic*, and *Below Basic* students.

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Standard Setting Overview

- *Why do standard setting?*
 - The Missouri Grade-Level Expectations define what students are tested on.
 - These are things students *should* be able to do.
 - Missouri has established GLEs for grades 5, 8, and 11 in Science.
 - Achievement standards define what students *can do* in each achievement level.
 - You will actively discuss your expectations of the Target Student in each achievement level.

CTB McGraw-Hill

Standard Setting Overview

- **Achievement Levels**
 - Specify the knowledge, skills, and abilities a student needs to know in order to be classified as *Below Basic*, *Basic*, *Proficient* and *Advanced*.

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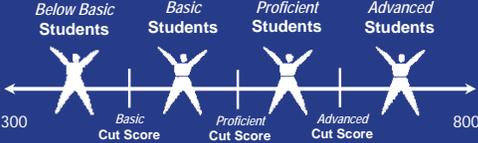
Standard Setting Overview

- How do we set our standards?
 - ~~Percentages~~
 - Arbitrary
 - Test-specific
 - Do not consider content
 - Content
 - Uses pre-established Grade-Level Expectations
 - Considers educational objectives
 - Bookmark Standard Setting Procedure



Standard Setting Overview

- Purpose of the Standard Setting
 - Allows cut scores to be set on the test scale
 - The test scale represents the ability of students



Standard Setting Overview

- Purpose of the standard setting
 - You will set a cut score on the test scale.
 - Students who meet or exceed the cut score will have enough knowledge, skills, and abilities to be classified in a given achievement level on the MAP Science tests.
 - Decisions will be based on the Missouri Grade-Level Expectations.



Committee Roles

- Group Leaders
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Standard Setting Committee



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Committee Roles

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Standard Setting Committee



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Committee Roles

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Standard Setting Committee



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Bookmark Standard Setting Procedure

- Content-based method
- Round 1
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Bookmark Standard Setting Procedure

- Key features
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 - Item map with proficiency ranges
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 - Impact data

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CTB McGraw-Hill

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Ordered Item 1

1

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Ordered Item 2

2

CARTONS OF EGGS SOLD LAST MONTH

Farm A ○ ○ ○ ○

Farm B ○ ○ ○ ○ ○ ○

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Each ○ = 100 Cartons

4. According to the graph how many cartons of eggs were sold altogether by farms A, B, and C last month?

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 B. 130
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CTB McGraw-Hill

6
Score Point
1 of 2

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CTB McGraw-Hill

6 scoring guide

SOLUTION:

For one day, the sum is \$1.75. For 5 days, the sum is \$8.75. Therefore, he should ask his mother for nine one-dollar bills (or 1 \$5 bill and 4 \$1 bills).

Answer may be given pictorially.

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 correct method but rounded down to \$8 (this requires work to be shown)
 OR
 correct method but small error and incorrect response of \$7 to \$11, inclusive

2 Correct response

CTB McGraw-Hill

Orientation

6 anchor

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CTB McGraw-Hill

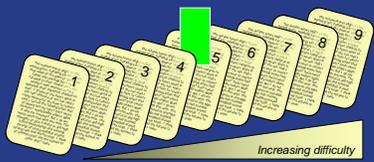
8
Score Point
2 of 2

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CTB McGraw-Hill

Bookmark Standard Setting Procedure

- **Bookmark**
 - Separates the content the Just *Proficient* student is expected to master from the content that is more than enough.



CTB McGraw-Hill

Bookmark Standard Setting Procedure

- Impact data
 - Percent of students in each achievement level
 - Presented in Rounds 2 and 3

<i>Below Basic</i>	<i>Basic</i>	<i>Proficient</i>	<i>Advanced</i>
0.0%	0.0%	0.0%	0.0%

CTB McGraw-Hill

Vertical Articulation Panel

- Purpose
 - Table Leaders will
 - Discuss the final recommendations from the standard setting
 - Examine the impact data for logical progression from grade to grade
 - Adjust the cut scores to allow for logical progression of the impact data across the grades

CTB McGraw-Hill

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CTB McGraw-Hill

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- Orientation
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 - CTB will overview process
- Round 1 Activities
 - Take the test
 - Target Student discussions
 - Overview anchor papers/scoring guides
 - Study items in Ordered Item Booklet

Bookmark Standard Setting Procedure

Day 3: Bookmark Training, Rounds 2 & 3

- Bookmark Training
 - Participants will spend 1 hour learning how to set a Bookmark
 - Round 1 Bookmark placement
- Round 2
 - Participants shown within-grade impact data
 - Participants will discuss Round 1 Bookmark placements in tables
 - Round 2 Bookmark placement

Bookmark Standard Setting Procedure

Day 3: Bookmark Training, Rounds 2 & 3 (cont.)

- Round 3
 - Participants will be shown cross-grade impact data
 - Participants will discuss Round 2 Bookmark placements as a large group
 - Round 3 Bookmark placement

Orientation

Bookmark Standard Setting Procedure

Day 4: Descriptor Writing

- Descriptor Writing
 - Participants will summarize the knowledge, skills, and abilities demonstrated by students in each achievement level
- Vertical Articulation Panel
 - Table Leaders will engage in a cross-grade discussion to smooth data

Questions?

- Thank you for your participation!

Bookmark Training

Setting the Standard
Missouri Assessment Program
Science
Bookmark Training
July 2008

CTB/McGraw-Hill | QUALITY ASSESSMENT SINCE 1924

Target Student

- We want to describe the skills held in *common* by *all* these students
 - These are the skills of the Just *Proficient* student

Just *Proficient* Student Mid-level *Proficient* Student High-Achieving *Proficient* Student

← Proficient Cut Score Advanced Cut Score →

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Bookmark Placement

- Items preceding the Bookmark reflect content that all *Proficient* students should master
 - MC item: *Proficient* students should most likely know the correct response
 - CR item: *Proficient* students should most likely obtain that score point

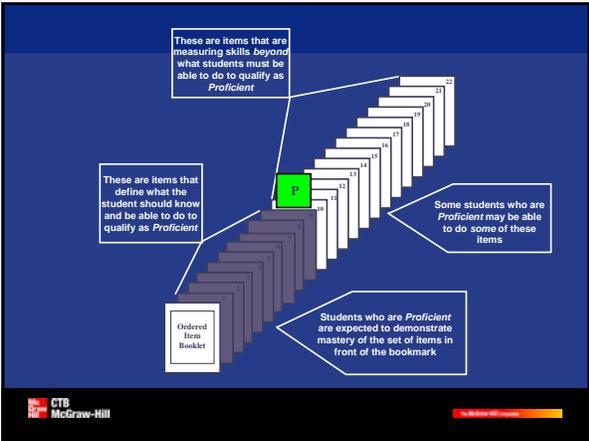
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Bookmark Training

Bookmark Placement

- Find a range of items in which you think the Bookmark falls.
- Locate the point where you believe the Bookmark should be placed.
- Bookmark meaning:
 - The items before the bookmark have been mastered by the Target students.
 - The Target students have demonstrated sufficient skills to infer that they are *Proficient*.





These are items that define what the student should know and be able to do to qualify as *Proficient*

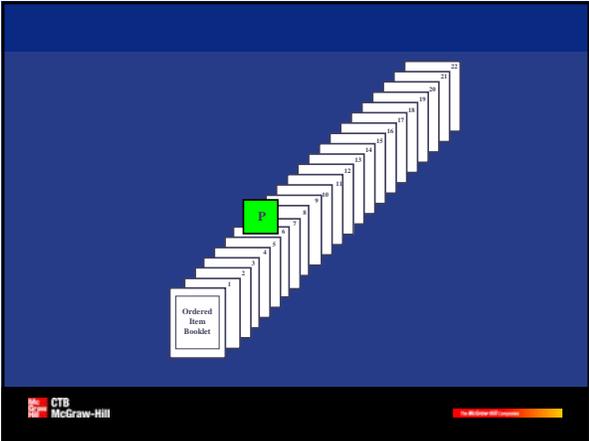
These are items that are measuring skills beyond what students must be able to do to qualify as *Proficient*

Some students who are *Proficient* may be able to do some of these items

Students who are *Proficient* are expected to demonstrate mastery of the set of items in front of the bookmark

Ordered Item Booklet

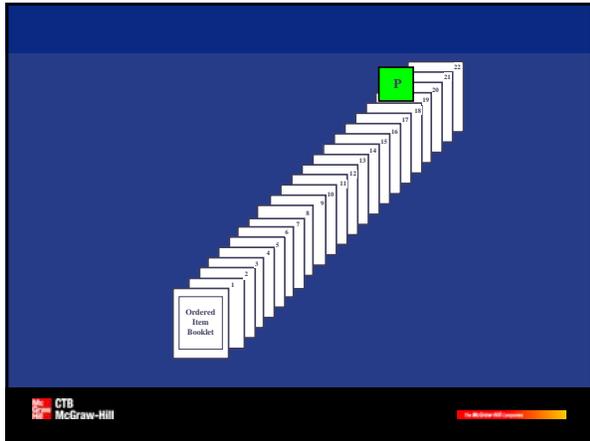


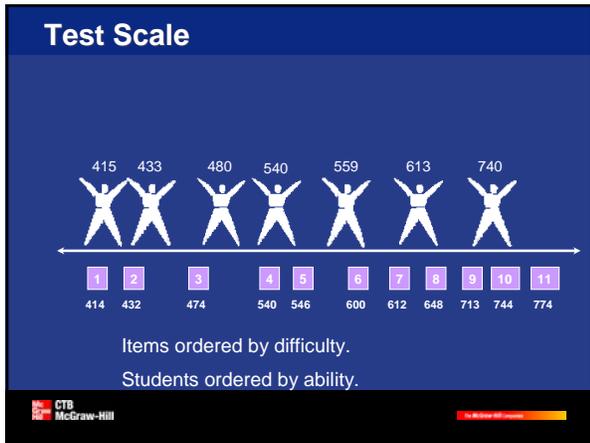


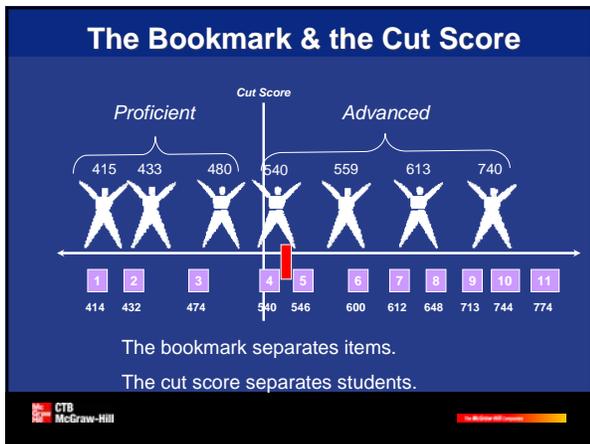
Ordered Item Booklet



Bookmark Training







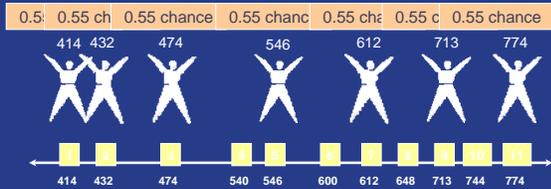
Bookmark Training

Mastery

- Students show mastery when they have at least a .55 probability of answering an item correctly.



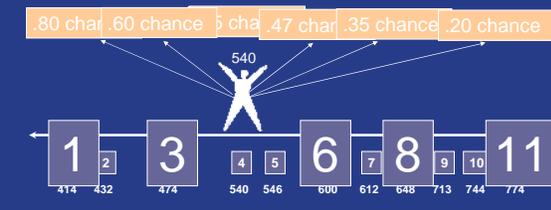
Item Location



Location is an indication of difficulty.
Location represents the ability level necessary to have a .55 chance of answering the item correctly.



Mastery and the Target Student



A student right at the cut score will have at least a .55 chance of answering the items correctly at and below the cut score.



Bookmark Training

Rating Form

Print Name _____ 2008 Missouri MAP Science Standard Setting Rating Form

Proficient Bookmark must be between 40 and 50

Grade	Round 1	Basic		Proficient		Advanced	
		1	2	1	2	1	2
<input type="radio"/> 5		①	②	③	④	⑤	⑥
<input type="radio"/> 8		①	②	③	④	⑤	⑥
<input type="radio"/> 11		①	②	③	④	⑤	⑥
Content Area		①	②	③	④	⑤	⑥
	<input type="radio"/> Science	①	②	③	④	⑤	⑥
		①	②	③	④	⑤	⑥
Table		①	②	③	④	⑤	⑥
	<input type="radio"/> 1	①	②	③	④	⑤	⑥
	<input type="radio"/> 2	①	②	③	④	⑤	⑥
<input type="radio"/> 3		①	②	③	④	⑤	⑥

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Make your mark heavy and dark...

Print Name _____ 2008 Missouri MAP Science Standard Setting Rating Form

Proficient Bookmark must be between 40 and 50

Grade	Round 1	Basic		Proficient		Advanced	
		1	2	1	2	1	2
<input type="radio"/> 5		●	●	③	④	⑤	⑥
<input type="radio"/> 8		●	●	③	④	⑤	⑥
<input type="radio"/> 11		●	●	③	④	⑤	⑥
Content Area		●	●	③	④	⑤	⑥
	<input type="radio"/> Science	●	●	③	④	⑤	⑥
		●	●	③	④	⑤	⑥
Table		●	●	③	④	⑤	⑥
	<input type="radio"/> 1	●	●	③	④	⑤	⑥
	<input type="radio"/> 2	●	●	③	④	⑤	⑥
<input type="radio"/> 3		●	●	③	④	⑤	⑥

CTB McGraw-Hill

Rating Form

Your packet number is located in the upper right hand corner of your secure materials.

Packet Number

①	①
①	①
②	②
③	③
④	④
⑤	⑤
⑥	⑥
⑦	⑦
⑧	⑧
⑨	⑨

CTB McGraw-Hill

Bookmark Training

Questions?

- Thank you for your participation!

Missouri Assessment Program

Science Achievement Level Setting July 16-18, 2008

Science

- In the spring of 2008 all Missouri students in grades 5, 8 and 11 took science assessments for the first time since all Missouri students took science at grades 3, 7, and 10 in 2003.

Achievement Levels

- Before reporting the results from the science tests, Missouri educators and citizens must meet to recommend cut points to the State Board of Education that represent the performance levels on these tests.
- Four performance levels will be established: Advanced, Proficient, Basic and Below Basic.

Panelists

- Panelist nominations were requested from superintendents, numerous educational organizations and Chambers of Commerce.

Panelists

- Each grade level will have 15 panelists.
- There will be 3 grade-level tables with panelists at each table.
- The panelists are:
 - classroom teachers
 - non-teacher educators
 - non-educators
 - A MAP Regional Facilitator (RF) will serve as a table leader for each group at a table. The RF will be a non-voting panelist.
 - A CTB content development specialist will work in each room as a room facilitator.

Procedures

- Performance standards for the MAP tests will be established using a modification of the Bookmark Standard Setting Procedure (BSSP).
- A modification of the BSSP is necessary because of Missouri Senate Bill 1080 which states that by June 30, 2006, the State Board of Education shall:

Senate Bill 1080

“Align the performance standards of the MAP so that such indicators meet, but do not exceed, the performance standards of the National Assessment of Educational Progress (NAEP) exam.....”

In other words, the percent of students who attain *Proficient* on the MAP should be similar to or slightly higher than the percent attaining *Proficient* on the NAEP.

Application of Senate Bill 1080

- The initial range of cut points will be based on the percentage of students classified as *Proficient or above* on the NAEP and MAP tests.
- The same range of percentages will be used for all grades.

The Range for Proficient

The high end of the range (scale score) will be based on the NAEP results. This cut score will be set for each grade/ content area such that approximately 27% of students are at or above the cut score. This was the lowest percentage of students classified as *Proficient or Advanced* on the NAEP test for Grades 4 and 8 Reading, Math and science using both national and state data.

The Range for Proficient

The low end of the range (scale score) will be based on current MAP results. This cut score will be set for each grade/content area such that approximately 48% of students are at or above the cut score. This is the highest percentage of students classified as *Proficient* or *Advanced* on grades 3-8 and 11 Communication Arts and/or grades 3-8 and 10 Math MAP tests.

Recommending Cuts

- There are three rounds of Bookmark activities. In the process are included procedures to ensure a reasonable and logical progression of *Proficient* as well as the cut points for *Advanced* and *Basic*.
- The recommended cut points will be presented to the department on July 18, 2008 and the cut points will be presented to the state board at their August meeting.

Loose Ends

- Security
- Questions
- Expense Accounts

Section E

Participant Training Materials

SAMPLE Mathematics Item Map

Print Name: _____ **Table Number:** _____

Order of difficulty (easy to hard)	Location	Form	Item No.	Item Type	Score Key	Content Strand *	What does this item measure? That is, what do you know about a student who can respond successfully to this item/score point?	Why is this item more difficult than the preceding items?
1	220	12	1	MC	2	1		N/A
2	225	9	4	MC	3	4		
3	229	9	3	MC	2	5		
4	240	12	2	MC	4	1		
5	241	12	4	MC	2	4		
Proficient item range begins on Page 6 (Bookmark range begins on Page 7)								
6	256	12	7	CR	1/2	1		
7	262	9	5	MC	1	1		
8	282	12	7	CR	2/2	1		
Proficient item range ends on Page 8 (Bookmark range ends on Page 9)								
9	303	9	6	MC	2	2		
10	321	9	8	MC	2	2		
11	401	9	9	MC	3	4		

* 1 = Number Sense, Properties, & Operations; 2 = Measurement; 3 = Geometry; 4 = Data Analysis, Statistics, & Probability; 5 = Algebra & Functions

SAMPLE

Standard Setting Workshop

Grade 4
Mathematics

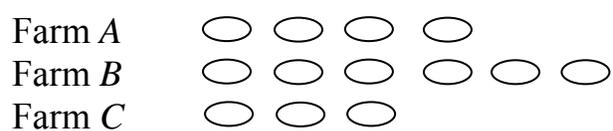
Ordered Item Booklet

Publicly released items from the National Assessment of Educational
Progress 1996 State Assessment Program in Mathematics.



1. Kitty is taking a trip on which she plans to drive 300 miles each day. Her trip is 1,723 miles long. She has already driven 849 miles. How much farther must she drive?
 - A. 574 miles
 - B. 874 miles
 - C. 1,423 miles
 - D. 2,872 miles

CARTONS OF EGGS SOLD LAST MONTH



Each ○ = 100 cartons

4. According to the graph, how many cartons of eggs were sold altogether by farms A, B, and C last month?
- A. 13
 - B. 130
 - C. 1,300
 - D. 13,000

3. N stands for the number of stamps John had. He gave 12 stamps to his sister. Which expression tells how many stamps John has now?

A. $N + 12$

B. $N - 12$

C. $12 - N$

D. $12 \times N$

2. A whole number is multiplied by 5. Which of these could be the result?

A. 652

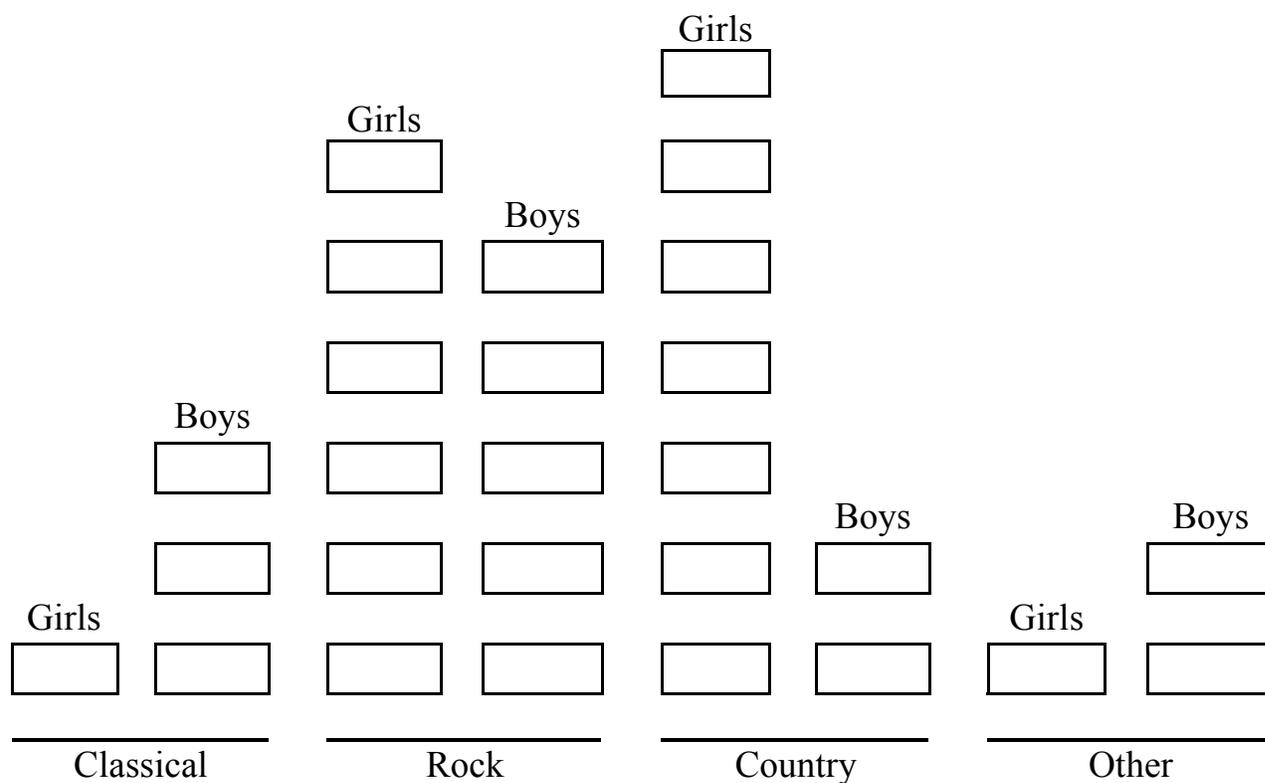
B. 562

C. 526

D. 265

4. Each boy and girl in the class voted for his or her favorite kind of music.
Here are the results.

= 1 student



Which kind of music did most students in the class prefer?

- A. Classical
- B. Rock
- C. Country
- D. Other

Score Point 1 of 2

7. Sam can purchase his lunch at school. Each day he wants to have juice that costs 50¢ , a sandwich that costs 90¢ , and fruit that costs 35¢ . His mother has only $\$1.00$ bills. What is the least number of $\$1.00$ bills that his mother should give him so he will have enough money to buy lunch for 5 days?

<p style="text-align: center;">Scoring Guide</p>
--

Solution:

For one day the sum is \$1.75. For 5 days, the sum is \$8.75. Therefore, he should ask his mother for nine \$1.00 bills (or one \$5.00 bill and four \$1.00 bills.)

Answer may be given pictorially.

Note: No explanation is asked for, so the paper could have a small error, such as copying a number incorrectly and still get a score of 2, provided method and answer are correct.

Scoring Guide:

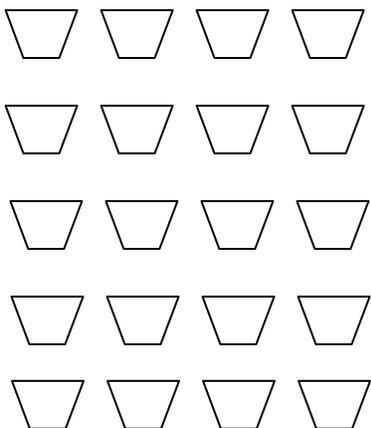
0	Incorrect response—includes \$1.75 or \$2; also \$875 or \$875.00
1	<p>\$8.75 or 875</p> <p>OR</p> <p>One day is \$1.75 so he needs \$2 each day, so \$10 for a week (picture of a \$10 bill is acceptable)</p> <p>OR</p> <p>Correct method but rounded down to \$8 (this requires work to be shown)</p> <p>OR</p> <p>Correct method but small error and incorrect response of \$7 to \$11, inclusive</p>
2	Correct response

Anchor Paper

7. Sam can purchase his lunch at school. Each day he wants to have juice that costs 50¢ , a sandwich that costs 90¢ , and fruit that costs 35¢ . His mother has only $\$1.00$ bills. What is the least number of $\$1.00$ bills that his mother should give him so he will have enough money to buy lunch for 5 days?

$\$8.75$

Score point: 1



5. The picture shows the flower pots in which Kevin will plant flower seeds. He needs 3 seeds for each pot. Which of the following number sentences shows how many seeds Kevin will need for all of the pots?

A. $5 \times 4 \times 3 = \square$

B. $(5 \times 4) + 3 = \square$

C. $(5 + 4) \times 3 = \square$

D. $5 + 4 + 3 = \square$

Score Point 2 of 2

8. Sam can purchase his lunch at school. Each day he wants to have juice that costs 50¢ , a sandwich that costs 90¢ , and fruit that costs 35¢ . His mother has only $\$1.00$ bills. What is the least number of $\$1.00$ bills that his mother should give him so he will have enough money to buy lunch for 5 days?

<p style="text-align: center;">Scoring Guide</p>
--

Solution:

For one day the sum is \$1.75. For 5 days, the sum is \$8.75. Therefore, he should ask his mother for nine \$1.00 bills (or one \$5.00 bill and four \$1.00 bills.)

Answer may be given pictorially.

Note: No explanation is asked for, so the paper could have a small error, such as copying a number incorrectly and still get a score of 2, provided method and answer are correct.

Scoring Guide:

0	Incorrect response—includes \$1.75 or \$2; also \$875 or \$875.00
1	<p>\$8.75 or 875</p> <p>OR</p> <p>One day is \$1.75 so he needs \$2 each day, so \$10 for a week (picture of a \$10 bill is acceptable)</p> <p>OR</p> <p>Correct method but rounded down to \$8 (this requires work to be shown)</p> <p>OR</p> <p>Correct method but small error and incorrect response of \$7 to \$11, inclusive</p>
<div style="border: 1px solid black; border-radius: 50%; width: 30px; height: 30px; display: flex; align-items: center; justify-content: center; margin: 0 auto;">2</div>	Correct response

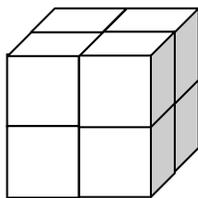
<p>Anchor Paper</p>

8. Sam can purchase his lunch at school. Each day he wants to have juice that costs 50¢, a sandwich that costs 90¢, and fruit that costs 35¢. His mother has only \$1.00 bills. What is the least number of \$1.00 bills that his mother should give him so he will have enough money to buy lunch for 5 days?

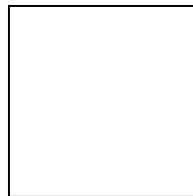
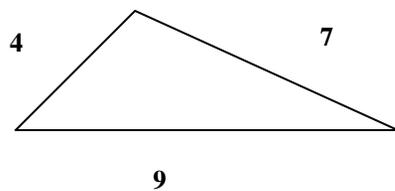
$$\begin{array}{r}
 50 \\
 90 \\
 35 \\
 \hline
 \$1.75 \\
 \times 5 \\
 \hline
 \$8.75
 \end{array}$$

9 dollar bills

Score point: 2

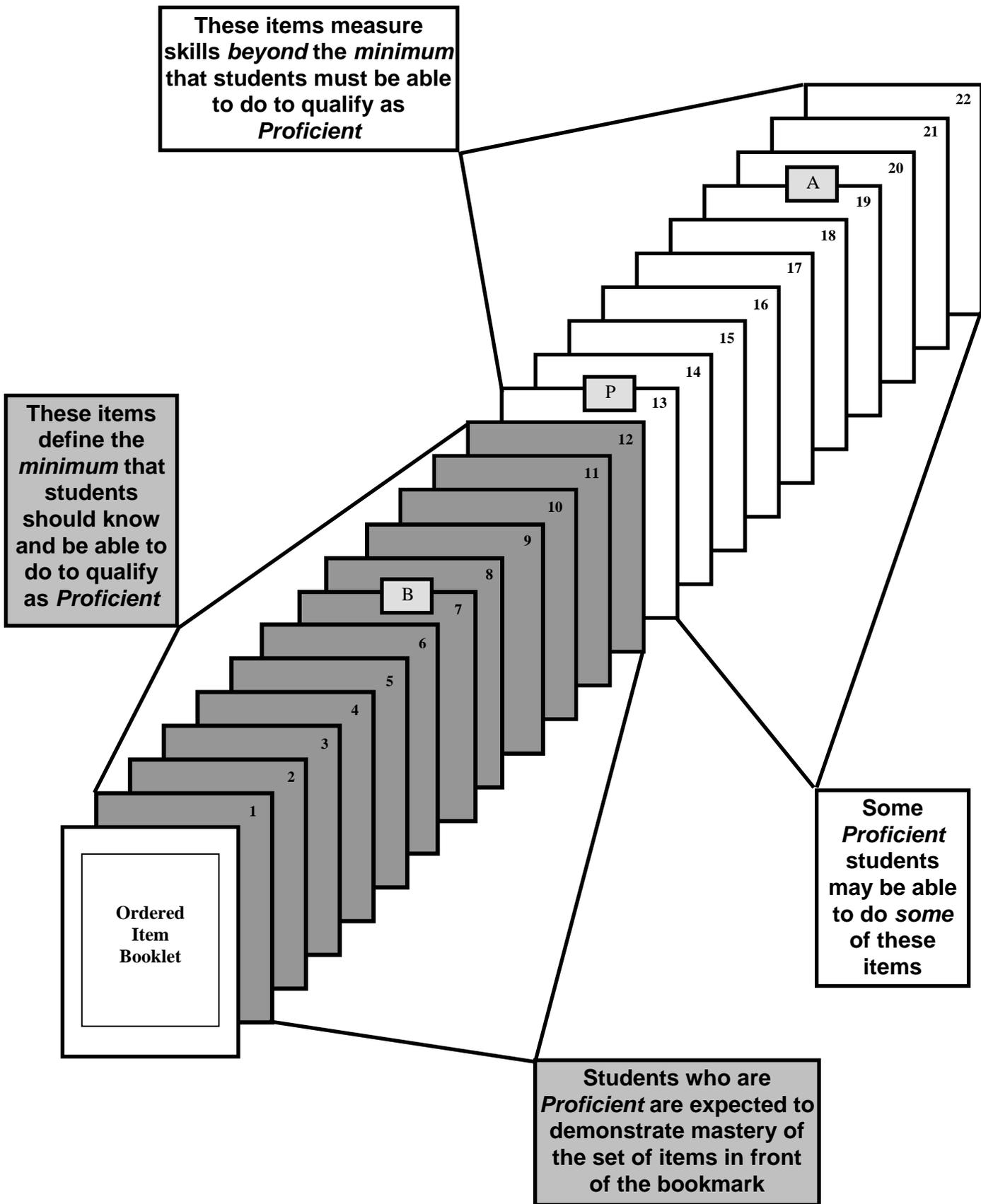


6. In this figure, how many small cubes were put together to form the large cube?
- A. 7
 - B. 8
 - C. 12
 - D. 24



8. If both the square and the triangle above have the same perimeter, what is the length of each side of the square?
- A. 4
 - B. 5
 - C. 6
 - D. 7

9. There are 3 fifth graders and 2 sixth graders on the swim team. Everyone's name is put in a hat and the captain is chosen by picking one name. What are the chances that the captain will be a fifth grader?
- A. 1 out of 5
 - B. 1 out of 3
 - C. 3 out of 5
 - D. 2 out of 3



Bookmark Placement

These directions are written for placing the *Proficient* bookmark and apply analogously to the *Basic* and *Advanced* bookmarks.

For whom am I placing this bookmark? The Target Student

When you place your *Proficient* bookmark, you are separating the highest ability *Basic* students from the lowest ability *Proficient* students. In other words, you are keeping in mind the Target Student who will just make it into the *Proficient* level.

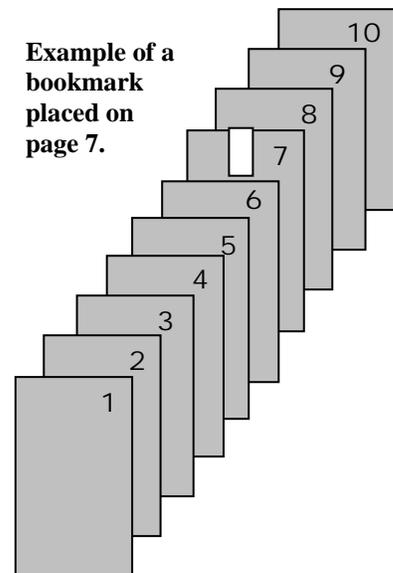
How do I place my bookmark? The Mechanics

The bookmark is exactly that: a bookmark. It separates the content students are expected to master from the content they are *not* expected to master. In the example below, a participant has placed the *Proficient* bookmark on page 7. With this bookmark placement, the participant says that a student must master the content represented by items 1 through 6 to be *Proficient*.

To place your bookmark, start at page 1 in the Ordered Item Booklet (OIB). Page through the OIB **looking at the content covered** until you find the **first** page where you think a student has demonstrated a sufficient body of evidence to indicate that the student is *Proficient* relative to the content standards. This is the content you are saying a *Proficient* Target Student needs to master to just make it into the *Proficient* level.

Hold the pages that contain the content you expect the student to master in your left hand. Place your bookmark on the page **AFTER** the last item you expect the student to master. This page number is your bookmark. Write it on your Rating Form.

Hint: It may be helpful to first identify the interval of items in which you are reasonably certain the bookmark should be placed; then you can place the bookmark within that interval. If you are uncertain about where to place your bookmark, make your best decision; you will have two more rounds of voting to reconsider your bookmark.



What does my *Proficient* Bookmark mean? Some Answers

- You expect *Proficient* students to master the knowledge, skills, and abilities contained in the items *before* your bookmark.
- *Proficient* students should know and be able to do the items *before* the bookmark. For multiple-choice items, *Proficient* students should know the correct response. For constructed-response items, *Proficient* students should most likely achieve the score points before the bookmark.

Is my bookmark the same as a raw score? NO

It is very important to remember that your bookmark placement is *not* equal to a raw score. In the example above, the *Proficient* bookmark was placed on page 7. The participant was *not* saying that a student must get six items correct to be classified as *Proficient*. This participant is saying that a barely *Proficient* student must master the content measured by the items on pages 1 through 6. The numbers in the OIB correspond to the rank order of difficulty of each item. These numbers do *not* correspond to a raw score.

Frequently Asked Questions about Bookmark Placement

These questions are written in reference to the *Proficient* bookmark and apply analogously to the *Basic* and *Advanced* bookmarks.

How do I know if I placed my bookmark in the “right” place?

The “right” place is a matter of judgment, *your* judgment. You are placing your bookmark based on the content you expect students to know and be able to do.

I set my bookmark based on the content I expect students to know and be able to do, that is, the content I expect students to master. What is the definition of mastery?

We look at mastery by considering the likelihood with which students will respond correctly to the items. This question is answered in more depth in the handout “Mastery.”

If a student misses some items before the *Proficient* bookmark and gets some correct after the bookmark, is that student still *Proficient*?

A student does *not* have to get every item before the bookmark correct to be *Proficient*. *Proficient* students can miss some items *before* the bookmark and correctly respond to some items *after* the bookmark.

Does the page number on which I place my bookmark correspond to the raw score a student must get on the test?

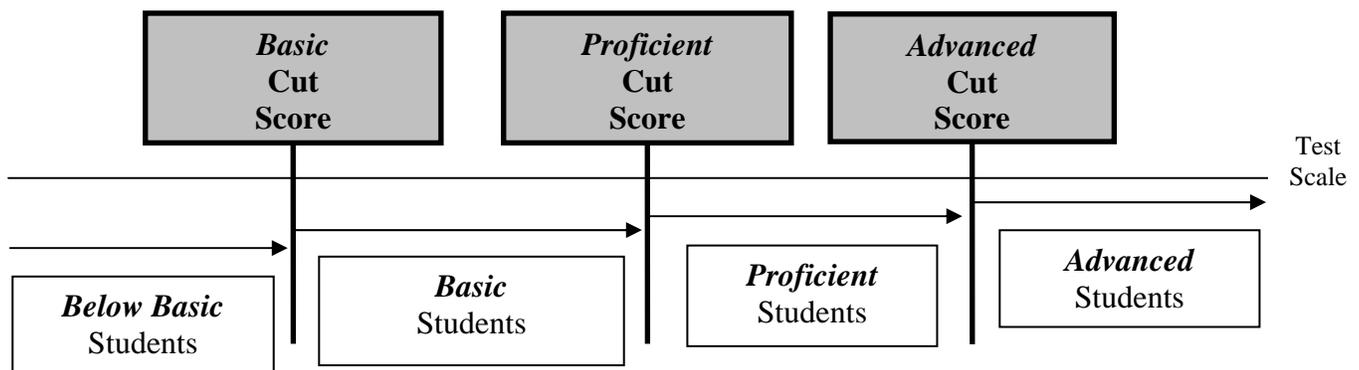
No. Remember, you are placing your bookmark based on the content you expect students to know and be able to do. You are *not* making your decision based on the number of items students must answer correctly. The bookmark is placed on a *page* in the Ordered Item Booklet. This page number corresponds to the difficulty ordering of the item, *not* to the raw score.

Should I place my bookmark in the first place in the Ordered Item Booklet where all the content standards have occurred?

Not necessarily. The test only samples the content domain. In some cases, some content standards will only be represented by difficult items that would be hard for most students to master.

How many bookmarks do I set?

You set one less bookmark than the number of achievement levels. In Missouri, you will set 3 bookmarks to separate students into 4 achievement levels.



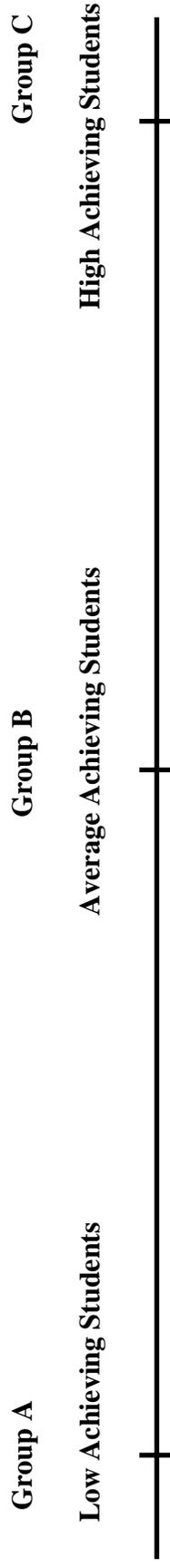
MASTERY

How Participants' Bookmark Judgments Relate to Expected Student Achievement within Each Achievement Level

You are participating in this standard setting because of your experience with students and your knowledge of the state content standards, curriculum, and current instructional practices. You will be making judgments that will operationalize your expectations for the level of achievement students must demonstrate in order to place in each achievement level. To understand how your judgments relate to expected student achievement within each achievement level, consider the following examples.

Consider how students at various scale locations might perform on an imaginary assessment that consists of a total of 50 score points. In particular, we will consider the performance of groups of students who are at three specific points on the test scale. Group A consists of 100 low achieving students, Group B consists of 100 average achieving students, and Group C consists of 100 high achieving students. Assume that the students have all taken the assessment and that the 100 students within each group have all obtained the exact same scale score. Note the location of the obtained scale score for each of the three groups on the test scale below.

Test Scale



The following three figures show how students in each of the three groups might perform on the assessment.

Definition of Mastery

We say that a group of like students have demonstrated mastery of the content represented by an item if at least 55 of the 100 students in the group can be expected to respond successfully to the item.

Figure C shows how many students in Group C responded correctly to each item in the ordered item booklet. Observe that Group C performed much better than Groups A or B. That makes sense because Group C consists of high achieving students while Groups A and B consist of low and average achieving students, respectively.

Before you read further, use Figure C and the definition of mastery to determine which items Group C has mastered. Group C students have demonstrated mastery of the content reflected in items 1 through 45 of the ordered item booklet, but have not demonstrated mastery of the content reflected by items 46 through 50. This is true according to the definition, because at least 55 of the 100 Group C students responded successfully to each of items 1 through 45, but fewer than 55 of them responded correctly to items 46 through 50.

Figure C. The number (or percent) of Group C students who responded correctly to each item in the ordered item booklet.

| item |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| <u>99</u> | <u>97</u> | <u>97</u> |
| 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

| item |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 |
| <u>97</u> | <u>97</u> | <u>95</u> | <u>95</u> | <u>94</u> | <u>93</u> | <u>92</u> | <u>92</u> | <u>91</u> | <u>89</u> | <u>89</u> | <u>89</u> | <u>88</u> | <u>88</u> | <u>88</u> | <u>87</u> | <u>87</u> | <u>86</u> | <u>85</u> | <u>84</u> |
| 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

| item |
|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| 31 | 32 | 33 | 34 | 35 | 36 | 37 | 38 | 39 | 40 | 41 | 42 | 43 | 44 | 45 | 46 | 47 | 48 | 49 | 50 |
| <u>83</u> | <u>81</u> | <u>81</u> | <u>81</u> | <u>80</u> | <u>80</u> | <u>79</u> | <u>78</u> | <u>75</u> | <u>72</u> | <u>68</u> | <u>64</u> | <u>60</u> | <u>58</u> | <u>55</u> | <u>52</u> | <u>51</u> | <u>50</u> | <u>49</u> | <u>46</u> |
| 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

You have seen from the above examples that by using a specific definition of mastery, we can identify the content in the ordered item booklet that students at any location of the test scale have mastered.

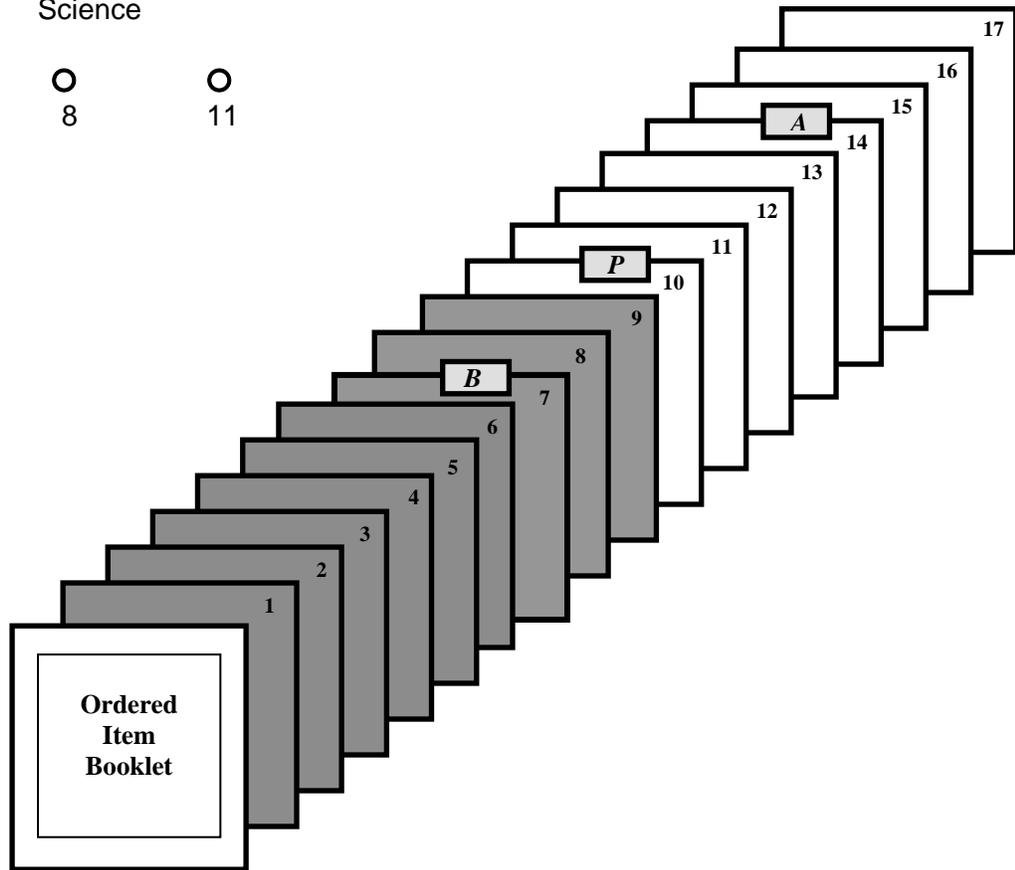
Also, if *you* identify a set of items in the ordered item booklet, the specific point on the test scale at which students have demonstrated mastery of the content you have specified can be determined. This is how the various cut scores are ascertained.

As experts, you will first specify the content in the ordered item booklet that you expect students to master in order to be classified as ***Proficient***. This means that you will identify the items that reflect the knowledge, skills, and abilities you expect all ***Proficient*** students to master. When you have made that judgment, the point on the scale at which students achieve that level of mastery can be identified.

Content Area: Science

Grade: 5 8 11

Missouri 2008



Suppose the bookmarks were placed in this sample ordered item booklet as follows:

	<i>Basic</i> Bookmark on Page #	<i>Proficient</i> Bookmark on Page #	<i>Advanced</i> Bookmark on Page #
Round 1	7	10	14

- Which items does a student need to master to just make it into the *Proficient* achievement level?

1 to 6 1 to 7 1 to 9 1 to 10
- If a student mastered only items 1 through 5, in which achievement level would this student be?

Below Basic *Basic* *Proficient* *Advanced*
- Suppose a student mastered items 1 through 9. Which achievement level is this student in?

Below Basic *Basic* *Proficient* *Advanced*
- For students who are classified as *Proficient*, with at least what likelihood will they be able to answer item 8?

0.50 0.55 0.60 0.65
- Will the items BEFORE the Proficient bookmark be more or less difficult to answer than the items AFTER the bookmark or about the same?

More difficult to answer About the same Less difficult to answer

Section F

Detailed Results

Missouri Science Grade 5 Science
Round 1 Bookmark Placements

Table	Participant	Basic	Proficient	Advanced
1	5	11	42	53
1	6	11	42	59
1	7	13	42	59
1	8	12	42	62
2	9	11	43	59
2	10	12	42	51
2	11	12	42	64
2	12	12	40	49
2	17	21	44	66
3	13	22	44	53
3	14	11	42	62
3	15	12	42	66
3	16	13	42	62

Overall	Median	12	42	59
	Minimum	11	40	49
	Maximum	22	44	66
	SD	3.71	1.01	5.67

Missouri Science Grade 5 Science
Round 1 Cut Scores

Table	Participant	Basic	Proficient	Advanced
1	5	603	669	688
1	6	603	669	691
1	7	617	669	691
1	8	605	669	696
2	9	603	672	691
2	10	605	669	682
2	11	605	669	700
2	12	605	665	681
2	17	636	675	701
3	13	639	675	688
3	14	603	669	696
3	15	605	669	701
3	16	617	669	696

Overall	Median	605	669	691
	Minimum	603	665	681
	Maximum	639	675	701
	SD	12.55	2.94	6.63

Missouri Science Grade 5 Science
Round 1 Summary of Bookmark Placements

Statistic	Table	Basic	Proficient	Advanced
Median	1	11.5	42	59
Median	2	12	42	59
Median	3	12.5	42	62
Median	Overall	12	42	59
Minimum	1	11	42	53
Minimum	2	11	40	49
Minimum	3	11	42	53
Minimum	Overall	11	40	49
Maximum	1	13	42	62
Maximum	2	21	44	66
Maximum	3	22	44	66
Maximum	Overall	22	44	66
SD	1	0.96	0.00	3.77
SD	2	4.16	1.48	7.60
SD	3	5.07	1.00	5.50
SD	Overall	3.71	1.01	5.67

Overall	Median	12	42	59
	Minimum	11	40	49
	Maximum	22	44	66
	SD	3.71	1.01	5.67

Missouri Science Grade 5 Science
Round 1 Summary of Cut Scores

Statistic	Table	Basic	Proficient	Advanced
Median	1	604	669	691
Median	2	605	669	691
Median	3	611	669	696
Median	Overall	605	669	691
Minimum	1	603	669	688
Minimum	2	603	665	681
Minimum	3	603	669	688
Minimum	Overall	603	665	681
Maximum	1	617	669	696
Maximum	2	636	675	701
Maximum	3	639	675	701
Maximum	Overall	639	675	701
SD	1	6.73	0.00	3.32
SD	2	14.11	3.74	9.51
SD	3	16.53	3.00	5.38
SD	Overall	12.55	2.94	6.63

Overall	Median	605	669	691
	Minimum	603	665	681
	Maximum	639	675	701
	SD	12.55	2.94	6.63

Missouri Science Grade 5 Science Round 1 Median Bookmark Summary

Table	Basic	Proficient	Advanced
1	11.5	42	59
2	12	42	59
3	12.5	42	62
Overall	12	42	59

Impact Data

	Below Basic	Basic	Proficient	Advanced
Overall	4.4	51.2	28.4	16.0

Missouri Science Grade 5 Science
Round 2 Bookmark Placements

Table	Participant	Basic	Proficient	Advanced
1	5	13	42	57
1	6	13	42	59
1	7	13	41	59
1	8	13	42	62
2	9	16	43	59
2	10	16	42	58
2	11	14	42	60
2	12	17	42	58
2	17	16	42	59
3	13	18	44	62
3	14	18	42	62
3	15	18	42	62
3	16	18	42	62

Overall	Median	16	42	59
	Minimum	13	41	57
	Maximum	18	44	62
	SD	2.14	0.69	1.85

Missouri Science Grade 5 Science
Round 2 Cut Scores

Table	Participant	Basic	Proficient	Advanced
1	5	617	669	690
1	6	617	669	691
1	7	617	666	691
1	8	617	669	696
2	9	622	672	691
2	10	622	669	690
2	11	619	669	692
2	12	626	669	690
2	17	622	669	691
3	13	630	675	696
3	14	630	669	696
3	15	630	669	696
3	16	630	669	696

Overall	Median	622	669	691
	Minimum	617	666	690
	Maximum	630	675	696
	SD	5.63	2.20	2.76

Missouri Science Grade 5 Science
Round 2 Summary of Bookmark Placements

Statistic	Table	Basic	Proficient	Advanced
Median	1	13	42	59
Median	2	16	42	59
Median	3	18	42	62
Median	Overall	16	42	59
Minimum	1	13	41	57
Minimum	2	14	42	58
Minimum	3	18	42	62
Minimum	Overall	13	41	57
Maximum	1	13	42	62
Maximum	2	17	43	60
Maximum	3	18	44	62
Maximum	Overall	18	44	62
SD	1	0.00	0.50	2.06
SD	2	1.10	0.45	0.84
SD	3	0.00	1.00	0.00
SD	Overall	2.14	0.69	1.85

Overall	Median	16	42	59
	Minimum	13	41	57
	Maximum	18	44	62
	SD	2.14	0.69	1.85

Missouri Science Grade 5 Science
Round 2 Summary of Cut Scores

Statistic	Table	Basic	Proficient	Advanced
Median	1	617	669	691
Median	2	622	669	691
Median	3	630	669	696
Median	Overall	622	669	691
Minimum	1	617	666	690
Minimum	2	619	669	690
Minimum	3	630	669	696
Minimum	Overall	617	666	690
Maximum	1	617	669	696
Maximum	2	626	672	692
Maximum	3	630	675	696
Maximum	Overall	630	675	696
SD	1	0.00	1.50	2.71
SD	2	2.49	1.34	0.84
SD	3	0.00	3.00	0.00
SD	Overall	5.63	2.20	2.76

Overall	Median	622	669	691
	Minimum	617	666	690
	Maximum	630	675	696
	SD	5.63	2.20	2.76

Missouri Science Grade 5 Science Round 2 Median Bookmark Summary

Table	Basic	Proficient	Advanced
1	13	42	59
2	16	42	59
3	18	42	62
Overall	16	42	59

Impact Data

	Below Basic	Basic	Proficient	Advanced
Overall	9.5	46.0	28.4	16.1

Missouri Science Grade 5 Science
Round 3 Bookmark Placements

Table	Participant	Basic	Proficient	Advanced
1	5	14	42	60
1	6	13	42	60
1	7	13	42	62
1	8	13	42	62
2	9	17	42	59
2	10	16	42	58
2	11	16	42	60
2	12	17	42	58
2	17	17	42	59
3	13	18	44	62
3	14	17	42	62
3	15	17	42	62
3	16	18	42	62

Overall	Median	17	42	60
	Minimum	13	42	58
	Maximum	18	44	62
	SD	1.91	0.55	1.61

Missouri Science Grade 5 Science
Round 3 Cut Scores

Table	Participant	Basic	Proficient	Advanced
1	5	619	669	692
1	6	617	669	692
1	7	617	669	696
1	8	617	669	696
2	9	626	669	691
2	10	622	669	690
2	11	622	669	692
2	12	626	669	690
2	17	626	669	691
3	13	630	675	696
3	14	626	669	696
3	15	626	669	696
3	16	630	669	696

Overall	Median	626	669	692
	Minimum	617	669	690
	Maximum	630	675	696
	SD	4.81	1.85	2.63

Missouri Science Grade 5 Science
Round 3 Summary of Bookmark Placements

Statistic	Table	Basic	Proficient	Advanced
Median	1	13	42	61
Median	2	17	42	59
Median	3	17.5	42	62
Median	Overall	17	42	60
Minimum	1	13	42	60
Minimum	2	16	42	58
Minimum	3	17	42	62
Minimum	Overall	13	42	58
Maximum	1	14	42	62
Maximum	2	17	42	60
Maximum	3	18	44	62
Maximum	Overall	18	44	62
SD	1	0.50	0.00	1.15
SD	2	0.55	0.00	0.84
SD	3	0.58	1.00	0.00
SD	Overall	1.91	0.55	1.61

Overall	Median	17	42	60
	Minimum	13	42	58
	Maximum	18	44	62
	SD	1.91	0.55	1.61

Missouri Science Grade 5 Science
Round 3 Summary of Cut Scores

Statistic	Table	Basic	Proficient	Advanced
Median	1	617	669	694
Median	2	626	669	691
Median	3	628	669	696
Median	Overall	626	669	692
Minimum	1	617	669	692
Minimum	2	622	669	690
Minimum	3	626	669	696
Minimum	Overall	617	669	690
Maximum	1	619	669	696
Maximum	2	626	669	692
Maximum	3	630	675	696
Maximum	Overall	630	675	696
SD	1	1.00	0.00	2.31
SD	2	2.19	0.00	0.84
SD	3	2.31	3.00	0.00
SD	Overall	4.81	1.85	2.63

Overall	Median	626	669	692
	Minimum	617	669	690
	Maximum	630	675	696
	SD	4.81	1.85	2.63

Missouri Science Grade 5 Science Round 3 Median Bookmark Summary

Table	Basic	Proficient	Advanced
1	13	42	61
2	17	42	59
3	17.5	42	62
Overall	17	42	60

Impact Data

	Below Basic	Basic	Proficient	Advanced
Overall	11.5	44.1	29.4	15.0

Missouri Science Grade 8 Science
Round 1 Bookmark Placements

Table	Participant	Basic	Proficient	Advanced
1	15	12	42	65
1	16	13	41	59
1	17	21	39	52
1	18	11	40	69
1	19	22	42	67
2	10	15	45	64
2	11	15	46	72
2	12	33	51	82
2	13	22	46	78
2	14	15	39	61
3	5	13	41	65
3	6	24	48	67
3	7	16	42	61
3	8	18	42	82
3	9	13	43	53

Overall	Median	15	42	65
	Minimum	11	39	52
	Maximum	33	51	82
	SD	5.91	3.42	9.14

Missouri Science Grade 8 Science
Round 1 Cut Scores

Table	Participant	Basic	Proficient	Advanced
1	15	667	706	737
1	16	671	706	729
1	17	679	703	719
1	18	667	703	746
1	19	680	706	738
2	10	675	709	737
2	11	675	709	751
2	12	695	715	771
2	13	680	709	762
2	14	675	703	732
3	5	671	706	737
3	6	680	712	738
3	7	675	706	732
3	8	677	706	771
3	9	671	709	721

Overall	Median	675	706	737
	Minimum	667	703	719
	Maximum	695	715	771
	SD	6.83	3.34	16.06

Missouri Science Grade 8 Science
Round 1 Summary of Bookmark Placements

Statistic	Table	Basic	Proficient	Advanced
Median	1	13	41	65
Median	2	15	46	72
Median	3	16	42	65
Median	Overall	15	42	65
Minimum	1	11	39	52
Minimum	2	15	39	61
Minimum	3	13	41	53
Minimum	Overall	11	39	52
Maximum	1	22	42	69
Maximum	2	33	51	82
Maximum	3	24	48	82
Maximum	Overall	33	51	82
SD	1	5.26	1.30	6.91
SD	2	7.87	4.28	8.93
SD	3	4.55	2.77	10.62
SD	Overall	5.91	3.42	9.14

Overall	Median	15	42	65
	Minimum	11	39	52
	Maximum	33	51	82
	SD	5.91	3.42	9.14

Missouri Science Grade 8 Science
Round 1 Summary of Cut Scores

Statistic	Table	Basic	Proficient	Advanced
Median	1	671	706	737
Median	2	675	709	751
Median	3	675	706	737
Median	Overall	675	706	737
Minimum	1	667	703	719
Minimum	2	675	703	732
Minimum	3	671	706	721
Minimum	Overall	667	703	719
Maximum	1	680	706	746
Maximum	2	695	715	771
Maximum	3	680	712	771
Maximum	Overall	695	715	771
SD	1	6.34	1.64	10.23
SD	2	8.66	4.24	16.41
SD	3	3.90	2.68	18.70
SD	Overall	6.83	3.34	16.06

Overall	Median	675	706	737
	Minimum	667	703	719
	Maximum	695	715	771
	SD	6.83	3.34	16.06

Missouri Science Grade 8 Science Round 1 Median Bookmark Summary

Table	Basic	Proficient	Advanced
1	13	41	65
2	15	46	72
3	16	42	65
Overall	15	42	65

Impact Data

	Below Basic	Basic	Proficient	Advanced
Overall	22.8	38.1	33.6	5.5

Missouri Science Grade 8 Science
Round 2 Bookmark Placements

Table	Participant	Basic	Proficient	Advanced
1	15	13	42	65
1	16	13	40	63
1	17	15	40	61
1	18	13	40	66
1	19	14	42	67
2	10	15	43	64
2	11	15	43	71
2	12	15	42	78
2	13	15	43	71
2	14	15	39	63
3	5	11	38	58
3	6	12	38	61
3	7	12	38	61
3	8	12	38	60
3	9	11	38	61

Overall	Median	13	40	63
	Minimum	11	38	58
	Maximum	15	43	78
	SD	1.55	2.05	5.29

Missouri Science Grade 8 Science
Round 2 Cut Scores

Table	Participant	Basic	Proficient	Advanced
1	15	671	706	737
1	16	671	703	735
1	17	675	703	732
1	18	671	703	737
1	19	674	706	738
2	10	675	709	737
2	11	675	709	748
2	12	675	706	762
2	13	675	709	748
2	14	675	703	735
3	5	667	699	728
3	6	667	699	732
3	7	667	699	732
3	8	667	699	731
3	9	667	699	732

Overall	Median	671	703	735
	Minimum	667	699	728
	Maximum	675	709	762
	SD	3.66	3.78	8.87

Missouri Science Grade 8 Science
Round 2 Summary of Bookmark Placements

Statistic	Table	Basic	Proficient	Advanced
Median	1	13	40	65
Median	2	15	43	71
Median	3	12	38	61
Median	Overall	13	40	63
Minimum	1	13	40	61
Minimum	2	15	39	63
Minimum	3	11	38	58
Minimum	Overall	11	38	58
Maximum	1	15	42	67
Maximum	2	15	43	78
Maximum	3	12	38	61
Maximum	Overall	15	43	78
SD	1	0.89	1.10	2.41
SD	2	0.00	1.73	6.11
SD	3	0.55	0.00	1.30
SD	Overall	1.55	2.05	5.29

Overall	Median	13	40	63
	Minimum	11	38	58
	Maximum	15	43	78
	SD	1.55	2.05	5.29

Missouri Science Grade 8 Science
Round 2 Summary of Cut Scores

Statistic	Table	Basic	Proficient	Advanced
Median	1	671	703	737
Median	2	675	709	748
Median	3	667	699	732
Median	Overall	671	703	735
Minimum	1	671	703	732
Minimum	2	675	703	735
Minimum	3	667	699	728
Minimum	Overall	667	699	728
Maximum	1	675	706	738
Maximum	2	675	709	762
Maximum	3	667	699	732
Maximum	Overall	675	709	762
SD	1	1.95	1.64	2.39
SD	2	0.00	2.68	10.79
SD	3	0.00	0.00	1.73
SD	Overall	3.66	3.78	8.87

Overall	Median	671	703	735
	Minimum	667	699	728
	Maximum	675	709	762
	SD	3.66	3.78	8.87

Missouri Science Grade 8 Science Round 2 Median Bookmark Summary

Table	Basic	Proficient	Advanced
1	13	40	65
2	15	43	71
3	12	38	61
Overall	13	40	63

Impact Data

	Below Basic	Basic	Proficient	Advanced
Overall	19.5	37.1	36.8	6.6

Missouri Science Grade 8 Science
Round 3 Bookmark Placements

Table	Participant	Basic	Proficient	Advanced
1	15	13	40	63
1	16	13	40	63
1	17	15	40	61
1	18	13	40	63
1	19	14	42	68
2	10	13	42	63
2	11	13	43	68
2	12	13	41	63
2	13	15	42	68
2	14	15	39	63
3	5	12	38	61
3	6	12	38	61
3	7	12	38	61
3	8	12	38	63
3	9	11	38	61

Overall	Median	13	40	63
	Minimum	11	38	61
	Maximum	15	43	68
	SD	1.22	1.75	2.58

Missouri Science Grade 8 Science
Round 3 Cut Scores

Table	Participant	Basic	Proficient	Advanced
1	15	671	703	735
1	16	671	703	735
1	17	675	703	732
1	18	671	703	735
1	19	674	706	738
2	10	671	706	735
2	11	671	709	738
2	12	671	706	735
2	13	675	706	738
2	14	675	703	735
3	5	667	699	732
3	6	667	699	732
3	7	667	699	732
3	8	667	699	735
3	9	667	699	732

Overall	Median	671	703	735
	Minimum	667	699	732
	Maximum	675	709	738
	SD	3.08	3.22	2.24

Missouri Science Grade 8 Science
Round 3 Summary of Bookmark Placements

Statistic	Table	Basic	Proficient	Advanced
Median	1	13	40	63
Median	2	13	42	63
Median	3	12	38	61
Median	Overall	13	40	63
Minimum	1	13	40	61
Minimum	2	13	39	63
Minimum	3	11	38	61
Minimum	Overall	11	38	61
Maximum	1	15	42	68
Maximum	2	15	43	68
Maximum	3	12	38	63
Maximum	Overall	15	43	68
SD	1	0.89	0.89	2.61
SD	2	1.10	1.52	2.74
SD	3	0.45	0.00	0.89
SD	Overall	1.22	1.75	2.58

Overall	Median	13	40	63
	Minimum	11	38	61
	Maximum	15	43	68
	SD	1.22	1.75	2.58

Missouri Science Grade 8 Science
Round 3 Summary of Cut Scores

Statistic	Table	Basic	Proficient	Advanced
Median	1	671	703	735
Median	2	671	706	735
Median	3	667	699	732
Median	Overall	671	703	735
Minimum	1	671	703	732
Minimum	2	671	703	735
Minimum	3	667	699	732
Minimum	Overall	667	699	732
Maximum	1	675	706	738
Maximum	2	675	709	738
Maximum	3	667	699	735
Maximum	Overall	675	709	738
SD	1	1.95	1.34	2.12
SD	2	2.19	2.12	1.64
SD	3	0.00	0.00	1.34
SD	Overall	3.08	3.22	2.24

Overall	Median	671	703	735
	Minimum	667	699	732
	Maximum	675	709	738
	SD	3.08	3.22	2.24

Missouri Science Grade 8 Science Round 3 Median Bookmark Summary

Table	Basic	Proficient	Advanced
1	13	40	63
2	13	42	63
3	12	38	61
Overall	13	40	63

Impact Data

	Below Basic	Basic	Proficient	Advanced
Overall	19.5	37.1	36.8	6.6

Missouri Science Grade 11 Science
Round 1 Bookmark Placements

Table	Participant	Basic	Proficient	Advanced
1	5	22	49	79
1	6	24	38	61
1	7	20	35	72
1	8	20	47	81
1	9	9	35	60
2	10	19	40	78
2	11	24	36	70
2	12	14	34	70
2	13	12	42	63
2	14	21	37	64
3	15	22	34	63
3	16	24	38	72
3	17	25	47	86
3	18	9	36	55
3	19	25	53	82

Overall	Median	21	38	70
	Minimum	9	34	55
	Maximum	25	53	86
	SD	5.63	6.11	9.30

Missouri Science Grade 11 Science
Round 1 Cut Scores

Table	Participant	Basic	Proficient	Advanced
1	5	711	744	796
1	6	712	731	762
1	7	708	729	776
1	8	708	743	799
1	9	686	729	761
2	10	708	737	789
2	11	712	729	771
2	12	703	728	771
2	13	702	738	763
2	14	710	730	764
3	15	711	728	763
3	16	712	731	776
3	17	714	743	809
3	18	686	729	748
3	19	714	747	800

Overall	Median	710	731	771
	Minimum	686	728	748
	Maximum	714	747	809
	SD	8.97	6.76	17.97

Missouri Science Grade 11 Science
Round 1 Summary of Bookmark Placements

Statistic	Table	Basic	Proficient	Advanced
Median	1	20	38	72
Median	2	19	37	70
Median	3	24	38	72
Median	Overall	21	38	70
Minimum	1	9	35	60
Minimum	2	12	34	63
Minimum	3	9	34	55
Minimum	Overall	9	34	55
Maximum	1	24	49	81
Maximum	2	24	42	78
Maximum	3	25	53	86
Maximum	Overall	25	53	86
SD	1	5.83	6.72	9.81
SD	2	4.95	3.19	6.00
SD	3	6.82	8.08	12.90
SD	Overall	5.63	6.11	9.30

Overall	Median	21	38	70
	Minimum	9	34	55
	Maximum	25	53	86
	SD	5.63	6.11	9.30

Missouri Science Grade 11 Science
Round 1 Summary of Cut Scores

Statistic	Table	Basic	Proficient	Advanced
Median	1	708	731	776
Median	2	708	730	771
Median	3	712	731	776
Median	Overall	710	731	771
Minimum	1	686	729	761
Minimum	2	702	728	763
Minimum	3	686	728	748
Minimum	Overall	686	728	748
Maximum	1	712	744	799
Maximum	2	712	738	789
Maximum	3	714	747	809
Maximum	Overall	714	747	809
SD	1	10.77	7.63	18.10
SD	2	4.36	4.72	10.43
SD	3	12.03	8.76	25.33
SD	Overall	8.97	6.76	17.97

Overall	Median	710	731	771
	Minimum	686	728	748
	Maximum	714	747	809
	SD	8.97	6.76	17.97

Missouri Science Grade 11 Science Round 1 Median Bookmark Summary

Table	Basic	Proficient	Advanced
1	20	38	72
2	19	37	70
3	24	38	72
Overall	21	38	70

Impact Data

	Below Basic	Basic	Proficient	Advanced
Overall	32.1	22.6	36.8	8.5

Missouri Science Grade 11 Science
Round 2 Bookmark Placements

Table	Participant	Basic	Proficient	Advanced
1	5	22	40	72
1	6	14	36	59
1	7	8	33	68
1	8	14	37	70
1	9	9	35	60
2	10	17	39	74
2	11	17	35	70
2	12	18	34	79
2	13	18	43	65
2	14	16	37	64
3	15	10	34	57
3	16	13	33	59
3	17	10	35	60
3	18	9	36	55
3	19	9	35	56

Overall	Median	14	35	64
	Minimum	8	33	55
	Maximum	22	43	79
	SD	4.31	2.75	7.32

Missouri Science Grade 11 Science
Round 2 Cut Scores

Table	Participant	Basic	Proficient	Advanced
1	5	711	737	776
1	6	703	729	760
1	7	684	728	769
1	8	703	730	771
1	9	686	729	761
2	10	706	735	778
2	11	706	729	771
2	12	707	728	796
2	13	707	739	764
2	14	704	730	764
3	15	694	728	756
3	16	702	728	760
3	17	694	729	761
3	18	686	729	748
3	19	686	729	756

Overall	Median	703	729	764
	Minimum	684	728	748
	Maximum	711	739	796
	SD	9.46	3.44	11.46

Missouri Science Grade 11 Science
Round 2 Summary of Bookmark Placements

Statistic	Table	Basic	Proficient	Advanced
Median	1	14	36	68
Median	2	17	37	70
Median	3	10	35	57
Median	Overall	14	35	64
Minimum	1	8	33	59
Minimum	2	16	34	64
Minimum	3	9	33	55
Minimum	Overall	8	33	55
Maximum	1	22	40	72
Maximum	2	18	43	79
Maximum	3	13	36	60
Maximum	Overall	22	43	79
SD	1	5.55	2.59	5.93
SD	2	0.84	3.58	6.27
SD	3	1.64	1.14	2.07
SD	Overall	4.31	2.75	7.32

Overall	Median	14	35	64
	Minimum	8	33	55
	Maximum	22	43	79
	SD	4.31	2.75	7.32

Missouri Science Grade 11 Science
Round 2 Summary of Cut Scores

Statistic	Table	Basic	Proficient	Advanced
Median	1	703	729	769
Median	2	706	730	771
Median	3	694	729	756
Median	Overall	703	729	764
Minimum	1	684	728	760
Minimum	2	704	728	764
Minimum	3	686	728	748
Minimum	Overall	684	728	748
Maximum	1	711	737	776
Maximum	2	707	739	796
Maximum	3	702	729	761
Maximum	Overall	711	739	796
SD	1	11.80	3.65	6.80
SD	2	1.22	4.66	13.30
SD	3	6.69	0.55	5.12
SD	Overall	9.46	3.44	11.46

Overall	Median	703	729	764
	Minimum	684	728	748
	Maximum	711	739	796
	SD	9.46	3.44	11.46

Missouri Science Grade 11 Science Round 2 Median Bookmark Summary

Table	Basic	Proficient	Advanced
1	14	36	68
2	17	37	70
3	10	35	57
Overall	14	35	64

Impact Data

	Below Basic	Basic	Proficient	Advanced
Overall	26.1	26.4	35.0	12.5

Missouri Science Grade 11 Science
Round 3 Bookmark Placements

Table	Participant	Basic	Proficient	Advanced
1	5	19	40	72
1	6	12	36	60
1	7	14	38	72
1	8	17	40	73
1	9	9	35	56
2	10	16	39	73
2	11	5	35	69
2	12	16	34	70
2	13	18	43	76
2	14	16	37	69
3	15	10	34	54
3	16	10	33	58
3	17	10	35	60
3	18	9	36	61
3	19	9	35	59

Overall	Median	12	36	69
	Minimum	5	33	54
	Maximum	19	43	76
	SD	4.17	2.79	7.34

Missouri Science Grade 11 Science
Round 3 Cut Scores

Table	Participant	Basic	Proficient	Advanced
1	5	708	737	776
1	6	702	729	761
1	7	703	731	776
1	8	706	737	778
1	9	686	729	756
2	10	704	735	778
2	11	668	729	770
2	12	704	728	771
2	13	707	739	786
2	14	704	730	770
3	15	694	728	748
3	16	694	728	757
3	17	694	729	761
3	18	686	729	762
3	19	686	729	760

Overall	Median	702	729	770
	Minimum	668	728	748
	Maximum	708	739	786
	SD	11.20	3.67	10.41

Missouri Science Grade 11 Science
Round 3 Summary of Bookmark Placements

Statistic	Table	Basic	Proficient	Advanced
Median	1	14	38	72
Median	2	16	37	70
Median	3	10	35	59
Median	Overall	12	36	69
Minimum	1	9	35	56
Minimum	2	5	34	69
Minimum	3	9	33	54
Minimum	Overall	5	33	54
Maximum	1	19	40	73
Maximum	2	18	43	76
Maximum	3	10	36	61
Maximum	Overall	19	43	76
SD	1	3.96	2.28	7.99
SD	2	5.22	3.58	3.05
SD	3	0.55	1.14	2.70
SD	Overall	4.17	2.79	7.34

Overall	Median	12	36	69
	Minimum	5	33	54
	Maximum	19	43	76
	SD	4.17	2.79	7.34

Missouri Science Grade 11 Science
Round 3 Summary of Cut Scores

Statistic	Table	Basic	Proficient	Advanced
Median	1	703	731	776
Median	2	704	730	771
Median	3	694	729	760
Median	Overall	702	729	770
Minimum	1	686	729	756
Minimum	2	668	728	770
Minimum	3	686	728	748
Minimum	Overall	668	728	748
Maximum	1	708	737	778
Maximum	2	707	739	786
Maximum	3	694	729	762
Maximum	Overall	708	739	786
SD	1	8.72	4.10	10.14
SD	2	16.49	4.66	7.00
SD	3	4.38	0.55	5.68
SD	Overall	11.20	3.67	10.41

Overall	Median	702	729	770
	Minimum	668	728	748
	Maximum	708	739	786
	SD	11.20	3.67	10.41

Missouri Science Grade 11 Science
Round 3 Median Bookmark Summary

Table	Basic	Proficient	Advanced
1	14	38	72
2	16	37	70
3	10	35	59
Overall	12	36	69

Impact Data

	Below Basic	Basic	Proficient	Advanced
Overall	25.4	27.1	38.5	9.0

Science

Based on Participants' Round 1 Bookmark Recommendations

Standard setting workshop held July 15-18, 2008

	5	8	11	Impact
Below Basic	4%	23%	32%	
Basic	51%	38%	23%	
Proficient	28%	34%	37%	
Advanced	16%	6%	8%	
Proficient & Above	44%	39%	45%	
				Cut Scores
Basic	605	675	710	
Proficient	669	706	731	
Advanced	691	737	771	

Science

Based on Participants' Round 2 Bookmark Recommendations Standard setting workshop held July 15-18, 2008

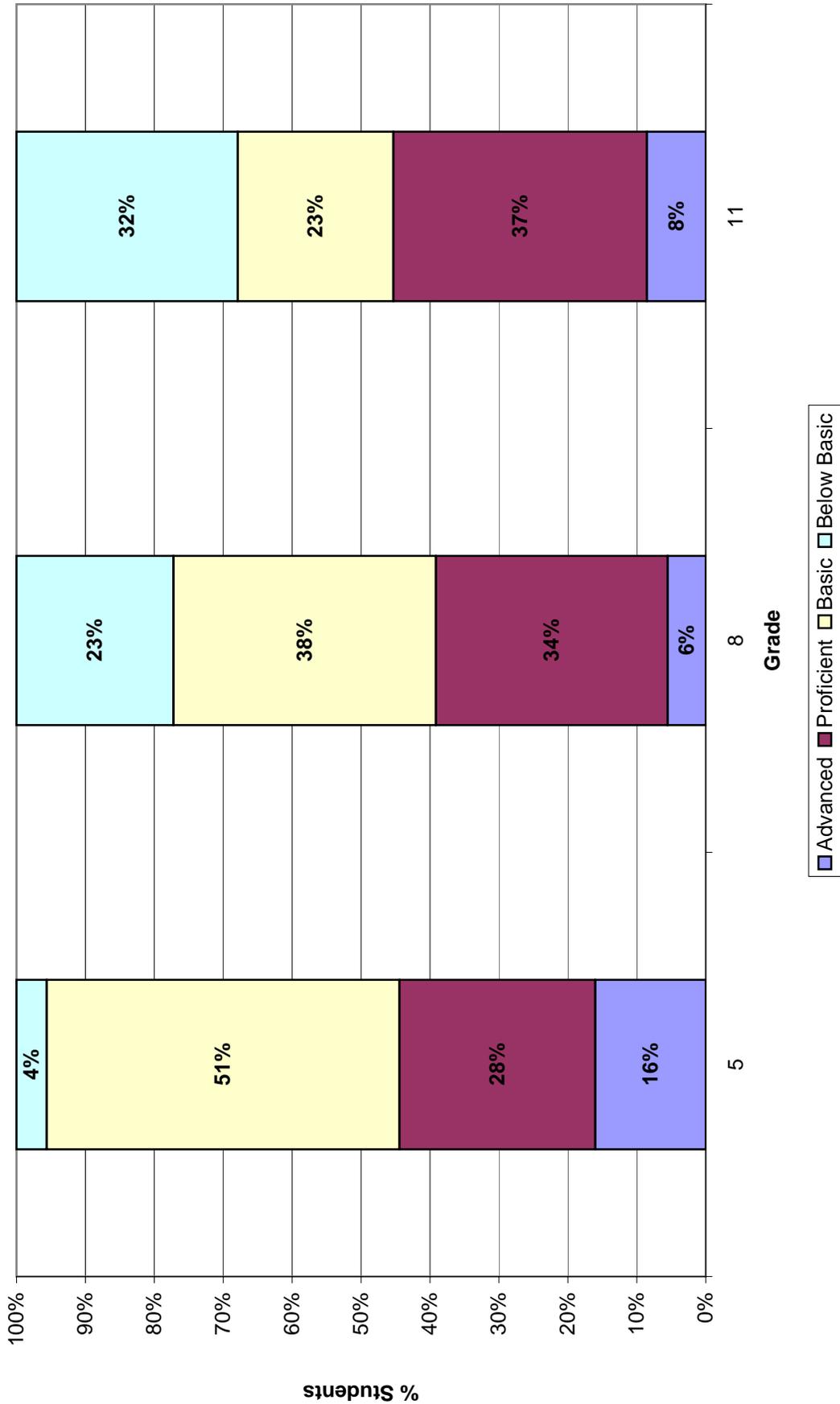
	5	8	11	Impact
Below Basic	10%	19%	26%	
Basic	46%	37%	26%	
Proficient	28%	37%	35%	
Advanced	16%	7%	13%	
Proficient & Above	44%	43%	48%	
Basic	622	671	703	Cut Scores
Proficient	669	703	729	
Advanced	691	735	764	

Science

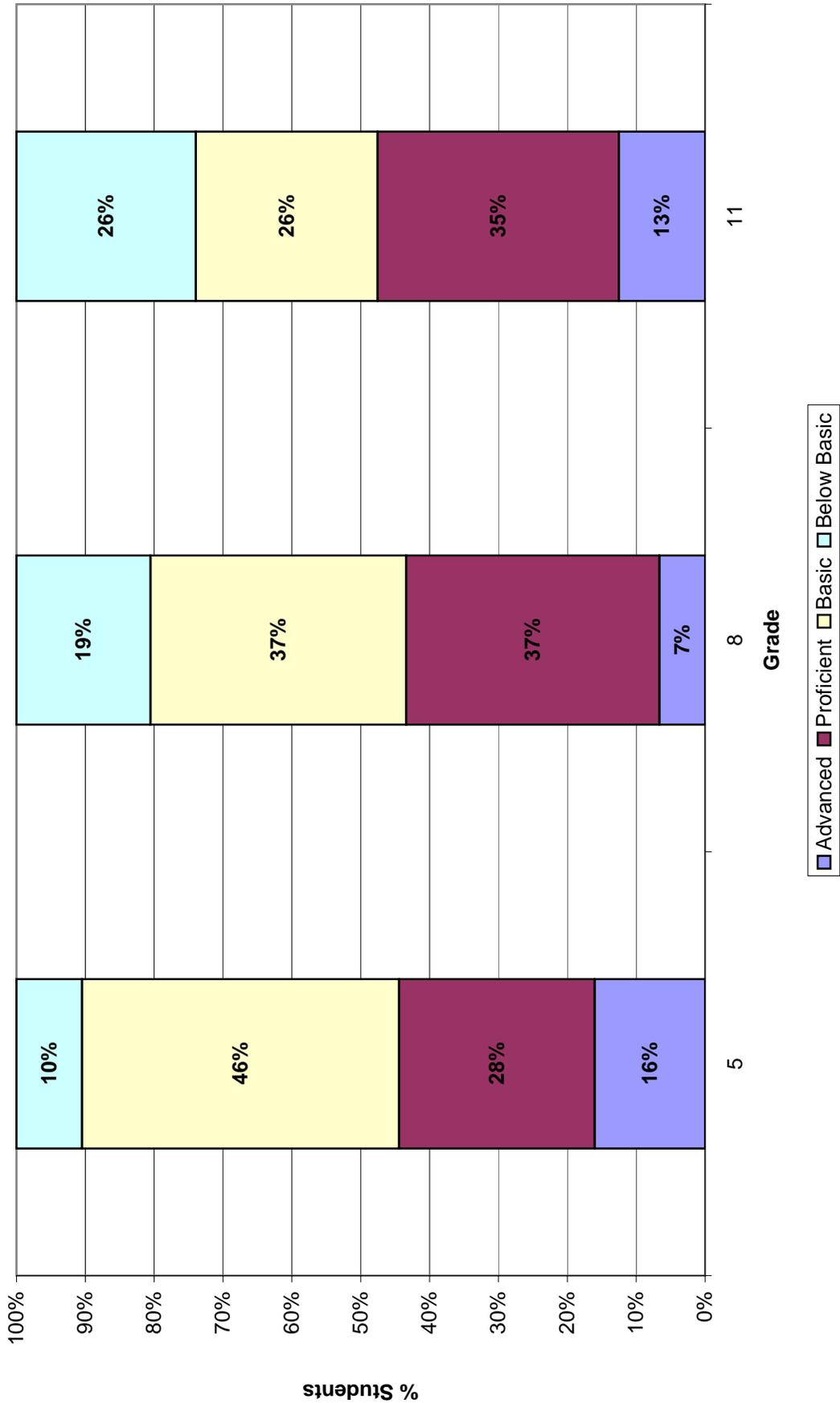
Based on Participants' Final Round Bookmark Recommendations
Standard setting workshop held July 15-18, 2008

	5	8	11	Impact
Below Basic	11%	19%	25%	
Basic	44%	37%	27%	
Proficient	29%	37%	39%	
Advanced	15%	7%	9%	
Proficient & Above	44%	43%	48%	
Basic	626	671	702	Cut Scores
Proficient	669	703	729	
Advanced	692	735	770	

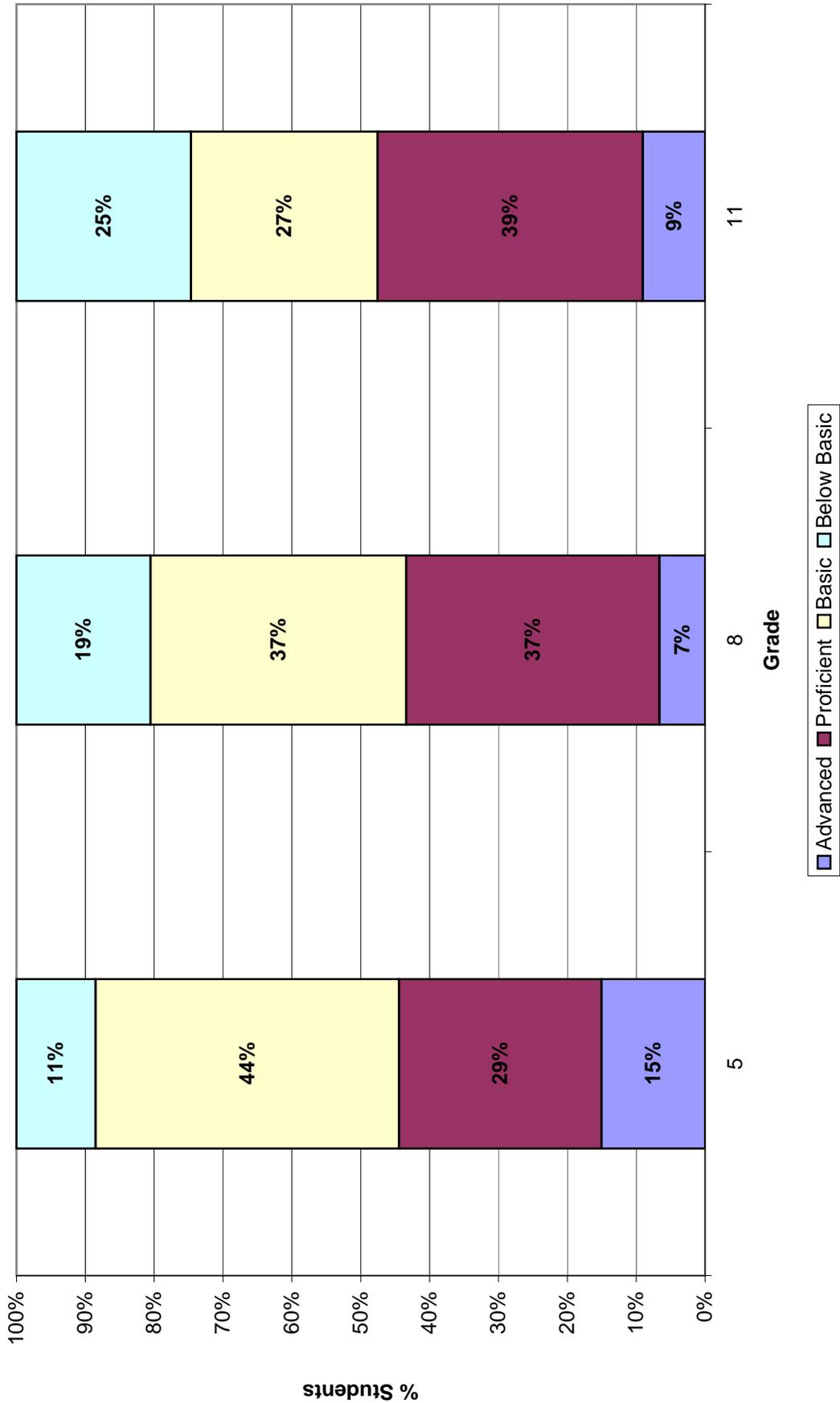
**Missouri Assessment Program
Science Round 1 Results: Percent of Students by Achievement Level**



**Missouri Assessment Program
Science Round 2 Results: Percent of Students by Achievement Level**



**Missouri Assessment Program
Science Final Round Results: Percent of Students by Achievement Level**



Section G

Standard Errors

Calculating a Meaningful Standard Error for the Bookmark Cut Score

Participants' Recommended Cut Scores Plus and Minus One, Two,
and Three Standard Errors with Associated Impact Data

Calculating a Meaningful Standard Error for the Bookmark Cut Score

In the Bookmark Standard Setting Procedure for a given grade and content area, participants are assigned to roughly equivalent small groups that work independently through Round 2. Thus, the set of Round 2 cut scores provide some information about the stability of consensus in Bookmark cut scores across independent small group replications. To quantify this degree of consensus, we calculate the cluster sample standard error (Cochran, 1963, p. 210) of the Round 2 mean cut score. Cluster sample standard errors are appropriate when, as may be reasonably assumed here, data are collected from groups and independence can be assumed between groups but not within groups.

For the Bookmark Procedure, the standard error of the Bookmark cut score (SE_{cut}) is based on the cluster sample standard error of the Round 2 mean cut score. Because the final Bookmark cut scores are based on the *median* of the group instead of the mean, this cluster sample standard error (SE_{cut}) is adjusted by $\sqrt{\frac{\pi}{2}}$ (Huynh, 2003). The standard error of the Bookmark cut score is:

$$SE_{cut} = \left(\sqrt{\frac{\pi}{2}} \right) \left(\sqrt{\frac{S^2}{N} \left[1 + \left(\frac{N}{n} - 1 \right) r \right]} \right),$$

where S^2 is the sample variance of individual Round 2 cut scores, r is the Round 2 intraclass correlation, N is the number of participants, and n is the number of groups. To be precise, if Y_{ik} is the cut score from the i^{th} participant in the k^{th} group, \bar{Y}_k is the average cut score for group k , and $\bar{\bar{Y}}$ is the average of all Round 2 cut scores, then

$$r = \frac{\text{Var}(\bar{Y}_k)}{\text{Var}(\bar{Y}_k) + \text{Var}(Y_{ik} - \bar{Y}_k)} \quad \text{and} \quad S^2 = \frac{1}{N-1} \sum_{n,k} (Y_{nk} - \bar{\bar{Y}})^2$$

If we have only two groups ($n=2$) and perfect dependence (agreement) within groups ($r=1$), then the cluster sample standard error simplifies to $SE_{cut} = \left(\sqrt{\frac{\pi}{2}} \right) \left(\frac{|Y_1 - Y_2|}{2} \right)$, which is the standard error formula employed by NAEP

for two independent replications of a modified Angoff procedure (ACT, 1983, pp. 4-8). If, on the other hand, individual participants acted independently of their groups ($r=0$), then the cluster sample standard error simplifies to the traditional standard error of the mean for independent observations, $SE_{cut} = \left(\sqrt{\frac{\pi}{2}} \right) \left(\sqrt{\frac{S^2}{N}} \right)$. In this

manner, SE_{cut} provides a simple, flexible, and general way to quantify the amount of uncertainty associated with final Bookmark cut scores.

It is appropriate (if statistically imprecise) to say that repeated replications of this very standard setting procedure with different judges sampled from the same population of potential judges would result in a range of cut scores, most of which would fall in a band of width $4 * SE_{cut}$. In the graphical displays of participant data, we depict such an interval centered at the median of the Round 3 cut score. The purpose of calculating statistics like SE_{cut} and producing graphs of the types displayed here is to effectively communicate the complex information that is gathered during a Bookmark Standard Setting Procedure.

References

ACT (1993). Setting achievement levels on the 1992 National Assessment of Educational Progress in Mathematics, Reading, and Writing: A technical report on reliability and validity.

Cochran, W. G. (1963). *Sampling techniques*. New York: John Wiley & Sons.

Huynh, H. (2003, August). Technical Memorandum for Computing Standard Error in Bookmark Standard Setting. (The South Carolina PACT 2003 Standard Setting Support Project). Columbia: University of South Carolina.

Missouri Science Grade 5 Science

Recommended Cut Points* Plus/Minus Selected Standard Errors (SEs) of the Cut Score

Performance Level	Below Basic	Basic	Proficient	Advanced	
SE (cut score)		3.84	1.02	1.76	
Recommended Cut Point* + 3 SE		638	672	697	+ 3 SE
Percent of Students in Each Level	19.3	40.6	29.4	10.7	
Recommended Cut Point* + 2 SE		634	671	695	+ 2 SE
Percent of Students in Each Level	16.3	42.2	29.1	12.4	
Recommended Cut Point* + 1 SE		630	670	694	+ 1 SE
Percent of Students in Each Level	13.7	43.3	29.7	13.3	
Recommended Cut Point*		626	669	692	Recommended Cut Points*
Percent of Students in Each Level	11.5	44.1	29.4	15.0	
Recommended Cut Point* -1 SE		622	668	690	-1 SE
Percent of Students in Each Level	9.5	44.6	28.8	17.1	
Recommended Cut Point* -2 SE		619	667	688	-2 SE
Percent of Students in Each Level	8.3	44.4	28.2	19.1	
Recommended Cut Point* -3 SE		615	666	687	-3 SE
Percent of Students in Each Level	6.9	44.3	28.4	20.4	

* Participants' Large Group Medians

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Missouri Science Grade 5 Science

Recommended Cut Points* Plus/Minus Selected Standard Errors (SEs) of Measurement

Performance Level	Below Basic	Basic	Proficient	Advanced	
Standard Error (SE) measurement		10.00	7.00	8.00	
Recommended Cut Point* + 3 SE		656	690	716	+ 3 SE
Percent of Students in Each Level	37.8	45.1	14.9	2.2	
Recommended Cut Point* + 2 SE		646	683	708	+ 2 SE
Percent of Students in Each Level	26.5	48.4	20.6	4.5	
Recommended Cut Point* + 1 SE		636	676	700	+ 1 SE
Percent of Students in Each Level	17.7	47.9	25.7	8.7	
Recommended Cut Point*		626	669	692	Recommended Cut Points*
Percent of Students in Each Level	11.5	44.1	29.4	15.0	
Recommended Cut Point* -1 SE		616	662	684	-1 SE
Percent of Students in Each Level	7.2	38.3	30.6	23.9	
Recommended Cut Point* -2 SE		606	655	676	-2 SE
Percent of Students in Each Level	4.6	31.9	29.1	34.4	
Recommended Cut Point* -3 SE		596	648	668	-3 SE
Percent of Students in Each Level	2.9	25.6	25.6	45.9	

* Participants' Large Group Medians

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Missouri Science Grade 5 Science

Recommended Cut Points* Plus/Minus Selected Standard Errors (SEs) of Measurement and the Cut Score

Performance Level	Below Basic	Basic	Proficient	Advanced	
Standard Error (SE) measurement + cutscore		10.71	7.07	8.19	
Recommended Cut Point* + 3 SE		658	690	717	+ 3 SE
Percent of Students in Each Level	40.2	42.7	15.1	2.0	
Recommended Cut Point* + 2 SE		648	683	708	+ 2 SE
Percent of Students in Each Level	28.5	46.4	20.6	4.5	
Recommended Cut Point* + 1 SE		637	676	700	+ 1 SE
Percent of Students in Each Level	18.5	47.1	25.7	8.7	
Recommended Cut Point*		626	669	692	Recommended Cut Points*
Percent of Students in Each Level	11.5	44.1	29.4	15.0	
Recommended Cut Point* -1 SE		616	662	684	-1 SE
Percent of Students in Each Level	7.2	38.3	30.6	23.9	
Recommended Cut Point* -2 SE		605	654	676	-2 SE
Percent of Students in Each Level	4.4	30.9	30.3	34.4	
Recommended Cut Point* -3 SE		594	647	667	-3 SE
Percent of Students in Each Level	2.7	24.8	25.1	47.4	

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* Participants' Large Group Medians

G5

Missouri Science Grade 8 Science

Recommended Cut Points* Plus/Minus Selected Standard Errors (SEs) of the Cut Score

Performance Level	Below Basic	Basic	Proficient	Advanced	
SE (cut score)		2.56	2.58	5.30	
Recommended Cut Point* + 3 SE		678	711	751	+ 3 SE
Percent of Students in Each Level	25.5	42.4	31.0	1.1	
Recommended Cut Point* + 2 SE		676	708	745	+ 2 SE
Percent of Students in Each Level	23.7	40.1	33.9	2.3	
Recommended Cut Point* + 1 SE		673	706	740	+ 1 SE
Percent of Students in Each Level	21.0	39.8	35.0	4.2	
Recommended Cut Point*		671	703	735	Recommended Cut Points*
Percent of Students in Each Level	19.5	37.1	36.8	6.6	
Recommended Cut Point* -1 SE		668	700	729	-1 SE
Percent of Students in Each Level	17.3	35.0	36.6	11.1	
Recommended Cut Point* -2 SE		666	698	724	-2 SE
Percent of Students in Each Level	16.0	33.5	34.8	15.7	
Recommended Cut Point* -3 SE		663	695	719	-3 SE
Percent of Students in Each Level	14.0	31.5	33.0	21.5	

* Participants' Large Group Medians

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Missouri Science Grade 8 Science

Recommended Cut Points* Plus/Minus Selected Standard Errors (SEs) of Measurement

Performance Level	Below Basic	Basic	Proficient	Advanced	
Standard Error (SE) measurement		7.00	6.00	7.00	
Recommended Cut Point* + 3 SE		692	721	756	+ 3 SE
Percent of Students in Each Level	41.5	39.4	18.6	0.5	
Recommended Cut Point* + 2 SE		685	715	749	+ 2 SE
Percent of Students in Each Level	33.0	40.2	25.4	1.4	
Recommended Cut Point* + 1 SE		678	709	742	+ 1 SE
Percent of Students in Each Level	25.5	39.6	31.6	3.3	
Recommended Cut Point*		671	703	735	Recommended Cut Points*
Percent of Students in Each Level	19.5	37.1	36.8	6.6	
Recommended Cut Point* -1 SE		664	697	728	-1 SE
Percent of Students in Each Level	14.6	33.5	40.0	11.9	
Recommended Cut Point* -2 SE		657	691	721	-2 SE
Percent of Students in Each Level	10.7	29.4	40.7	19.2	
Recommended Cut Point* -3 SE		650	685	714	-3 SE
Percent of Students in Each Level	7.7	25.3	38.9	28.1	

* Participants' Large Group Medians

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Missouri Science Grade 8 Science

Recommended Cut Points* Plus/Minus Selected Standard Errors (SEs) of Measurement and the Cut Score

Performance Level	Below Basic	Basic	Proficient	Advanced	
Standard Error (SE) measurement + cutscore		7.45	6.53	8.78	
Recommended Cut Point* + 3 SE		693	723	761	+ 3 SE
Percent of Students in Each Level	42.8	40.4	16.5	0.3	
Recommended Cut Point* + 2 SE		686	716	752	+ 2 SE
Percent of Students in Each Level	34.1	40.5	24.4	1.0	
Recommended Cut Point* + 1 SE		678	710	743	+ 1 SE
Percent of Students in Each Level	25.5	41.0	30.6	2.9	
Recommended Cut Point*		671	703	735	Recommended Cut Points*
Percent of Students in Each Level	19.5	37.1	36.8	6.6	
Recommended Cut Point* -1 SE		663	696	726	-1 SE
Percent of Students in Each Level	14.0	32.8	39.5	13.7	
Recommended Cut Point* -2 SE		656	690	717	-2 SE
Percent of Students in Each Level	10.3	28.6	37.1	24.0	
Recommended Cut Point* -3 SE		648	683	708	-3 SE
Percent of Students in Each Level	7.0	23.8	33.1	36.1	

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* Participants' Large Group Medians

Missouri Science Grade 11 Science

Recommended Cut Points* Plus/Minus Selected Standard Errors (SEs) of the Cut Score

Performance Level	Below Basic	Basic	Proficient	Advanced	
SE (cut score)		5.19	1.62	6.64	
Recommended Cut Point* + 3 SE		718	734	790	+ 3 SE
Percent of Students in Each Level	40.2	18.0	39.5	2.3	
Recommended Cut Point* + 2 SE		712	732	784	+ 2 SE
Percent of Students in Each Level	34.0	21.8	40.5	3.7	
Recommended Cut Point* + 1 SE		707	731	777	+ 1 SE
Percent of Students in Each Level	29.4	25.3	39.4	5.9	
Recommended Cut Point*		702	729	770	Recommended Cut Points*
Percent of Students in Each Level	25.4	27.1	38.5	9.0	
Recommended Cut Point* -1 SE		697	727	764	-1 SE
Percent of Students in Each Level	21.7	28.4	37.4	12.5	
Recommended Cut Point* -2 SE		692	726	757	-2 SE
Percent of Students in Each Level	18.5	30.4	33.3	17.8	
Recommended Cut Point* -3 SE		687	724	750	-3 SE
Percent of Students in Each Level	15.7	30.9	29.2	24.2	

* Participants' Large Group Medians

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Missouri Science Grade 11 Science

Recommended Cut Points* Plus/Minus Selected Standard Errors (SEs) of Measurement

Performance Level	Below Basic	Basic	Proficient	Advanced	
Standard Error (SE) measurement		9.00	8.00	8.00	
Recommended Cut Point* + 3 SE		729	753	794	+ 3 SE
Percent of Students in Each Level	52.4	26.1	19.7	1.8	
Recommended Cut Point* + 2 SE		720	745	786	+ 2 SE
Percent of Students in Each Level	42.3	28.3	26.3	3.1	
Recommended Cut Point* + 1 SE		711	737	778	+ 1 SE
Percent of Students in Each Level	33.1	28.5	32.9	5.5	
Recommended Cut Point*		702	729	770	Recommended Cut Points*
Percent of Students in Each Level	25.4	27.1	38.5	9.0	
Recommended Cut Point* -1 SE		693	721	762	-1 SE
Percent of Students in Each Level	19.1	24.3	42.8	13.8	
Recommended Cut Point* -2 SE		684	713	754	-2 SE
Percent of Students in Each Level	14.2	20.9	44.5	20.4	
Recommended Cut Point* -3 SE		675	705	746	-3 SE
Percent of Students in Each Level	10.6	17.1	44.0	28.3	

* Participants' Large Group Medians

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Missouri Science Grade 11 Science

Recommended Cut Points* Plus/Minus Selected Standard Errors (SEs) of Measurement and the Cut Score

Performance Level	Below Basic	Basic	Proficient	Advanced	
Standard Error (SE) measurement + cutscore		10.38	8.16	10.39	
Recommended Cut Point* + 3 SE		733	753	801	+ 3 SE
Percent of Students in Each Level	57.0	21.6	20.5	0.9	
Recommended Cut Point* + 2 SE		723	745	791	+ 2 SE
Percent of Students in Each Level	45.6	25.0	27.3	2.1	
Recommended Cut Point* + 1 SE		712	737	781	+ 1 SE
Percent of Students in Each Level	34.0	27.6	33.8	4.6	
Recommended Cut Point*		702	729	770	Recommended Cut Points*
Percent of Students in Each Level	25.4	27.1	38.5	9.0	
Recommended Cut Point* -1 SE		692	721	760	-1 SE
Percent of Students in Each Level	18.5	24.9	41.3	15.3	
Recommended Cut Point* -2 SE		681	713	749	-2 SE
Percent of Students in Each Level	13.0	22.1	39.8	25.1	
Recommended Cut Point* -3 SE		671	705	739	-3 SE
Percent of Students in Each Level	9.3	18.4	36.3	36.0	

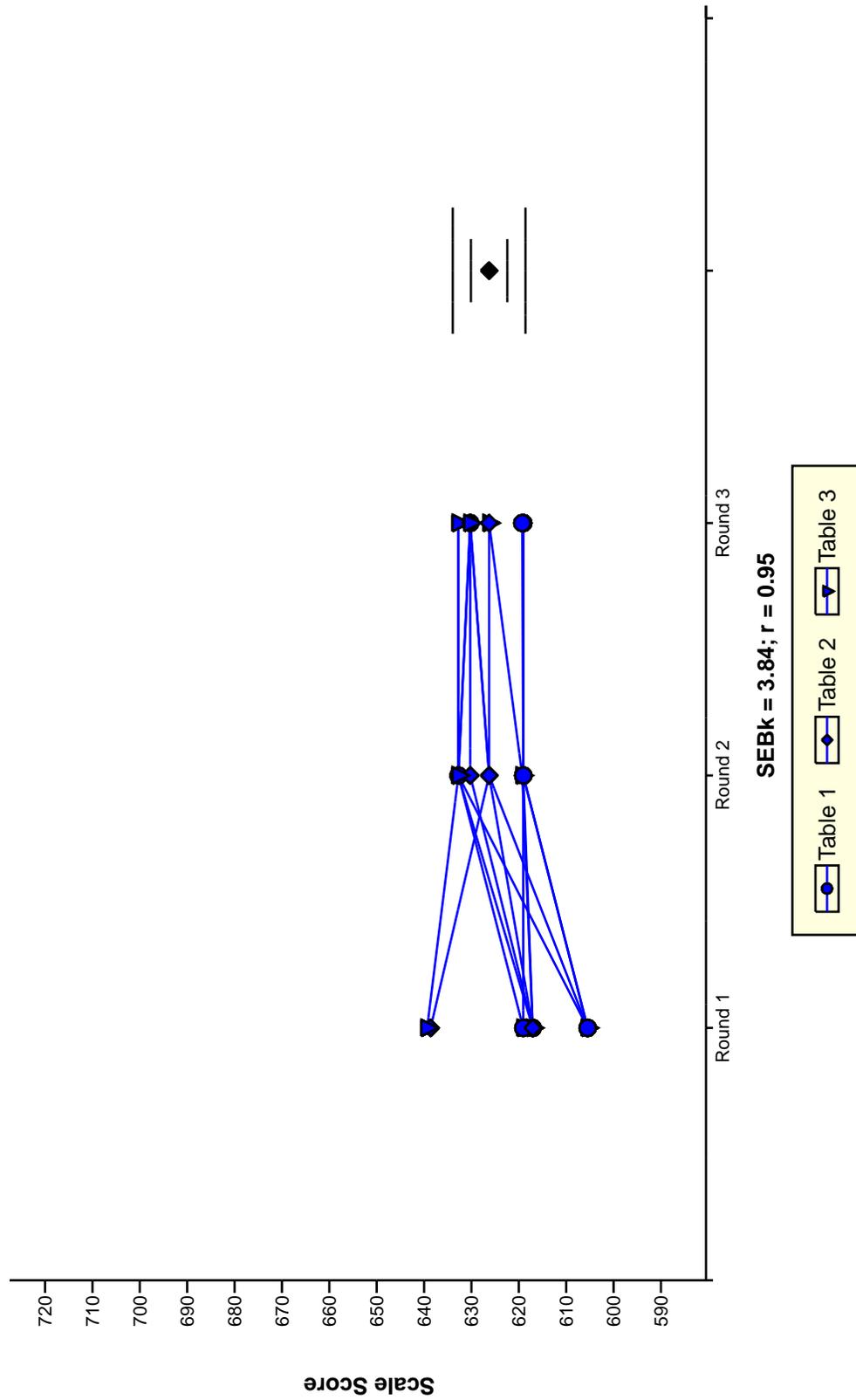
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* Participants' Large Group Medians

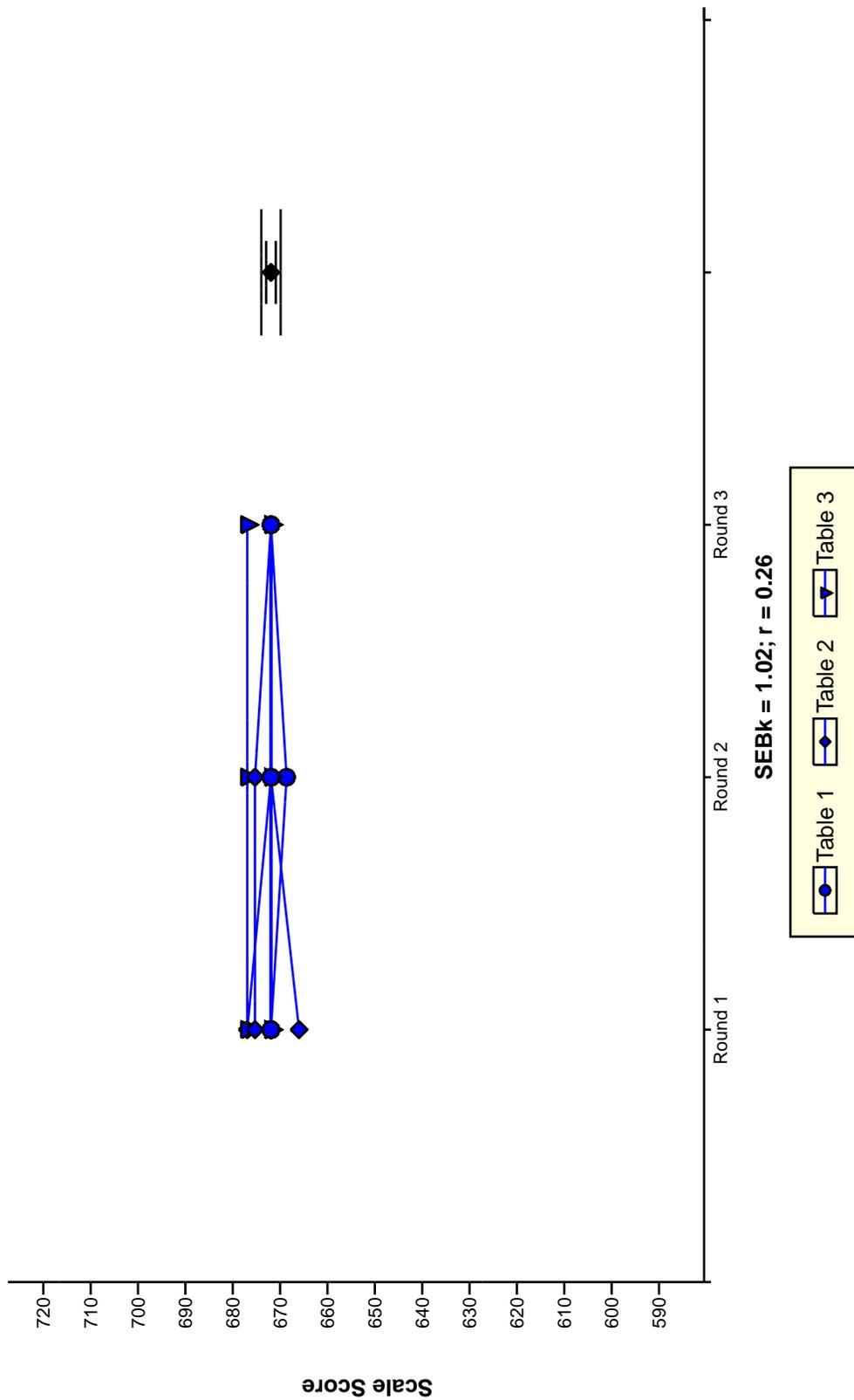
Section H

Graphical Representations of Participants' Judgments and Standard Errors

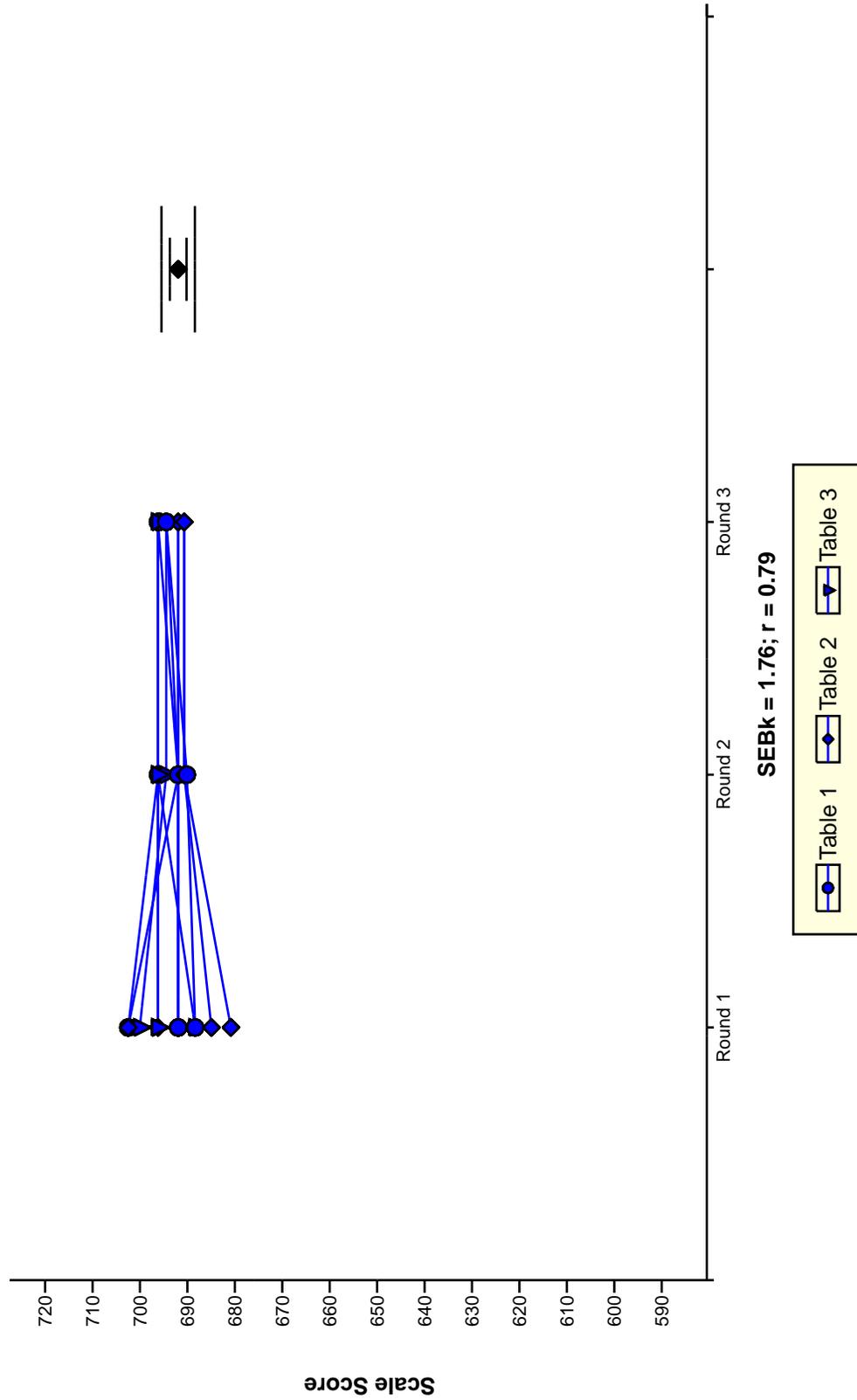
Missouri Science Grade 5 Science Basic Cut Point



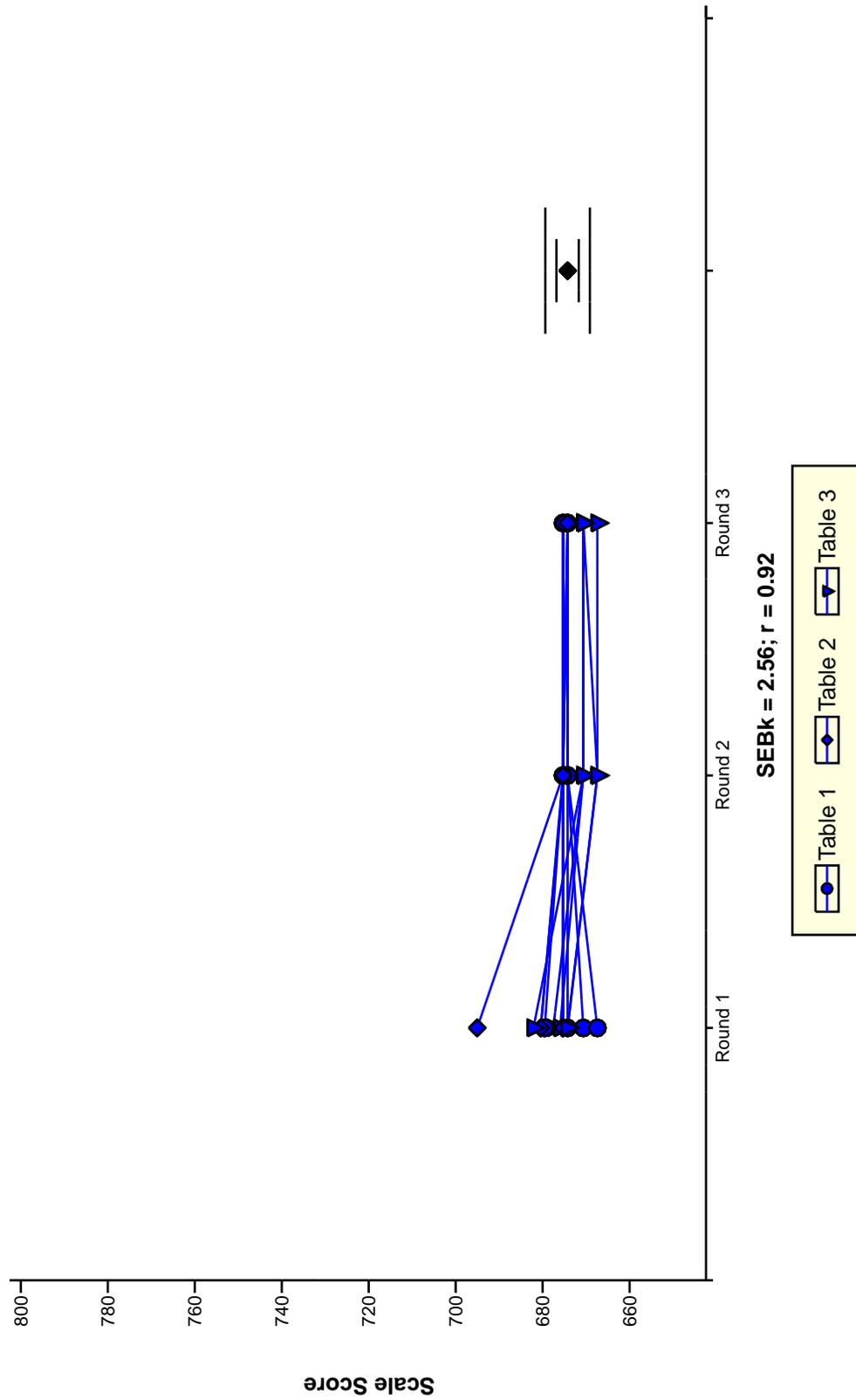
Missouri Science Grade 5 Science Proficient Cut Point



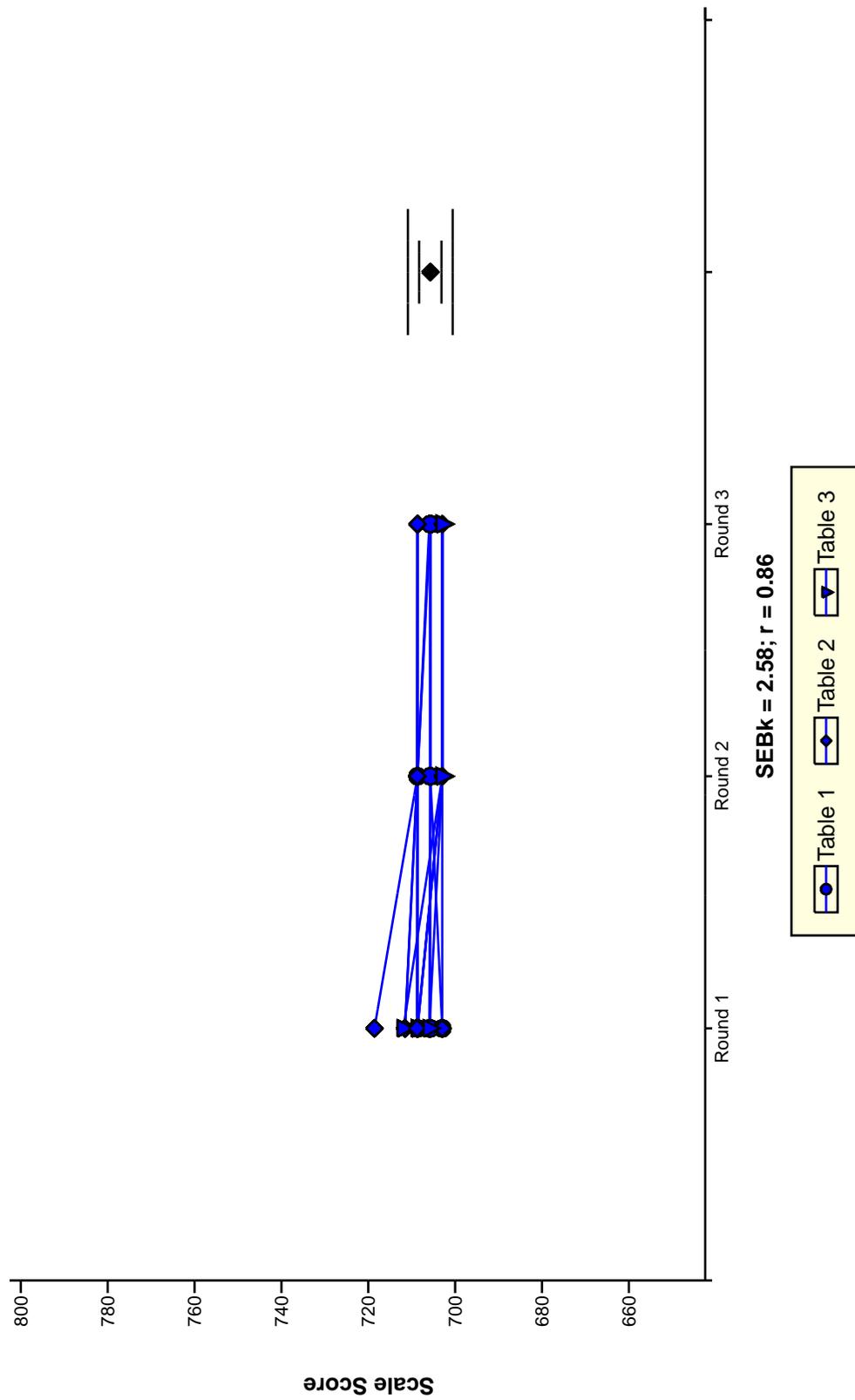
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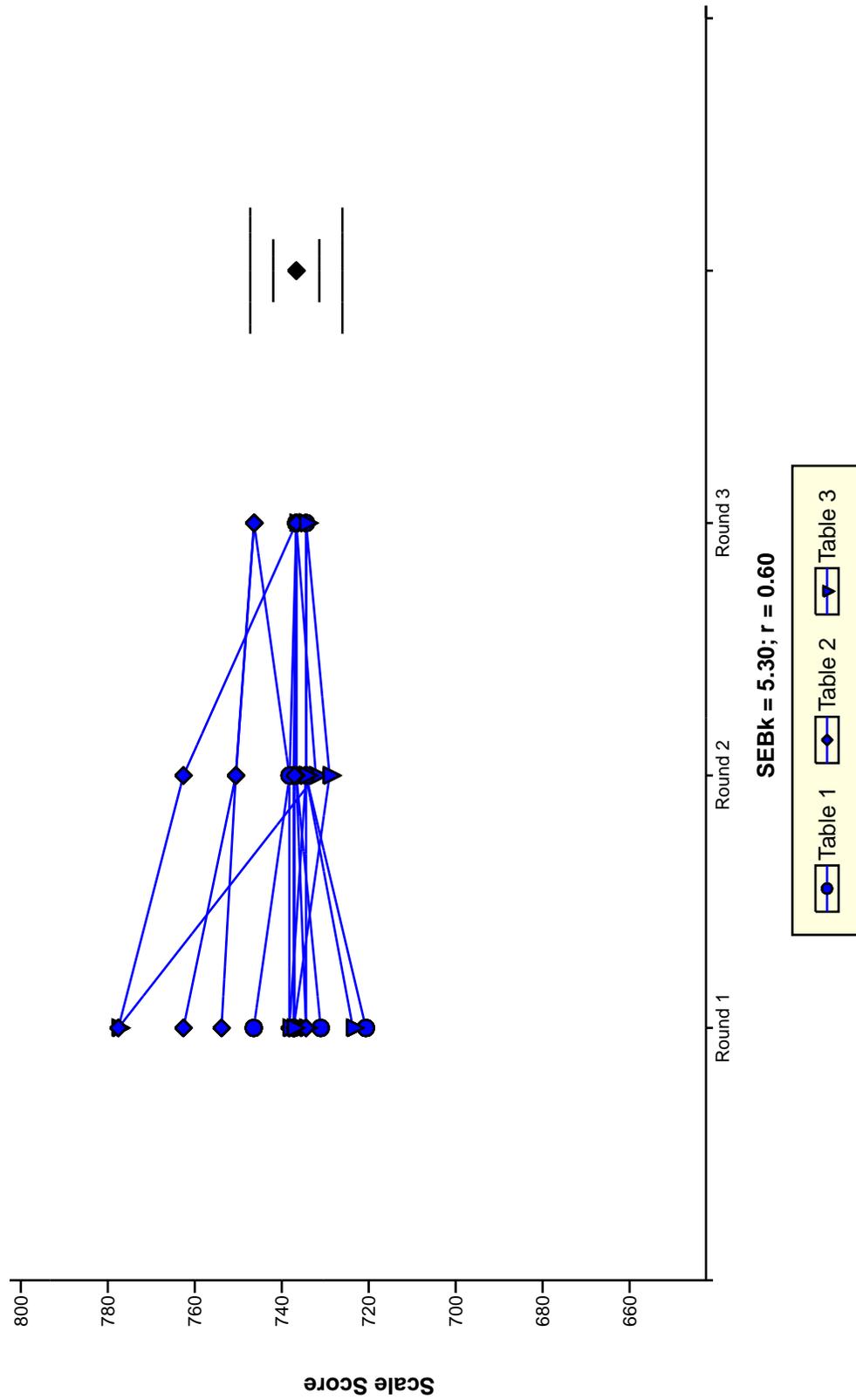
Missouri Science Grade 8 Science Basic Cut Point



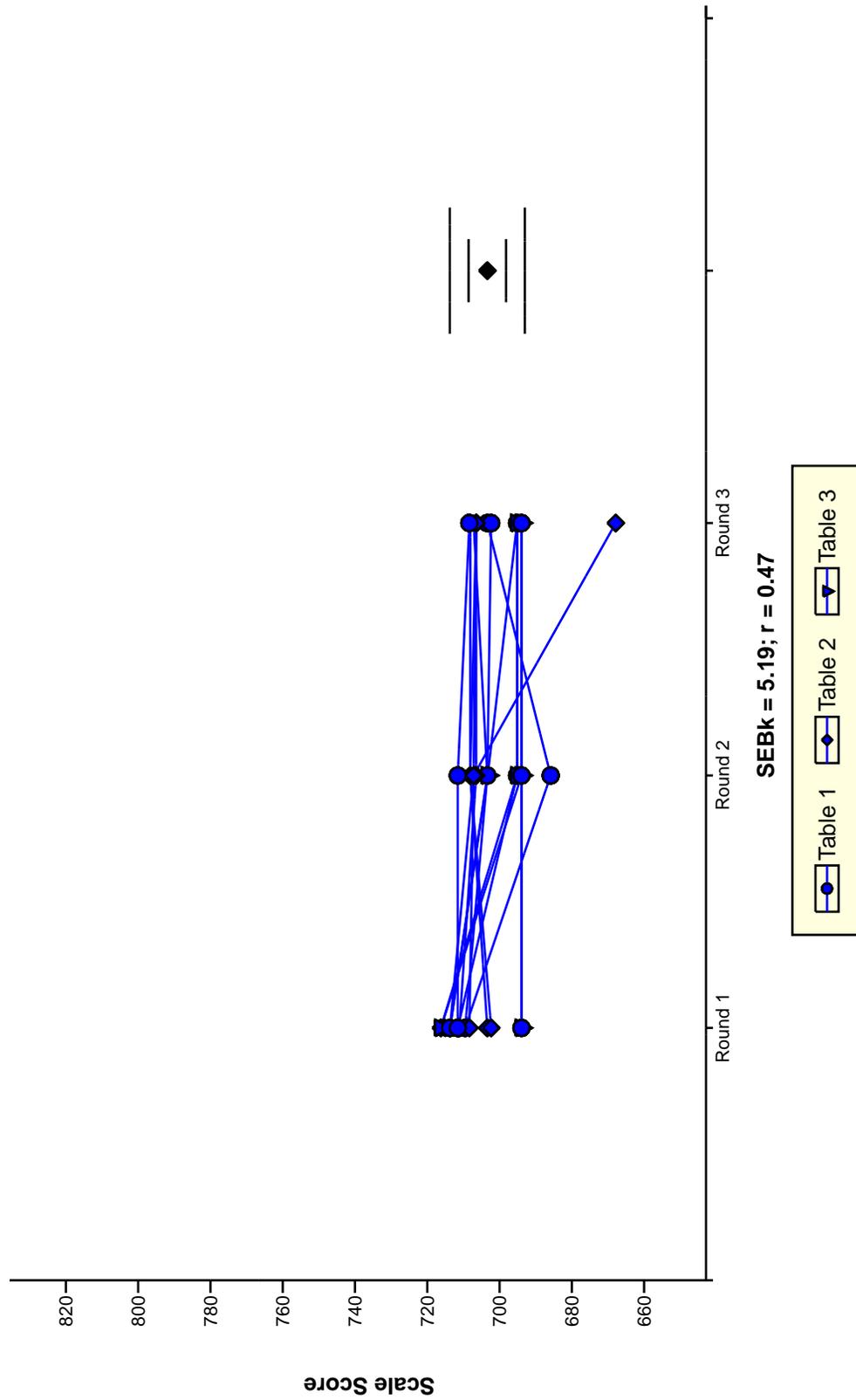
Missouri Science Grade 8 Science Proficient Cut Point



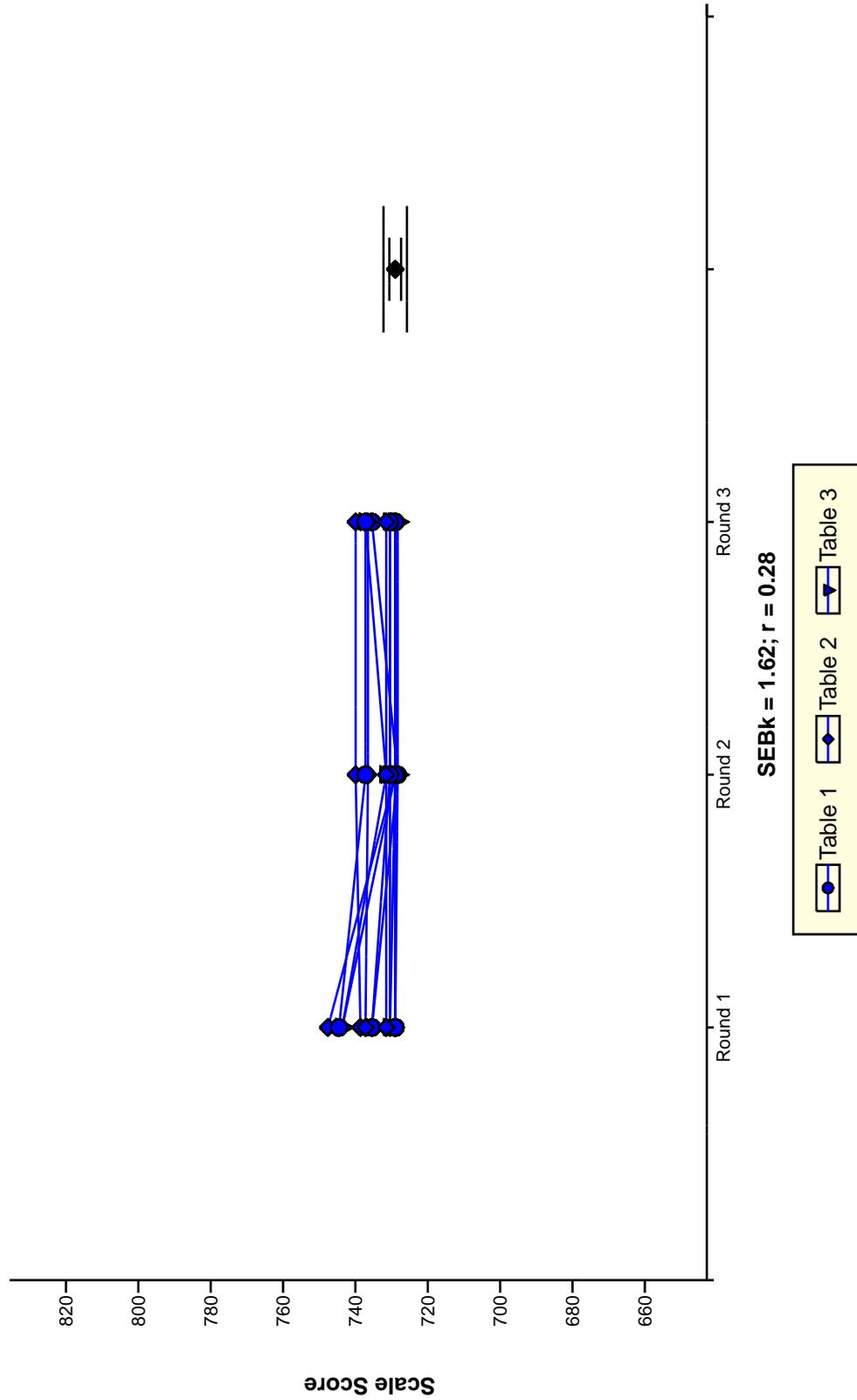
Missouri Science Grade 8 Science Advanced Cut Point



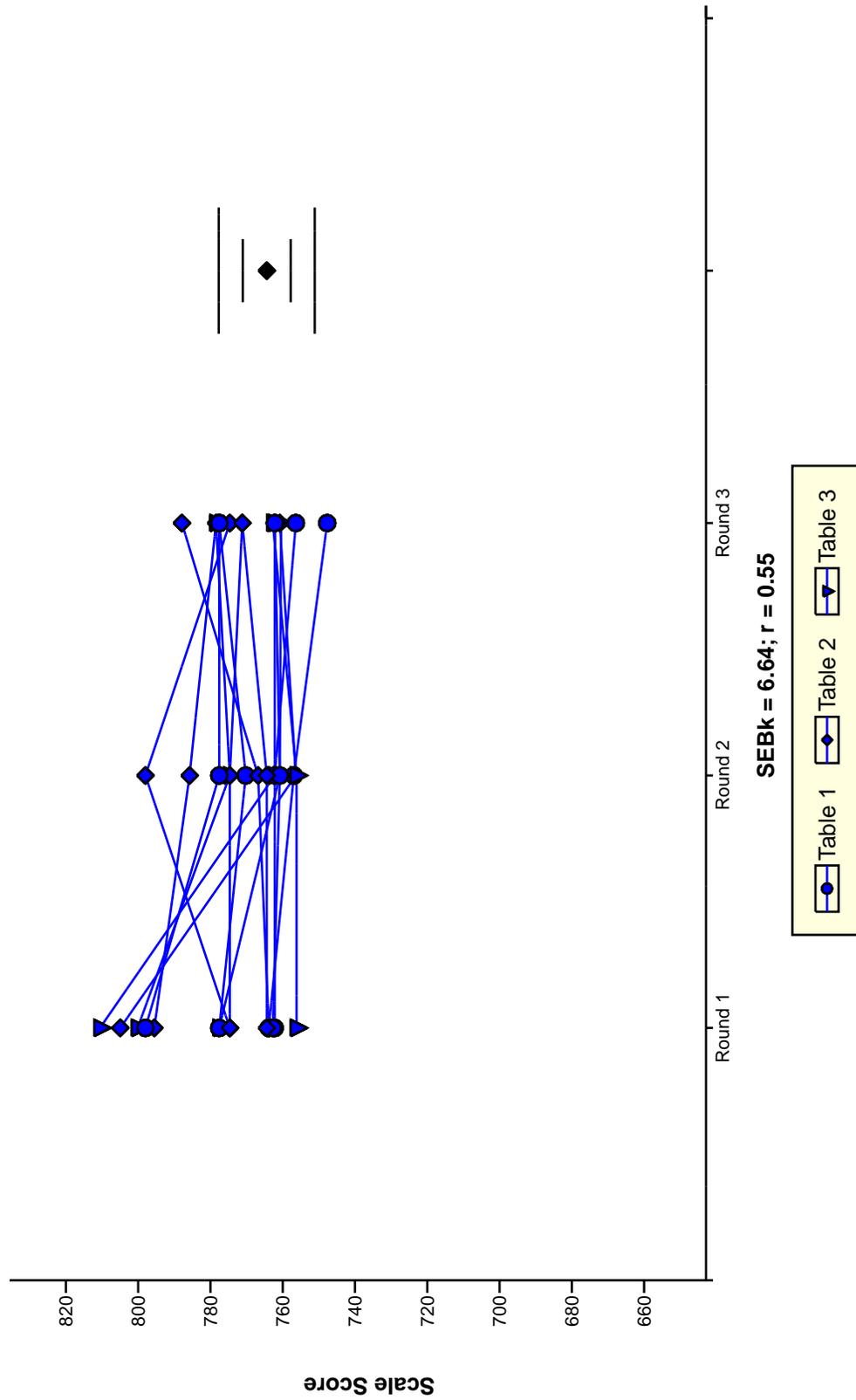
Missouri Science Grade 11 Science Basic Cut Point



Missouri Science Grade 11 Science Proficient Cut Point



Missouri Science Grade 11 Science Advanced Cut Point



Section I

Participant Evaluation

Missouri MAP Science 2008
Bookmark Standard Setting
Evaluation Results

About these results

Each question is shown, along with its answer choices and associated response percentages. For Likert-type questions, there are five possible responses: "Strongly Disagree," "Disagree," "Neutral," "Agree," and "Strongly Agree." For each question, the number of respondents is shown in the column labeled "N."

Question 1

The Bookmark Procedure was well described.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	0.0%	0.0%	0.0%	39.5%	60.5%
	Grade 5	13	0.0%	0.0%	0.0%	38.5%	61.5%
	Grade 8	15	0.0%	0.0%	0.0%	26.7%	73.3%
	Grade 11	15	0.0%	0.0%	0.0%	53.3%	46.7%

Question 2

The training on Bookmark placement made the task clear to me.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	0.0%	0.0%	0.0%	51.2%	48.8%
	Grade 5	13	0.0%	0.0%	0.0%	46.2%	53.8%
	Grade 8	15	0.0%	0.0%	0.0%	46.7%	53.3%
	Grade 11	15	0.0%	0.0%	0.0%	60.0%	40.0%

Question 3

The training materials were helpful.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	0.0%	0.0%	4.7%	44.2%	51.2%
	Grade 5	13	0.0%	0.0%	7.7%	38.5%	53.8%
	Grade 8	15	0.0%	0.0%	0.0%	33.3%	66.7%
	Grade 11	15	0.0%	0.0%	6.7%	60.0%	33.3%

Question 4

The goals for the Bookmark Procedure were clear.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	0.0%	4.7%	2.3%	44.2%	48.8%
	Grade 5	13	0.0%	7.7%	7.7%	38.5%	46.2%
	Grade 8	15	0.0%	0.0%	0.0%	46.7%	53.3%
	Grade 11	15	0.0%	6.7%	0.0%	46.7%	46.7%

Question 5

Taking the test helped me place my bookmarks.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	2.3%	4.7%	9.3%	34.9%	48.8%
	Grade 5	13	7.7%	15.4%	15.4%	15.4%	46.2%
	Grade 8	15	0.0%	0.0%	0.0%	33.3%	66.7%
	Grade 11	15	0.0%	0.0%	13.3%	53.3%	33.3%

Question 6

The ordering of the items in the ordered item booklet agreed with my perception of the relative difficulty of the items.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		42	7.1%	26.2%	23.8%	40.5%	2.4%
	Grade 5	13	15.4%	38.5%	15.4%	30.8%	0.0%
	Grade 8	14	0.0%	14.3%	21.4%	57.1%	7.1%
	Grade 11	15	6.7%	26.7%	33.3%	33.3%	0.0%

Question 7

Reviewing the NAEP achievement level descriptors helped me place my bookmarks.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	0.0%	9.3%	18.6%	53.5%	18.6%
	Grade 5	13	0.0%	7.7%	7.7%	69.2%	15.4%
	Grade 8	15	0.0%	0.0%	20.0%	46.7%	33.3%
	Grade 11	15	0.0%	20.0%	26.7%	46.7%	6.7%

Question 8

Reviewing the Target Students helped me place my bookmarks.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		42	0.0%	9.5%	19.0%	57.1%	14.3%
	Grade 5	12	0.0%	25.0%	25.0%	50.0%	0.0%
	Grade 8	15	0.0%	6.7%	13.3%	53.3%	26.7%
	Grade 11	15	0.0%	0.0%	20.0%	66.7%	13.3%

Question 9

I considered the GLEs when I placed my bookmarks.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	2.3%	11.6%	4.7%	53.5%	27.9%
	Grade 5	13	0.0%	30.8%	0.0%	46.2%	23.1%
	Grade 8	15	0.0%	0.0%	6.7%	66.7%	26.7%
	Grade 11	15	6.7%	6.7%	6.7%	46.7%	33.3%

Question 10

I understood how to place my bookmarks.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		42	0.0%	2.4%	0.0%	35.7%	61.9%
	Grade 5	12	0.0%	8.3%	0.0%	50.0%	41.7%
	Grade 8	15	0.0%	0.0%	0.0%	6.7%	93.3%
	Grade 11	15	0.0%	0.0%	0.0%	53.3%	46.7%

Question 11

I had enough time to consider my Round 1 bookmarks.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	2.3%	2.3%	0.0%	30.2%	65.1%
	Grade 5	13	7.7%	0.0%	0.0%	30.8%	61.5%
	Grade 8	15	0.0%	0.0%	0.0%	13.3%	86.7%
	Grade 11	15	0.0%	6.7%	0.0%	46.7%	46.7%

Question 12

During Round 1, I placed my bookmarks without consulting other participants.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	0.0%	9.3%	4.7%	32.6%	53.5%
	Grade 5	13	0.0%	23.1%	7.7%	46.2%	23.1%
	Grade 8	15	0.0%	0.0%	6.7%	26.7%	66.7%
	Grade 11	15	0.0%	6.7%	0.0%	26.7%	66.7%

Question 13

I learned how to do the bookmark placement as I went along, so my later ones may not be comparable to my earlier ones.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	18.6%	39.5%	9.3%	25.6%	7.0%
	Grade 5	13	7.7%	53.8%	7.7%	23.1%	7.7%
	Grade 8	15	33.3%	33.3%	0.0%	26.7%	6.7%
	Grade 11	15	13.3%	33.3%	20.0%	26.7%	6.7%

Question 14

Overall, my table's discussions were open and honest.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	0.0%	0.0%	0.0%	23.3%	76.7%
	Grade 5	13	0.0%	0.0%	0.0%	23.1%	76.9%
	Grade 8	15	0.0%	0.0%	0.0%	13.3%	86.7%
	Grade 11	15	0.0%	0.0%	0.0%	33.3%	66.7%

Question 15

Overall, I believe that my opinions were considered and valued by my group.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	0.0%	0.0%	0.0%	44.2%	55.8%
	Grade 5	13	0.0%	0.0%	0.0%	46.2%	53.8%
	Grade 8	15	0.0%	0.0%	0.0%	26.7%	73.3%
	Grade 11	15	0.0%	0.0%	0.0%	60.0%	40.0%

Question 16

The presentation of impact data was helpful to me.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		42	0.0%	0.0%	4.8%	38.1%	57.1%
	Grade 5	13	0.0%	0.0%	0.0%	46.2%	53.8%
	Grade 8	14	0.0%	0.0%	0.0%	42.9%	57.1%
	Grade 11	15	0.0%	0.0%	13.3%	26.7%	60.0%

Question 17

I feel this procedure was fair.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	0.0%	2.3%	9.3%	48.8%	39.5%
	Grade 5	13	0.0%	0.0%	15.4%	69.2%	15.4%
	Grade 8	15	0.0%	0.0%	0.0%	40.0%	60.0%
	Grade 11	15	0.0%	6.7%	13.3%	40.0%	40.0%

Question 18

I am confident that the Bookmark Procedure produced valid standards.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		42	0.0%	4.8%	16.7%	50.0%	28.6%
	Grade 5	12	0.0%	0.0%	25.0%	66.7%	8.3%
	Grade 8	15	0.0%	0.0%	0.0%	53.3%	46.7%
	Grade 11	15	0.0%	13.3%	26.7%	33.3%	26.7%

Question 19

Overall, I am satisfied with my group's final bookmarks.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	0.0%	4.7%	2.3%	62.8%	30.2%
	Grade 5	13	0.0%	7.7%	0.0%	84.6%	7.7%
	Grade 8	15	0.0%	0.0%	0.0%	46.7%	53.3%
	Grade 11	15	0.0%	6.7%	6.7%	60.0%	26.7%

Question 20

I would defend the Basic cut score against criticism that it is too high.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	4.7%	20.9%	0.0%	37.2%	37.2%
	Grade 5	13	7.7%	38.5%	0.0%	46.2%	7.7%
	Grade 8	15	0.0%	0.0%	0.0%	46.7%	53.3%
	Grade 11	15	6.7%	26.7%	0.0%	20.0%	46.7%

Question 21

I would defend the Basic cut score against criticism that it is too low.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		42	4.8%	14.3%	0.0%	52.4%	28.6%
	Grade 5	13	0.0%	15.4%	0.0%	76.9%	7.7%
	Grade 8	14	0.0%	0.0%	0.0%	50.0%	50.0%
	Grade 11	15	13.3%	26.7%	0.0%	33.3%	26.7%

Question 22

I would defend the Proficient cut score against criticism that it is too high.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	2.3%	14.0%	2.3%	51.2%	30.2%
	Grade 5	13	7.7%	30.8%	0.0%	61.5%	0.0%
	Grade 8	15	0.0%	6.7%	0.0%	53.3%	40.0%
	Grade 11	15	0.0%	6.7%	6.7%	40.0%	46.7%

Question 23

I would defend the Proficient cut score against criticism that it is too low.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	4.7%	7.0%	2.3%	58.1%	27.9%
	Grade 5	13	7.7%	15.4%	0.0%	76.9%	0.0%
	Grade 8	15	0.0%	0.0%	0.0%	60.0%	40.0%
	Grade 11	15	6.7%	6.7%	6.7%	40.0%	40.0%

Question 24

I would defend the Advanced cut score against criticism that it is too high.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		42	9.5%	14.3%	9.5%	40.5%	26.2%
	Grade 5	12	8.3%	33.3%	0.0%	58.3%	0.0%
	Grade 8	15	6.7%	0.0%	20.0%	33.3%	40.0%
	Grade 11	15	13.3%	13.3%	6.7%	33.3%	33.3%

Question 25

I would defend the Advanced cut score against criticism that it is too low.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		42	4.8%	7.1%	2.4%	52.4%	33.3%
	Grade 5	12	0.0%	16.7%	0.0%	75.0%	8.3%
	Grade 8	15	0.0%	0.0%	0.0%	46.7%	53.3%
	Grade 11	15	13.3%	6.7%	6.7%	40.0%	33.3%

Question 26

Participating in the standard setting increased my understanding of the test.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	2.3%	0.0%	0.0%	23.3%	74.4%
	Grade 5	13	7.7%	0.0%	0.0%	23.1%	69.2%
	Grade 8	15	0.0%	0.0%	0.0%	20.0%	80.0%
	Grade 11	15	0.0%	0.0%	0.0%	26.7%	73.3%

Question 27

This experience will help me target instruction for the students in my classroom.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		40	2.5%	0.0%	22.5%	20.0%	55.0%
	Grade 5	12	8.3%	0.0%	16.7%	16.7%	58.3%
	Grade 8	15	0.0%	0.0%	40.0%	13.3%	46.7%
	Grade 11	13	0.0%	0.0%	7.7%	30.8%	61.5%

Question 28

Overall, I valued the conference as a professional development experience.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	0.0%	0.0%	7.0%	14.0%	79.1%
	Grade 5	13	0.0%	0.0%	15.4%	15.4%	69.2%
	Grade 8	15	0.0%	0.0%	6.7%	13.3%	80.0%
	Grade 11	15	0.0%	0.0%	0.0%	13.3%	86.7%

Question 29

The standard setting was well organized.

Content Area	Grade Level	N	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
Overall		43	0.0%	2.3%	2.3%	20.9%	74.4%
	Grade 5	13	0.0%	7.7%	7.7%	38.5%	46.2%
	Grade 8	15	0.0%	0.0%	0.0%	13.3%	86.7%
	Grade 11	15	0.0%	0.0%	0.0%	13.3%	86.7%

Question 30

What is your current profession?

Content Area	Grade Level	N	Teacher	Administrator	Other (please specify)
Overall		43	55.8%	9.3%	34.9%
	Grade 5	13	61.5%	0.0%	38.5%
	Grade 8	15	53.3%	13.3%	33.3%
	Grade 11	15	53.3%	13.3%	33.3%

Question 31

How many years in your current profession?

Content Area	Grade Level	N	1-5	6-10	11-15
Overall		43	18.6%	16.3%	14.0%
	Grade 5	13	30.8%	7.7%	30.8%
	Grade 8	15	13.3%	26.7%	6.7%
	Grade 11	15	13.3%	13.3%	6.7%

Content Area	Grade Level	N	16-20	21+
Overall		43	9.3%	41.9%
	Grade 5	13	7.7%	23.1%
	Grade 8	15	13.3%	40.0%
	Grade 11	15	6.7%	60.0%

Question 32

What is your highest education level?

Content Area	Grade Level	N	High school	Bachelor's	Master's
Overall		43	2.3%	27.9%	62.8%
	Grade 5	13	7.7%	30.8%	53.8%
	Grade 8	15	0.0%	20.0%	73.3%
	Grade 11	15	0.0%	33.3%	60.0%

Content Area	Grade Level	N	Doctorate
Overall		43	7.0%
	Grade 5	13	7.7%
	Grade 8	15	6.7%
	Grade 11	15	6.7%

Question 33

What is your race/ethnicity?

Content Area	Grade Level	N	Asian/Pacific Islander	Black/African-American	American Indian
Overall		43	2.3%	4.7%	2.3%
	Grade 5	13	0.0%	0.0%	0.0%
	Grade 8	15	0.0%	0.0%	6.7%
	Grade 11	15	6.7%	13.3%	0.0%

Content Area	Grade Level	N	White	Other
Overall		43	88.4%	2.3%
	Grade 5	13	92.3%	7.7%
	Grade 8	15	93.3%	0.0%
	Grade 11	15	80.0%	0.0%

Question 34

Are you of Hispanic origin?

Content Area	Grade Level	N	Yes	No
Overall		43	2.3%	97.7%
	Grade 5	13	7.7%	92.3%
	Grade 8	15	0.0%	100.0%
	Grade 11	15	0.0%	100.0%

Question 35

What is your gender?

Content Area	Grade Level	N	Male	Female
Overall		43	37.2%	62.8%
	Grade 5	13	30.8%	69.2%
	Grade 8	15	40.0%	60.0%
	Grade 11	15	40.0%	60.0%

Question 36

Have you taught Special Education in the last 5 years?

Content Area	Grade Level	N	Yes	No
Overall		42	0.0%	100.0%
	Grade 5	13	0.0%	100.0%
	Grade 8	15	0.0%	100.0%
	Grade 11	14	0.0%	100.0%

Question 37

Have you taught Adult Education in the last 5 years?

Content Area	Grade Level	N	Yes	No
Overall		43	25.6%	74.4%
	Grade 5	13	23.1%	76.9%
	Grade 8	15	6.7%	93.3%
	Grade 11	15	46.7%	53.3%

Question 38

Have you taught Alternative Education in the last 5 years?

Content Area	Grade Level	N	Yes	No
Overall		42	2.4%	97.6%
	Grade 5	13	0.0%	100.0%
	Grade 8	15	0.0%	100.0%
	Grade 11	14	7.1%	92.9%

Question 39

Have you taught Vocational Education in the last 5 years?

Content Area	Grade Level	N	Yes	No
Overall		42	2.4%	97.6%
	Grade 5	13	0.0%	100.0%
	Grade 8	15	0.0%	100.0%
	Grade 11	14	7.1%	92.9%

Question 40

Have you taught ELL in the last 5 years?

Content Area	Grade Level	N	Yes	No
Overall		42	0.0%	100.0%
	Grade 5	13	0.0%	100.0%
	Grade 8	15	0.0%	100.0%
	Grade 11	14	0.0%	100.0%

Question 41

Which grade did you work on during this standard setting?

Content Area	Grade Level	N	Grade 5	Grade 8
Overall		43	30.2%	34.9%
	Grade 5	13	100.0%	0.0%
	Grade 8	15	0.0%	100.0%
	Grade 11	15	0.0%	0.0%

Content Area	Grade Level	N	Grade 11
Overall		43	34.9%
	Grade 5	13	0.0%
	Grade 8	15	0.0%
	Grade 11	15	100.0%

Evaluation of the MAP Science Bookmark Standard Setting Workshop — July 2008

Key:	<i>SD=Strongly Disagree</i>	<i>D=Disagree</i>	<i>N=Neutral</i>	<i>A=Agree</i>	<i>SA=Strongly Agree</i>	SD	D	N	A	SA
1. The Bookmark Procedure was well described.						0	0	0	0	0
2. The training on bookmark placement made the task clear to me.						0	0	0	0	0
3. The training materials were helpful.						0	0	0	0	0
4. The goals for the Bookmark Procedure were clear.						0	0	0	0	0
5. Taking the test helped me place my bookmarks.						0	0	0	0	0
6. The ordering of the items in the ordered item booklet agreed with my perception of the relative difficulty of the items.						0	0	0	0	0
7. Reviewing the NAEP achievement level descriptors helped me place my bookmarks.						0	0	0	0	0
8. Reviewing the Target Students helped me place my bookmarks.						0	0	0	0	0
9. I considered the GLEs when I placed my bookmarks.						0	0	0	0	0
10. I understood how to place my bookmarks.						0	0	0	0	0
11. I had enough time to consider my Round 1 bookmarks.						0	0	0	0	0
12. During Round 1, I placed my bookmarks without consulting other participants.						0	0	0	0	0
13. I learned how to do the bookmark placement as I went along, so my later ones may not be comparable to my earlier ones.						0	0	0	0	0
14. Overall, my table's discussions were open and honest.						0	0	0	0	0
15. Overall, I believe that my opinions were considered and valued by my group.						0	0	0	0	0
16. The presentation of impact data was helpful to me.						0	0	0	0	0
17. I feel this procedure was fair.						0	0	0	0	0
18. I am confident that the Bookmark Procedure produced valid standards.						0	0	0	0	0
19. Overall, I am satisfied with my group's final bookmarks.						0	0	0	0	0
20. I would defend the <i>Basic</i> cut score against criticism that it is too high.						0	0	0	0	0
21. I would defend the <i>Basic</i> cut score against criticism that it is too low.						0	0	0	0	0
22. I would defend the <i>Proficient</i> cut score against criticism that it is too high.						0	0	0	0	0
23. I would defend the <i>Proficient</i> cut score against criticism that it is too low.						0	0	0	0	0
24. I would defend the <i>Advanced</i> cut score against criticism that it is too high.						0	0	0	0	0
25. I would defend the <i>Advanced</i> cut score against criticism that it is too low.						0	0	0	0	0
26. Participating in the standard setting increased my understanding of the test.						0	0	0	0	0
27. This experience will help me target instruction for the students in my classroom.						0	0	0	0	0
28. Overall, I valued the conference as a professional development experience.						0	0	0	0	0
29. The standard setting was well organized.						0	0	0	0	0

30. What is your current profession?
 Teacher
 Administrator
 Other (please specify)

31. How many years in your current profession?
 1-5
 6-10
 11-15
 16-20
 21+

32. What is your highest education level?
 High school
 Bachelor's
 Master's
 Doctorate

33. What is your race/ethnicity?
 Asian/
Pacific Islander
 Black/
African-American
 American Indian
 White
 Other

34. Are you of Hispanic origin?
 Yes
 No

35. What is your gender?
 Male
 Female

36. Have you taught Special Education in the last 5 years?
 Yes
 No

37. Have you taught Adult Education in the last 5 years?
 Yes
 No

38. Have you taught Alternative Education in the last 5 years?
 Yes
 No

39. Have you taught Vocational Education in the last 5 years?
 Yes
 No

40. Have you taught ELL in the last 5 years?
 Yes
 No

41. Which grade did you work during this standard setting?
 5
 8
 11

Please add your comments on the back of this evaluation.
Thank you!

Section J

NAEP Materials

Policy Definitions

Achievement Level Descriptions

NAEP Achievement Level Policy Definitions

<i>Basic</i>	Partial mastery of prerequisite knowledge and skills that are fundamental for proficient work at each grade.
<i>Proficient</i>	Solid academic performance for each grade assessed. Students reaching this level have demonstrated competency over challenging subject matter, including subject matter knowledge, application of such knowledge to real-world situations, and analytical skills appropriate to the subject matter.
<i>Advanced</i>	Superior performance.

NAEP Science Achievement Level Descriptions *Grade 4*

Basic

Students performing at the Basic level demonstrate some of the knowledge and reasoning required for understanding the Earth, physical, and life sciences at a level appropriate to grade 4. For example, they can carry out simple investigations and read uncomplicated graphs and diagrams. Students at this level also show a beginning understanding of classification, simple relationships, and energy.

Fourth-grade students performing at the Basic level are able to follow simple procedures, manipulate simple materials, make observations, and record data. They are able to read simple graphs and diagrams and draw reasonable but limited conclusions based on data provided to them. These students can recognize appropriate experimental designs, although they are unable to justify their decisions.

When presented with diagrams, students at this level can identify seasons; distinguish between day and night; and place the position of the Earth, Sun, and planets. They are able to recognize major energy sources and simple energy changes. In addition, they show an understanding of the relationship between sound and vibrations. These students are able to identify organisms by physical characteristics and group organisms with similar physical features. They can also describe simple relationships among structure, function, habitat, life cycles, and different organisms.

Proficient

Students performing at the Proficient level demonstrate the knowledge and reasoning required for understanding the Earth, physical, and life sciences at a level appropriate to grade 4. For example, they understand concepts relating to the Earth's features, physical properties, structure, and function. In addition, students can formulate solutions to familiar problems as well as show a beginning awareness of issues associated with technology.

Fourth-grade students performing at the Proficient level are able to provide an explanation of day and night when given a diagram.

They can recognize major features of the Earth's surface and the impact of natural forces. They are also able to recognize water in its various forms in the water cycle and can suggest ways to conserve it. These students recognize that various materials possess different properties that make them useful. Students at this level are able to explain how structure and function help living things survive. They have a beginning awareness of the benefits and challenges associated with technology and recognize some human effects on the environment. They can also make straightforward predictions and justify their position.

Advanced

Students performing at the Advanced level demonstrate a solid understanding of the Earth, physical, and life sciences as well as the ability to apply their understanding to practical situations at a level appropriate to grade 4. For example, they can perform and critique simple investigations, make connections from one or more of the sciences to predict or conclude, and apply fundamental concepts to practical applications.

Fourth-grade students performing at the Advanced level are able to combine information, data, and knowledge from one or more of the sciences to reach a conclusion or to make a valid prediction. They can also recognize, design, and explain simple experimental procedures.

Students at this level recognize nonrenewable sources of energy. They also recognize that light and sound travel at different speeds. These students understand some principles of ecology and are able to compare and contrast life cycles of various common organisms. In addition, they have a developmental awareness of the benefits and challenges associated with technology.

Basic

Students performing at the Basic level demonstrate some of the knowledge and reasoning required for understanding the Earth, physical, and life sciences at a level appropriate to grade 8. For example, they can carry out investigations and obtain information from graphs, diagrams, and tables. In addition, they demonstrate some understanding of concepts relating to the solar system and relative motion. Students at this level also have a beginning understanding of cause-and-effect relationships.

Eighth-grade students performing at the Basic level are able to observe, measure, collect, record, and compute data from investigations. They can read simple graphs and tables and are able to make simple data comparisons. These students are able to follow directions and use basic science equipment to perform simple experiments. In addition, they have an emerging ability to design experiments.

Students at this level have some awareness of causal relationships. They recognize the position of planets and their movement around the Sun and know basic weather-related phenomena. These students can explain changes in position and motion such as the movement of a truck in relation to that of a car. They also have an emerging understanding of the interrelationships among plants, animals, and the environment.

Proficient

Students performing at the Proficient level demonstrate much of the knowledge and many of the reasoning abilities essential for understanding the Earth, physical, and life sciences at a level appropriate to grade 8. For example, students can interpret graphic information, design simple investigations, and explain such scientific concepts as energy transfer. Students at this level also show an awareness of environmental issues, especially those addressing energy and pollution.

Eighth-grade students performing at the Proficient level are able to create, interpret, and make predictions from charts, diagrams, and graphs based on information provided to them or from their own investigations. They have the ability to design an experiment and have an emerging understanding of variables and controls. These students are able to read and interpret geographic and topographic maps. In addition, they have an emerging ability to use and understand models, can partially formulate explanations of their understanding of scientific phenomena, and can design plans to solve problems.

Students at this level can begin to identify forms of energy and describe the role of energy transformations in living and nonliving systems. They have knowledge of organization, gravity, and motion within the solar system and can identify some factors that shape the surface of the Earth. These students have some understanding of properties of materials and have an emerging understanding of the particulate nature of matter, especially the effect of temperature on states of matter. They also know that light and sound travel at different speeds and can apply their knowledge of force, speed, and motion. These students demonstrate a developmental understanding of the flow of energy from the Sun through living systems, especially plants. They know that organisms reproduce and that characteristics are inherited from previous generations. These students also understand that organisms are made up of cells and that cells have subcomponents with different functions. In addition, they are able to develop their own classification system based on physical characteristics. These students can list some effects of air and water pollution as well as demonstrate knowledge of the advantages and disadvantages of different energy sources in terms of how they affect the environment and the economy.

Advanced

Students performing at the Advanced level demonstrate a solid understanding of the Earth, physical, and life sciences as well as the abilities required to apply their understanding in practical situations at a level appropriate to grade 8. For example, students can perform and critique the design of investigations, relate scientific concepts to each other, explain their reasoning, and discuss the impact of human activities on the environment.

Eighth-grade students performing at the Advanced level are able to provide an explanation for scientific results. They have a modest understanding of scale and are able to design a controlled experiment. These students have an understanding of models as representations of natural systems and can describe energy transfer in living and nonliving systems.

Students at this level are able to understand that present physical clues, including fossils and geological formations, are indications that the Earth has not always been the same and that the present is a key to understanding the past. They have a solid knowledge of forces and motions within the solar system and an emerging understanding of atmospheric pressure. These students can recognize a wide range of physical and chemical properties of matter and some of their interactions and understand some of the properties of light and sound. Also, they can infer relationships between structure and function. These students know the differences between plant and animal cells and can apply their knowledge of food as a source of energy to a practical situation. In addition, they are able to explain the impact of human activities on the environment and the economy.

NAEP Science Achievement Level Descriptions *Grade 12*

Basic

Students performing at the Basic level demonstrate some knowledge and certain reasoning abilities required for understanding the Earth, physical, and life sciences at a level appropriate to grade 12. In addition, they demonstrate knowledge of the themes of science (models, systems, and patterns of change) required for understanding the most basic relationships among the Earth, physical, and life sciences. They are able to conduct investigations, critique the design of investigations, and demonstrate a rudimentary understanding of scientific principles.

Twelfth-grade students performing at the Basic level are able to select and use appropriate simple laboratory equipment and write down simple procedures that others can follow. They also have a developmental ability to design complex experiments. These students are able to make classifications based on definitions such as physical properties and characteristics.

Students at this level demonstrate a rudimentary understanding of basic models and can identify some parts of physical and biological systems. They are also able to identify some patterns in nature and rates of change over time. These students have the ability to identify basic scientific facts and terminology and have a rudimentary understanding of the scientific principles underlying such phenomena as volcanic activity, disease transmission, and energy transformation. In addition, they have some familiarity with the application of technology.

Proficient

Students performing at the Proficient level demonstrate the knowledge and reasoning abilities required for understanding the Earth, physical, and life sciences at a level appropriate to grade 12. In addition, they demonstrate knowledge of the themes of science (models, systems, and patterns of change) required for understanding how these themes illustrate essential relationships among the Earth, physical, and life sciences. They are able to analyze data and apply scientific principles to everyday situations.

Twelfth-grade students performing at the Proficient level are able to demonstrate a working ability to design and conduct scientific investigations. They are able to analyze data in various forms and utilize information to provide explanations and to draw reasonable conclusions.

Students at this level have a developmental understanding of both physical and conceptual models and are able to compare various models. They recognize some inputs and outputs, causes and effects, and interactions of a system. In addition, they can correlate structure to function for the parts of a system that they can identify. These students also recognize that rate of change depends on initial conditions and other factors. They are able to apply scientific concepts and principles to practical applications and solutions for problems in the real world and show a developmental understanding of technology, its uses, and its applications.

Advanced

Students performing at the Advanced level demonstrate the knowledge and reasoning abilities required for a solid understanding of the Earth, physical, and life sciences at a level appropriate to grade 12. In addition, they demonstrate knowledge of the themes of science (models, systems, and patterns of change) required for integrating knowledge of scientific principles from the Earth, physical, and life sciences. Students can design investigations that answer questions about real-world situations and use their reasoning abilities to make predictions.

Twelfth-grade students performing at the Advanced level are able to design scientific investigations to solve complex, real-world situations. They can integrate, interpolate, and extrapolate information embedded in data to draw well-formulated explanations and conclusions. They are also able to use complex reasoning skills to apply scientific knowledge to make predictions based on conditions, variables, and interactions.

Students at this level recognize the inherent strengths and limitations of models and can revise models based on additional information. They are able to recognize cause-and-effect relationships within systems and can utilize this knowledge to make reasonable predictions of future events. These students are able to recognize that patterns can be constant, exponential, or irregular and can apply this recognition to make predictions. They can also design a technological solution for a given problem.

Section K

MAP Descriptor Writing
Training Materials
Short Descriptors
Long Descriptors

Training Materials

Missouri Assessment Program

Science
Standard Setting

Descriptor Writing
July 18, 2008



CTB/McGraw-Hill | QUALITY ASSESSMENT SINCE 1988

What is a Descriptor?

- A **descriptor** summarizes the knowledge, skills, and abilities required of a student in an achievement level.
- These **achievement level descriptors (ALDs)** will be clear, informative, and directly based on the MAP Science assessment.
- Our task: **write 12 ALDs for MAP Science** describing the *Below Basic*, *Basic*, *Proficient*, and *Advanced* achievement levels for grades 5, 8, and 11.

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What is the purpose of ALDs?



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Descriptor Writing Process

- Group leaders guide participants through writing long descriptors for each item at each achievement level.
- Draft descriptors are written on large "wall post-er" with markers. "Annotator" refers to writing the CIB number(s) next to each unique skill listed as written on the butcher paper.
- 2) CTB takes the PGD's back to home offices and key enters them (verbatim). These are now considered the first draft of the **long descriptors**.
- 2.5) CTB edits the first draft long descriptors -- cleaning up grammar and eliminating identical skills that are described at more than one performance level (keeping only the first and lowest performance instance of a skill).
- 3) CTB delivers the key entered PGD's and CTB-edited versions to DESE for approval.
- 3.5) Once approved by DESE, CTB then creates the short descriptors for the reports by combining (and shortening) the long descriptors (CTB edited versions) into single paragraphs (no longer double bulleted statements). These single paragraphs are shortened statements separated by semicolons and must be within a set character limit (usually provided by Neal Tanna). In the past the limit has been around 350 characters per performance level.
- 4) CTB provides DESE with short descriptors for approval.
- 4.5) Kalia provides final out score ranges correlating to the CIB numbers. Using these final out scores, both long and short descriptors are adjusted so item descriptor skills are residing in the correct performance level.
- 5) DESE approves the adjustments. Short Descriptors are delivered to Technology. Long Descriptors are delivered to DESE in Word format so they can post them on their website. (note: it is my understanding that long descriptors are only intended for publication on the DESE website).

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Training Materials

Helpful Hints for Writing Missouri's Achievement Level Descriptors

1. Check that each descriptor is unique to its level.
 - If several items that test skills at the same level appear at two adjacent performance levels, put the description where the majority of those items appear. If roughly the same number occur at each level, put the descriptor with the lower level (since descriptors in that lower level will also be assumed to apply to students above that level).
 - Use adverbial phrases to describe the skill at a particular level, such as “in real-world contexts” or “in problem-solving situations.”
 - Describe the stimulus level, such as “in a simple graph,” “in a chart with a sophisticated arrangement,” or “using a scale with fractions.”
 - Mention specific types of stimuli where appropriate, such as “in a multi-step problem” or “using an analog clock.”
2. List the skills using bullets.
 - Use demonstrable verbs, such as *explain*, *apply*, and *justify*. Use the format “Students [verb],” *not* “Students can [verb].”
 - Avoid generic verbs, such as *know*, *understand*, and *recognize*.
3. Avoid “select” or “choose” in descriptions of TerraNova items. While that is what the student did to demonstrate the skill assessed by the item, it shouldn't be listed as a part of the skill. “Identify” usually works if there is a need to differentiate.
4. Descriptors must be neither too specific nor too general. Find the right balance.
 - A descriptor that is *too specific* can compromise test security and fail to be applicable to future test administrations. (“Find the length of a ladder that reaches 24 feet up the side of a house and has a base 10 feet from the side of the house.”)
 - A descriptor that is *too general* contains too little information to be helpful. (“Demonstrate knowledge of geometry.”)
 - An example of an appropriate descriptor would be: “Apply the Pythagorean theorem in real-world situations.”
5. Although teachers will see these descriptors on reports, consider their audience to be parents, and avoid technical content-area or education jargon.
6. Notate the item number (the order number in the upper right corner) of each item next to its description. If an item is described by more than one sentence, notate the number everywhere it applies. This will help ensure that you are describing skills used in the test, not rephrasing content standards. For example:
 - Determine perimeter (109) and area (115) using nonroutine units.
 - Use rectangles to approximate the area under a curve (115, 117, 125)
7. When writing descriptors based on multipoint constructed response items, describe only the highest point value that occurs in a particular performance level. For instance, if both the 2-point response and the 3-point response of an item appear at the Proficient level, describe only the 3-point response. The skills needed for the 2-point response are assumed in the 3-point response.

Training Materials

Example Missouri Descriptors (from Grade 5 Mathematics)

Descriptor for “Basic” Achievement Level:

(Short Version)

Students:

- identify place value to the millions place
- use data to create a bar graph and perform calculations using numbers between given intervals
- identify lines of symmetry
- perform multiplication of decimals to hundredths place
- identify appropriate units of area

(Long Version)

Students identify place value to the millions place; read, write, and compare unit fractions and decimals to the thousandths place; identify lines of symmetry; identify appropriate units of area; identify appropriate units of measure; use data to create a bar graph and perform calculations using numbers between given intervals.

Descriptor for “Proficient” Achievement Level:

(Short Version)

Students:

- interpret movement and direction on a coordinate grid
- compare and analyze data in tables
- analyze results and make conclusions based on data in a line graph
- identify similar figures
- identify missing information in performing calculations
- extend numeric patterns
- apply multiplication of decimals in mathematical situations
- solve problems involving rate
- identify faces of 3-dimensional figures
- identify appropriate units of measure
- identify number sentences to solve a problem using a single operation
- identify appropriate methods of collecting data for statistical surveys
- apply estimation strategies in computations
- interpret data from tables and charts to construct a graph

(Long Version)

Students multiply decimals to the hundredths place; use estimation in computations; divide 3-digit by 2-digit numbers; add fractions with like denominators; solve problems involving rates of change; extend numeric patterns; complete number sentences; identify faces of 3-D and similar figures; interpret direction on a coordinate grid; calculate area using a grid; compute elapsed time in hours; analyze data in line graphs and tables; explain the probability of a simple event.

Training Materials

The NAEP Science Achievement Levels

These descriptors were accessed online from:

<http://nces.ed.gov/nationsreportcard/science/achieveall.asp>

Specific definitions of the *Basic*, *Proficient*, and *Advanced* achievement levels for grades 4, 8, and 12 are presented in the tables that follow. The achievement levels are cumulative. Therefore, students performing at the *Proficient* level also display the competencies associated with the *Basic* level, and students at the *Advanced* level also demonstrate the skills and knowledge associated with both the *Basic* and the *Proficient* levels. For each achievement level listed, the scale score that corresponds to the beginning of that level is shown in parentheses.

Grade 4

<p><i>Basic</i> (138)</p>	<p>Students performing at the <i>Basic</i> level demonstrate some of the knowledge and reasoning required for understanding Earth, physical, and life sciences at a level appropriate to grade 4. For example, they can carry out simple investigations and read uncomplicated graphs and diagrams. Students at this level also show a beginning understanding of classification, simple relationships, and energy.</p> <p>Fourth-grade students performing at the <i>Basic</i> level are able to follow simple procedures, manipulate simple materials, make observations, and record data. They are able to read simple graphs and diagrams and draw reasonable but limited conclusions based on data provided to them. These students can recognize appropriate experimental designs, although they are unable to justify their decisions.</p> <p>When presented with diagrams, students at this level can identify seasons; distinguish between day and night; and place the position of the Earth, sun, and planets. They are able to recognize major energy sources and simple energy changes. In addition, they show an understanding of the relationships between sound and vibrations. These students are able to identify organisms with similar physical features. They can also describe relationships among structure, function, habitat, life cycles, and different organisms.</p>
<p><i>Proficient</i> (170)</p>	<p>Students performing at the <i>Proficient</i> level demonstrate the knowledge and reasoning required for understanding of the Earth, physical properties, structure, and function. In addition, students can formulate solutions to familiar problems as well as show a beginning awareness of issues associated with technology.</p> <p>Fourth-grade students performing at the <i>Proficient</i> level are able to provide an explanation of day and night when given a diagram. They can recognize major features of the Earth's surface and the impact of natural forces. They are also able to recognize water in its various forms in the water cycle and can suggest ways to conserve it. These students recognize that various materials possess different properties that make them useful. Students at this level are able to explain how structure and function help living things survive. They have a beginning awareness of the benefits and challenges associated with technology and recognize some human effects on the environment. They can also make straightforward predictions and justify their position.</p>

Training Materials

Advanced (205)	<p>Students performing at the <i>Advanced</i> level demonstrate a solid understanding of the Earth, physical, and life sciences as well as the ability to apply their understanding to practical situations at a level appropriate to grade 4. For example, they can perform and critique simple investigations, make connections from one or more of the sciences to predict or conclude, and apply fundamental concepts to practical applications.</p> <p>Fourth-grade students performing at the <i>Advanced</i> level are able to combine information, data, and knowledge from one or more of the sciences to reach a conclusion or to make a valid prediction. They can also recognize, design and explain simple experimental procedures.</p> <p>Students at this level recognize nonrenewable sources of energy. They also recognize that light and sound travel at different speeds. These students understand some principles of ecology and are able to compare and contrast life cycles of various common organisms. In addition, they have a developmental awareness of the benefits and challenges associated with technology.</p>
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Grade 8

Basic (143)	<p>Students performing at the <i>Basic</i> level demonstrate some of the knowledge and reasoning required for understanding of the Earth, physical, and life sciences at a level appropriate to grade 8. For example, they can carry out investigations and obtain information from graphs, diagrams, and tables. In addition, they demonstrate some understanding of concepts relating to the solar system and relative motion. Students at this level also have a beginning understanding of cause-and-effect relationships.</p> <p>Eighth-grade students performing at the <i>Basic</i> level are able to observe, measure, collect, record, and compute data from investigations. They can read simple graphs and tables and are able to make simple data comparisons. These students are able to follow directions and use basic science equipment to perform simple experiments. In addition, they have an emerging ability to design experiments.</p> <p>Students at this level have some awareness of causal relationships. They recognize the position of planets and their movement around the sun and know basic weather-related phenomena. These students can explain changes in position and motion such as the movement of a truck in relation to that of a car. They also have emerging understanding of the interrelationships among plants, animals, and the environment.</p>
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Training Materials

<p><i>Proficient</i> (170)</p>	<p>Students performing at the <i>Proficient</i> level demonstrate much of the knowledge and many of the reasoning abilities essential for understanding of the Earth, physical, and life sciences at a level appropriate to grade 8. For example, students can interpret graphic information, design simple investigations, and explain such scientific concepts as energy transfer. Students at this level also show an awareness of environmental issues, especially those addressing energy and pollution.</p> <p>Eighth-grade students performing at the <i>Proficient</i> level are able to create, interpret, and make predictions from charts, diagrams, and graphs based on information provided to them or from their own investigations. They have the ability to design an experiment and have an emerging understanding of scientific phenomena, and can design plans to solve problems.</p> <p>Students at this level can begin to identify forms of energy and describe the role of energy transformation in living and nonliving systems. They have knowledge of organization, gravity, and motion within the solar system and can identify some factors that shape the surface of the Earth. These students have some understanding of properties of materials and have an emerging understanding of the particulate nature of matter, especially the effect of temperature on states of matter. They also know that light and sound travel at different speeds and can apply their knowledge of force, speed, and motion. The students demonstrate a developmental understanding of the flow of energy from the sun through living systems, especially plants. They know that organisms reproduce and that characteristics are inherited from previous generations. These students also understand that organisms are made up of cells and that cells have subcomponents with different functions. In addition, they are able to develop their own classification system based on physical characteristics. These students can list some effects of air and water pollution as well as demonstrate knowledge of the advantages and disadvantages of different energy sources in terms of how they affect the environment and the economy.</p>
<p><i>Advanced</i> (208)</p>	<p>Students performing at the <i>Advanced</i> level demonstrate a solid understanding of the Earth, physical, and life sciences as well as the abilities required to apply their understanding in practical situations at a level appropriate to grade 8. For example, students can perform and critique the design of investigations, relate scientific concepts to each other, explain their reasoning, and discuss the impact of human activities on the environment.</p> <p>Eighth-grade students performing at the <i>Advanced</i> level are able to provide an explanation for scientific results. They have a modest understanding of scale and are able to design a controlled experiment. These students have an understanding of models as representations of natural systems and can describe energy transfer in living and nonliving systems.</p> <p>Students at this level are able to understand that present physical clues, including fossils and geological formations, are indications that the Earth has not always been the same and that the present is a key to understanding the past. They have a solid knowledge of forces and motions within the solar system and an emerging understanding of atmospheric pressure. These students can recognize a wide range of physical and chemical properties of matter and some of their interactions and understand some of the properties of light and sound. Also, they can infer relationships between structure and function. These students know the difference between plant and animal cells and can apply their knowledge of food as a source of energy to a practical situation. In addition, they are able to explain the impact of human activities on the environment and the economy.</p>

Training Materials

Grade 12

<p>Basic (146)</p>	<p>Students performing at the <i>Basic</i> level demonstrate some knowledge and certain reasoning abilities required for understanding of the Earth, physical, and life sciences at a level appropriate to grade 12. In addition, they demonstrate knowledge of the themes of science (models, systems, and patterns of change) required for understanding the most basic relationships among the Earth, physical, and life sciences. They are able to conduct investigations, critique the design of investigations, and demonstrate a rudimentary understanding of the scientific principles.</p> <p>Twelfth-grade students performing at the <i>Basic</i> level are able to select and use appropriate simple laboratory equipment and write down simple procedures that others can follow. They also have a developmental ability to design complex experiments. These students are able to make classifications based on definitions such as physical properties and characteristics.</p> <p>Students at this level demonstrate a rudimentary understanding of basic models and can also identify some parts of physical and biological systems. They are also able to identify some patterns in nature and rates of change over time. These students have the ability to identify basic scientific facts and terminology and have a rudimentary understanding of the scientific principles underlying such phenomena as volcanic activity, disease transmission, and energy transformation. In addition, they have some familiarity with the application of technology.</p>
<p>Proficient (178)</p>	<p>Students performing at the <i>Proficient</i> level demonstrate the knowledge and reasoning abilities required for understanding of the Earth, physical, and life sciences at a level appropriate to grade 12. In addition, they demonstrate knowledge of the themes of science (models, systems, and patterns of change) required for understanding of the Earth, physical, and life sciences at a level appropriate to grade 12. In addition, they demonstrate knowledge of the themes of science (models, systems, and patterns of change) required for understanding how these themes illustrate essential relationships among the Earth, physical, and life sciences. They are able to analyze data and apply scientific principles to everyday situations.</p> <p>Twelfth-grade students performing at the <i>Proficient</i> level are able to demonstrate a working ability to design and conduct scientific investigations. They are able to analyze data in various forms and utilize information to provide explanations and to draw reasonable conclusions.</p> <p>Students at this level have a developmental understanding of both physical and conceptual models and are able to compare various models. They recognize some inputs and outputs, causes and effects, and interactions of a system. In addition, they can correlate structure to function for the parts of a system that they can identify. These students also recognize that rate of change depends on initial conditions and other factors. They are able to apply scientific concepts and principles to practical applications and solutions for problems in the real world and show developmental understanding of technology, its uses, and its applications.</p>

Training Materials

<p><i>Advanced</i> (210)</p>	<p>Students performing at the <i>Advanced</i> level demonstrate the knowledge and reasoning abilities required for a solid understanding of the Earth, physical, and life sciences at a level appropriate to grade 12. In addition, they demonstrate knowledge of the themes of science (models, systems, and patterns of change) required for integrating knowledge of scientific principles from Earth, physical, and life sciences. Students can design investigations that answer questions about real-world situations and use their reasoning abilities to make predictions.</p> <p>Twelfth-grade students performing at the <i>Advanced</i> level are able to design scientific investigations to solve complex, real-world situations. They can integrate, interpolate, and extrapolate information embedded in data to draw well-formulated explanations and conclusions. They are also able to use complex reasoning skills to apply scientific knowledge to make predictions based on conditions, variables, and interactions.</p> <p>Students at this level recognize the inherent strengths and limitations of models and can revise models based on additional information. They are able to recognize cause-and-effect relationships within systems and can utilize this knowledge to make reasonable predictions of future events. These students are able to recognize that patterns can be constant, exponential, or irregular and can apply this recognition to make predictions. They can also design a technological solution for a given problem.</p>
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Missouri 2008 Science

GRADE 5 - SHORT DESCRIPTORS

Below Basic—(470-625)

Students identify the relationship between mass and force; classify bodies of water; identify weather instruments and their uses; identify characteristics of the solar system; compare amounts/measurements given in a simple format; identify appropriate tools for simple scientific measurements; identify how technological advances may be helpful to humans.

Basic—(626-668)

Students explain the relationship between mass and force; describe how specialized body structures help animals survive; match environments to the plants and animals they support; identify environmental problems and find solutions; construct part of a graph; determine the appropriate scientific tool and its function in an investigation; determine how technological advances address problems and enhance life.

Proficient—(669-691)

Students describe changes in properties of matter; identify uses of simple machines; explain how work is done; identify forces of magnetism; describe the motion of objects; identify plant parts and their functions; classify vertebrates and invertebrates; classify producers, consumers, or decomposers; predict changes in food chains; identify the effects of human activities on other organisms; describe the Sun as a source of light and heat, or the moon as a reflector of light; explain the day/night cycle; identify characteristics and variables of a fair test; interpret data and make predictions; draw conclusions based on evidence; distinguish between man-made and natural objects; apply problem solving skills to a situation.

Advanced—(692-855)

Students identify energy transformations; predict the effect of heat energy on water; diagram a complete electrical circuit; predict how simple machines affect the force needed to do work; describe the effects of weathering and erosion on Earth's surface; describe relationships in weather data; explain how the Sun's position and the length and position of shadows relate to the time of day; interpret and apply knowledge from a data table; identify appropriate steps, tools and metric units in an investigation; construct a graph and plot data; formulate a question for an investigation.

Missouri 2008 Science

GRADE 8 - SHORT DESCRIPTORS

Below Basic—(540-670)

Students identify simple terms related to matter and energy; demonstrate beginning understanding of properties of light and how it travels; identify structures of plants and animals needed for survival; identify levels of organization in multicellular organisms; read simple graphs and make simple data comparisons.

Basic—(671-702)

Students identify an example of a force; demonstrate simple understanding of how traits are passed from one generation to the next; have a basic understanding of climate; identify a simple hypothesis; recognize a trend in a data table; demonstrate some awareness of how various factors influence and are influenced by science and technology.

Proficient—(703-734)

Students classify types of motion; calculate the speed of an object; demonstrate simple understanding of life processes; classify and/or show relationships between organisms; explain how adaptations help organisms survive; explain how species are affected by environmental change; understand and describe a food web; explain rock and fossil evidence of changes in the Earth; explain how Earth's systems interact; draw conclusions from tables or graphs; demonstrate basic understanding of the solar system; recognize the need for, and calculate, averages; understand the importance of constants in investigations; use appropriate tools and methods to collect data; describe tools and discoveries that advance scientific knowledge.

Advanced—(735-895)

Students explain the physical and chemical properties of matter; apply knowledge of energy and energy transfer; demonstrate understanding of physical and chemical processes of organisms; evaluate the effects of balanced and unbalanced forces; predict the impact of environmental change in ecosystems; justify how adaptations help organisms survive; demonstrate understanding of the water cycle; compare and contrast weather and climate; explain the cause of seasons on Earth; demonstrate understanding of the solar system; apply the concept of light years; construct a complete graph; evaluate experimental design; create testable questions and hypotheses; apply awareness of the influence of science and technology in society.

Missouri 2008 Science

GRADE 11 - SHORT DESCRIPTORS

Below Basic—(550-701)

Students describe that matter is made up of particles too small to be seen; describe how the mass of an object affects its motion; identify that organisms are made up of cells; define a species in terms of ability to reproduce; identify major gasses that make up the atmosphere; identify an advantage or disadvantage of tools used to study the universe; identify a valid justification of a conclusion; communicate minimal information about the data collected in an experiment; identify how one environmental factor can be impacted by technology.

Basic—(702-728)

Students identify some properties that can be used to classify substances; perform basic calculations related to force and motion of an object when given a formula; identify and describe cell structures and their functions; explain community interaction to maintain a balanced ecosystem; identify the processes involved in the rock cycle; identify a property of the electromagnetic spectrum as it relates to the universe; select appropriate investigation methods; use data to formulate an explanation; describe a reason theories change.

Proficient—(729-769)

Students describe properties and changes in matter; explain gravitational force between objects; apply Newton's Laws of Motion; describe the relationship between force and work; describe photosynthesis and cellular respiration; describe energy flow in a food web; explain natural selection; identify processes of the water cycle; explain the motion of the Earth, moon and Sun; describe the role of the electromagnetic spectrum in the universe; design scientific investigations; analyze data, form conclusions and communicate results; identify the constants and variables in an investigation required for reliable results; create testable hypotheses; identify technology used to increase scientific knowledge.

Advanced—(770-970)

Students explain energy and energy transfer; apply an understanding of the Periodic Table; apply the Law of Conservation of Matter and Energy; evaluate the Law of Gravity; compare the efficiency of machines; apply the principles of Mendelian genetics; explain cell division; analyze genetic diversity; predict changes in a food web; explain factors of climate; justify land use based on natural resources; explain the processes and energy sources of plate tectonics; provide evidence for the revolution and rotation of Earth; construct data tables and graphs; justify constants and variables; design a valid scientific investigation; gather and interpret qualitative and quantitative data; determine the effects of technology.

MAP SCIENCE ACHIEVEMENT LEVEL DESCRIPTORS

GRADE 5

Below Basic—(470-625)

Students

- identify the relationship between mass and force
- classify bodies of water
- identify weather instruments and their uses
- identify characteristics of the solar system
- compare amounts/measurements given in a simple format
- identify appropriate tools for simple scientific measurements
- identify how technological advances may be helpful to humans

Basic—(626-668)

Students

- explain the relationship between mass and force
- describe how specialized body structures help animals survive
- match different environments to the plants and animals they support
- identify environmental problems and find solutions
- construct one part of a graph
- determine the appropriate scientific tool and its function in an investigation
- determine how technological advances address problems and enhance life

Proficient—(669-691)

Students

- describe changes in physical properties of matter
- use scientific tools
- compare the mass of different objects
- identify properties and uses of simple machines and explain how work is done on objects
- identify forces of magnetism
- describe the motion of objects in terms of speed, distance, and time
- identify the main parts of plants and their functions
- classify vertebrates and invertebrates according to characteristics and behavior
- identify how plants progress through life cycle stages to reproduce
- classify populations of organisms as producers, consumers, or decomposers
- predict the effect of removing an organism from a food chain
- identify the effects of human activities on other organisms
- identify multiple specialized structures and describe how they help animals survive in their environment
- describe a relationship/pattern in weather data collected over time
- identify properties of bodies of water
- describe the Sun as a source of light and heat, or the moon as a reflector of light

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- explain the day/night cycle on Earth
- identify some variables in experimental design
- identify characteristics and variables of a fair test
- interpret data and make a prediction using information from a graph
- draw a conclusion based on evidence
- partially construct a graph (x/y axis) based on given data
- distinguish between man-made and natural objects and identify how man-made objects enhance human life
- apply problem solving skills to a given situation

Advanced—(692-855)

Students

- identify evidence of energy transformations
- predict the effect of heat energy on the physical properties of water as it changes states
- construct/diagram a complete, closed, electrical circuit
- predict how simple machines affect the force needed to do work
- explain the functions of all major parts of a plant
- describe the effects of weathering and erosion on Earth's surface
- describe multiple relationships in weather data over time
- identify that Earth is round and this affects what is seen from a given location
- explain how the Sun's position in the sky and the length and position of shadows relate to the time of day
- describe our Sun as a star that provides light and heat, and describe the moon as a reflector of light
- interpret and apply knowledge from a data table
- identify steps in experimental design
- identify appropriate tools and metric units in an investigation
- construct a graph and plot given data
- formulate a question that can lead to an investigation
- apply advanced problem solving skills to a given situation

MAP SCIENCE ACHIEVEMENT LEVEL DESCRIPTORS

GRADE 8

Below Basic—(540-670)

Students

- identify simple terms related to matter and energy
- demonstrate beginning understanding of properties of light and how it travels
- identify structures of plants and animals needed for survival
- identify levels of organization in multicellular organisms
- read simple graphs and make simple data comparisons

Basic—(671-702)

Students

- identify an example of a force
- demonstrate simple understanding of how traits are passed from one generation to the next
- demonstrate basic understanding of climate
- identify a simple hypothesis
- recognize a trend in a data table
- demonstrate some awareness of how various factors influence, and are influenced by, science and technology

Proficient—(703-734)

Students

- classify and describe different types of motion (e.g. straight line, projectile, circular, vibrational)
- calculate speed of an object in motion (distance/time)
- make predictions of an object's motion based on knowledge of Newton's Laws of Motion
- interpret a graph of distance over time
- demonstrate simple understanding of life processes (e.g. cellular respiration and photosynthesis) necessary for survival
- use physical characteristics to classify and/or show relationships between organisms
- explain how an organism's adaptations help it survive in its environment
- explain how species in an ecosystem are affected by changes in their environment
- classify species within a food web and define their roles
- explain how rock and fossil evidence can show changes in the Earth over time
- explain how Earth's systems interact with one another and cause change
- read and interpret geographs, topographic maps, and charts
- describe how the location of celestial bodies and the structure of the universe affects its appearance from Earth
- demonstrate and understanding of concepts relating to the relative motion of objects in the solar system (years, days, moon phases)
- recognize the need to average data for accurate experimental results

- utilize appropriate tools to collect data and measure to the appropriate units
- calculate the average from a set of data points
- draw a conclusion from a data table or graph
- identify and recognize the importance of constants in the design of a valid experiment
- identify and describe technological tools and scientific discoveries that advance scientific knowledge
- describe difficulties scientists experience as they propose new ideas that contradict accepted beliefs

Advanced—(735-895)

Students

- describe and compare the physical and chemical properties of types of matter in problem-solving situations
- identify and apply knowledge of forms of energy, and explain how energy can be transferred and transformed into various forms but is conserved
- evaluate the effects of balanced and unbalanced forces on an object's motion (e.g. simple machines, objects and rest)
- demonstrate solid knowledge of physical and chemical processes that multicellular organisms use to survive
- predict the impact of an environmental change in an ecosystem
- justify how an organism's adaptations help it to survive in its environment
- describe changes in the form of water as it moves through the water cycle
- compare and contrast weather and climate and the factors affecting each
- identify and explain the cause of seasons on Earth
- demonstrate solid knowledge of force and motion within the solar system
- apply the concept of light years in real world situations
- construct a graph with all information labeled and data accurately plotted
- evaluate the design of an experiment
- create a testable question
- write a testable hypothesis that predicts an effect (or lack thereof) on the independent or the dependent variable
- apply awareness of how various factors influence, and are influenced by, science and technology in real-world contexts

MAP SCIENCE ACHIEVEMENT LEVEL DESCRIPTORS

GRADE 11

Below Basic—(550-701)

Students

- describe that matter is made up of particles too small to be seen
- describe how the mass of an object affects its motion
- identify that organisms are made up of cells
- define a species in terms of ability to reproduce
- identify major gasses that make up the atmosphere
- identify an advantage or disadvantage of tools used to study the universe
- identify a valid justification of a conclusion
- communicate minimal information about the data collected in a experiment
- identify how one environmental factor can be impacted by technology

Basic—(702-728)

Students

- identify some properties that can be used to classify substances
- perform basic calculations related to force and motion of an object when given a formula
- identify and describe cell structures and their functions
- explain community interaction to maintain a balanced ecosystem
- identify the processes involved in the rock cycle
- identify a property of the electromagnetic spectrum as it relates to the universe
- select appropriate investigation methods
- use data to formulate an explanation
- describe a reason theories change

Proficient—(729-769)

Students

- describe chemical and physical properties and changes in matter
- explain the gravitational force of objects relative to their masses and the distances between them
- apply Newton's Laws of Motion to real-world situations
- describe the relationship between force and work
- describe photosynthesis and cellular respiration
- describe energy flow in a food web
- explain how natural selection is related to environmental changes or species adaptations
- identify the processes involved in the water cycle
- explain natural phenomenon by using the motions of the Earth and moon relative to the Sun
- identify properties of the electromagnetic spectrum as it relates to the universe
- communicate information about data collected in an investigation
- determine scientific conclusions based on observations
- identify constants and variables in an investigation

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- formulate testable hypotheses
- use patterns and extrapolate data to form conclusions
- identify factors required to make investigative results reliable
- analyze quantitative data
- design scientific investigations consisting of at least three steps
- identify technology used to collect data to increase scientific knowledge

Advanced—(770-970)

Students

- compare and contrast the properties of objects and the materials from which they are made
- describe different forms of energy and explain how they are transferred
- apply the current model of atomic structure
- explain and analyze the organization of the Periodic Table
- apply the Law of Conservation of Matter and Energy
- evaluate the Law of Universal Gravitation
- compare the mechanical efficiency of different machines
- predict patterns of inheritance using principles of Mendelian genetics
- compare and explain types of cell division
- analyze genetic diversity with regard to reproduction
- predict the impact of changes within a food web
- identify factors that influence climate and explain their impact on the climate
- justify the development of land and use based upon availability of natural resources, geomorphology, water and economics
- explain the internal processes and sources of energy within the geosphere that cause changes in Earth's crustal plates
- provide evidence for the revolution and rotation of Earth
- identify advantages and disadvantages of tools in the study of the universe
- use quantitative data to calculate results
- communicate information from investigations in data tables and appropriate graphical forms
- identify and justify constants and variables in a repeatable scientific investigation
- design a repeatable multi-step scientific investigation
- gather evidence in qualitative and quantitative forms
- determine how technological advances can affect real-world situations

Section L

DESE's Nomination Forms and Guidelines for Recruiting Participants



Missouri Department of Elementary and Secondary Education

— Making a positive difference through education and service —

April 2008

Dear School Administrator,

This spring, all Missouri students in grades 5, 8 and 11 are participating in the required MAP Science assessment. Missouri is adding this component to the MAP program in accordance with No Child Left Behind Legislation, which requires states to administer a science assessment to all students at least once in elementary school, once in middle school, and once in high school. As we add this new component to our assessment system, we will need to determine the scores that will be used to define student performance as Below Basic, Basic, Proficient or Advanced.

To accomplish this important task, we will conduct an Achievement Level Setting Conference during which panels of educators and other individuals will review and discuss science grade-level expectations and assessment items to determine the appropriate "cut scores" for each achievement level. The composition of the achievement level setting panels and the expertise of panelists are critically important to this process. Each grade-span panel will consist of approximately 15 members. Within each panel, 50 percent of the panelists will be classroom teachers, 25 percent will be non-teacher educators (administrators, librarians, counselors, etc.) and 25 percent will be non-school employees (parents, business professionals, etc.). Because you have the opportunity to work with excellent educators, as well as members of your community, we are asking for your input in assembling achievement level setting panels that are knowledgeable and reflective of Missouri's diverse population.

Enclosed with this letter are forms for you to nominate classroom teachers, non-teacher educators and non-school employees to serve on Science achievement level setting panels. These nominations will be placed into a large pool from which we will select final panelists. Selected panelists will be representative of the state's demographic characteristics and geographic make-up. **The Science Achievement Level Setting Conference will be held on July 16-18, 2008. Specific location for the conference has not yet been determined, but it will be held in mid-Missouri.**

If you are interested in nominating an individual(s) to serve as a panelist, please refer to the enclosed "Guidelines for Classroom Teacher/Non-Teacher Educator Panelist Nomination" and "Guidelines for Non-School Employee Panelist Nomination". In order to submit nominations for the achievement level setting panels, you must complete the enclosed form(s) according to the specified guidelines. You may photocopy the appropriate form if you would like to submit more than one nomination. **Nomination forms must be postmarked or faxed on or before April 21, 2008, to be considered for panel selection. Return address and fax number are printed on the forms.**

Prior to submitting nominations, please contact any individual you wish to nominate to ensure his/her interest and availability if selected to participate as a panelist. It is very important that panelists are available for all three days of the conference. All participants will be reimbursed for travel expenses and meals not provided during the conference. Additionally, those panelists that are not otherwise being compensated (by their employer, school district, etc.) will receive a stipend of \$150 for each full day of work. We will notify all panelists of the status of their nomination in early May. Those nominees selected to participate in the Achievement Level Setting Conference will receive further information about the conference at that time. Thank you for your assistance in this important endeavor. Please feel free to contact the Assessment Section at 573-751-3545 if you have any questions.

Sincerely,

A handwritten signature in cursive script that reads "Stan Johnson". The signature is written in black ink and is positioned below the word "Sincerely,".

Stan Johnson, Assistant Commissioner
Division of School Improvement

Enclosures: Guidelines for Classroom Teacher/Non-Teacher Educator Panelist Nomination (green)
Guidelines for Non-School Employee Panelist Nomination (blue)
Classroom Teacher Nomination Form (green)
Non-Teacher Educator Nomination Form (yellow)
Non-School Employee Nomination Form (blue)



Missouri Department of Elementary and Secondary Education

— *Making a positive difference through education and service* —

April 2008

TO: RPDC Directors
FROM: Michael Muenks, Coordinator, Curriculum and Assessment
RE: MAP Science Achievement Level Setting

As you know, all Missouri students in grades 5, 8, and 11 are participating in the first required MAP Science assessment this spring. From July 16-18, DESE's Assessment Section will conduct an achievement level setting conference to determine the scores that will be used to define student performance as Below Basic, Basic, Proficient or Advanced. (Specific location for the conference has not yet been determined, but it will be held in mid-Missouri.)

During the conference, panels of educators and other individuals will review and discuss science grade-level expectations and assessment items to determine the appropriate "cut scores" for each achievement level. The composition of the achievement level setting panels and the expertise of panelists are critically important to this process. We anticipate including at least two post-secondary education representatives on each of the three panels.

I am requesting your assistance in identifying teacher educators or other post-secondary educators to serve as elementary, middle, and high school panelists. Nomination guidelines are enclosed. If you would like to nominate an individual to serve as a panelist, please complete the enclosed form and return it to the Assessment Section no later than April 21, 2008 (mailing address and fax number are printed on the form).

Prior to submitting nominations, please contact any individual you wish to nominate to ensure his/her interest and availability if selected to participate as a panelist. It is very important that panelists are available for all three days of the conference. All participants will be reimbursed for travel expenses and meals not provided during the conference. Additionally, those panelists that are not otherwise being compensated by their employer will receive a stipend of \$150 for each full day of work. We will notify all panelists of the status of their nomination in early May. Those nominees selected to participate in the Achievement Level Setting Conference will receive further information about the conference at that time.

Enclosures: Guidelines for Post-Secondary Educator Panelist Nomination
Non-Teacher Educator Nomination Form



Missouri Department of Elementary and Secondary Education

— *Making a positive difference through education and service* —

April, 2008

Name
Professional Educator Organization
Address

Dear _____,

This spring, all Missouri students in grades 5, 8 and 11 are participating in the required MAP Science assessment. Missouri is adding this component to the MAP program in accordance with No Child Left Behind Legislation, which requires states to administer a science assessment to all students at least once in elementary school, once in middle school, and once in high school. As we add this new component to our assessment system, we will need to determine the scores that will be used to define student performance as Below Basic, Basic, Proficient or Advanced.

To accomplish this important task, we will conduct an Achievement Level Setting Conference during which panels of educators and other individuals will review and discuss science grade-level expectations and assessment items to determine the appropriate "cut scores" for each achievement level. The composition of the achievement level setting panels and the expertise of panelists are critically important to this process. Each grade-span panel will consist of approximately 15 members. Within each panel, 50 percent of the panelists will be classroom teachers, 25 percent will be non-teacher educators (administrators, librarians, counselors, etc.) and 25 percent will be non-school employees (parents, business professionals, etc.). Because you have the opportunity to work with excellent educators, we are asking for your input in assembling achievement level setting panels that are knowledgeable and reflective of Missouri's diverse population.

Enclosed with this letter are forms for you to nominate educators to serve on Science achievement level setting panels. These nominations will be placed into a large pool from which we will select final panelists. Selected panelists will be representative of the state's demographic characteristics and geographic make-up. **The Science Achievement Level Setting Conference will be held on July 16-18, 2008. Specific location for the conference has not yet been determined, but it will be held in mid-Missouri.**

If you are interested in nominating an individual(s) to serve as a panelist, please refer to the enclosed "Guidelines for Classroom Teacher/Non-Teacher Educator Panelist Nomination". In order to submit nominations for the achievement level setting panels, you must complete the enclosed form(s) according to the specified guidelines. You may photocopy the appropriate form if you would like to submit more than one nomination. **Nomination forms must be postmarked or**

faxed on or before April 21, 2008, to be considered for panel selection. Return address and fax number are printed on the forms.

Prior to submitting nominations, please contact any individual you wish to nominate to ensure his/her interest and availability if selected to participate as a panelist. It is very important that panelists are available for all three days of the conference. All participants will be reimbursed for travel expenses and meals not provided during the conference. Additionally, those panelists that are not otherwise being compensated (by their employer, school district, etc.) will receive a stipend of \$150 for each full day of work. We will notify all panelists of the status of their nomination in early May. Those nominees selected to participate in the Achievement Level Setting Conference will receive further information about the conference at that time. Thank you for your assistance in this important endeavor. Please feel free to contact the Assessment Section at 573-751-3545 if you have any questions.

Sincerely,

A handwritten signature in cursive script that reads "Stan Johnson". The signature is written in black ink and is positioned below the word "Sincerely,".

Stan Johnson, Assistant Commissioner
Division of School Improvement

Enclosures: Guidelines for Classroom Teacher/Non-Teacher Educator Panelist Nomination
Classroom Teacher Nomination Form (green)
Non-Teacher Educator Nomination Form (yellow)



Missouri Department of Elementary and Secondary Education

— Making a positive difference through education and service —

April, 2008

Name
Address
City, MO ZIP

Dear _____,

Each spring, Missouri schools administer subject area tests to all students in the state as part of the Missouri Assessment Program (MAP). MAP assessments provide Missouri educators, parents and community members with a comprehensive picture of student progress. This spring, for the first time, all Missouri students in grades 5, 8, and 11 will take a MAP Science assessment in accordance with the requirements of No Child Left Behind Legislation, which requires states to administer a science assessment to all students at least once in elementary school, once in middle school, and once in high school.

An important part of adding a Science assessment to the MAP program is determining the achievement levels that describe student performance. From the beginning of the MAP, both educators and business professionals throughout the state have been instrumental in determining the knowledge, skills and competencies that Missouri's young people should be able to demonstrate. We will continue to involve Missouri citizens in MAP development as we go about the important task of setting achievement levels for the spring 2008 MAP Science assessment. The "achievement level setting panel" for Science will consist of 25 classroom teachers, 10 non-teacher educators, and 10 non-educators. **These panels will convene for an Achievement Level Setting Conference on July 16-18, 2008.** The specific location for the conference has not yet been determined; however, it will be held in mid-Missouri.

We are asking for your help in ensuring that we assemble achievement level setting panels that are knowledgeable and reflective of Missouri's diverse population. Enclosed with this letter is a form to nominate business leaders from your community to participate in the achievement level setting activities. These nominations will create a large pool from which we will select final panelists. Selected panelists for each grade range will be representative of the state's demographic characteristics and geographic make-up.

If you are interested in nominating an individual(s) to serve as a panelist, please refer to the enclosed "Guidelines for Non-School Employee Panelist Nomination". In order to submit nominations for the achievement level setting panel, you must complete the enclosed form according to the specified guidelines. You may photocopy the form if you would like to submit more than one nomination. **Nomination forms must be faxed or postmarked on or before**

April 21, 2008, to be considered for panel selection. Return address and fax number are printed on the form.

Prior to submitting nominations, please contact any individual you wish to nominate to ensure his/her interest and availability if selected to participate as a panelist. It is very important that all panelists are available for all three days of the conference. All participants will be reimbursed for travel expenses and meals not provided during the conference. Additionally, those panelists that are not otherwise being compensated by their employer will receive a stipend of \$150 for each full day of work. We will notify all panelists of the status of their nomination in early May. Those nominees selected to participate in the Achievement Level Setting Conference will receive further information about the conference at that time. Thank you for your assistance in this important endeavor. Please feel free to contact the Assessment Section at 573-751-3545 if you have any questions.

Sincerely,

A handwritten signature in cursive script that reads "Stan Johnson". The signature is written in dark ink and is positioned below the word "Sincerely,".

Stan Johnson, Assistant Commissioner
Division of School Improvement

Enclosures: Guidelines for Non-Educator Nomination
 Non-Educator Nomination Form

GUIDELINES FOR CLASSROOM TEACHER/NON-TEACHER EDUCATOR PANELIST NOMINATION

Refer to these guidelines for nomination of classroom teachers, administrators, counselors, librarians or others who are employed by the public school system, or individuals employed by post-secondary institutions.

Qualifications of Classroom Teachers

- Must have taught at least five of the last 10 years in the grade range for which they are being nominated to serve as a panelist.
- For individuals being nominated to serve as a high-school panelist, must have taught science content for at least five years.
- Should be familiar with the Show-Me Standards and Science Grade-Level Expectations.
- Should be recognized as “outstanding” in professional performance by a supervisor or other individual in a position to make that judgment.

Qualifications of Non-Teacher Educators

- May be a non-teacher educational staff member at a primary or secondary educational institution or a district central office, or an instructor or administrator at a post-secondary institution.
- Must have familiarity with science content at the grade range for which they are being nominated to serve as a panelist.
- Should be familiar with the Show-Me Standards and Science Grade-Level Expectations.
- Must be recognized as “outstanding” in professional performance by the individual making the nomination.

Number of Individuals to Nominate

- If you are an administrator nominating on behalf of a school district, you may nominate individuals for Science Achievement Level Setting as follows based on your district’s student enrollment.
 - District student enrollment less than 10,000 – Nominate 1
 - District student enrollment 10,000-25,000 – Nominate up to 2
 - District student enrollment greater than 25,000 – Nominate up to 3
- If you are nominating on behalf of a professional educator organization, your organization may nominate up to three individuals.
- If you nominate more than one individual as a potential panelist, at least one of those individuals must be a minority.

Before Making a Nomination(s)...

- Be sure to contact the individuals you wish to nominate to verify that they are interested in achievement level setting activities.
- Verify that nominees are available for **ALL conference dates from July 16, 2008, through July 18, 2008. It is imperative that panelists participate fully in all conference activities.**
- Let nominees know that approximately 45 panelists will be selected from nominations we receive. (Of the 45 panelists, 23 will be classroom teachers, 11 will be non-classroom educators and 11 will be non-educators.) All potential panelists will receive notice of the status of their nomination in early May.
- Let nominees know that they will receive a stipend of \$150 per day for their work if they are not otherwise being compensated (e.g., by their school district or employer). Participants will be reimbursed for mileage at the State’s approved rate, lodging, and meals not provided during the conference.

Completing the Nomination Form

- Please complete a separate nomination form for each individual nominated. Nomination forms may be duplicated.
- Be sure to use the correct nomination form:
 - Classroom Teacher (green)
 - Non-Teacher Educator (including individuals employed by post-secondary institutions) (yellow)
 - Non-Educator (blue)
- Forms must be fully completed in order to be placed in the pool for consideration. Please verify all information on each form prior to submitting nominations.
- Forms must be postmarked or faxed on or before April 21, 2008, in order to be placed in the pool for consideration. Forms postmarked or faxed after April 21, 2008, will NOT be accepted.

PLEASE CONTACT THE ASSESSMENT SECTION AT 573-751-3545 OR E-MAIL map@dese.mo.gov IF YOU HAVE FURTHER QUESTIONS ABOUT COMPLETING NOMINATION FORMS.

GUIDELINES FOR POST-SECONDARY EDUCATOR PANELIST NOMINATION

Qualifications of Post-Secondary Educator Nominees

- May be an instructor or administrator at a post-secondary institution.
- Must have familiarity with science content for which they are being nominated to serve as a panelist.
- Should be familiar with the Show-Me Standards and Science Grade-Level Expectations in the grade level for which they are being nominated to serve as a panelist.
- Must be recognized as “outstanding” in professional performance by the individual making the nomination.

Number of Individuals to Nominate

- You may nominate one individual.

Before Making a Nomination(s)...

- Be sure to contact the individuals you wish to nominate to verify that they are interested in achievement level setting activities.
- Verify that nominees are available for **ALL conference dates from July 16, 2008, through July 18, 2008. It is imperative that panelists participate fully in all conference activities.**
- Let nominees know that all potential panelists will receive notice of the status of their nomination in early May.
- Let nominees know that they will receive a stipend of \$150 per day for their work if they are not otherwise being compensated. Participants will be reimbursed for travel, lodging and meals not provided during the conference.

Completing the Nomination Form

- Complete the correct nomination form for the individual you are nominating.
- Be sure to use the correct nomination form:
 - **Non-Teacher Educator** Nomination Form
- Forms must be fully completed in order to be placed in the pool for consideration.
- Please verify all information on each form prior to submitting nominations.
- Forms must be faxed or postmarked on or before April 21, 2008, in order to be placed in the pool for consideration. Forms faxed or postmarked after April 21, 2008, will NOT be accepted.

PLEASE CONTACT THE ASSESSMENT SECTION AT 573-751-3545 OR EMAIL map@dese.mo.gov IF YOU HAVE FURTHER QUESTIONS ABOUT COMPLETING NOMINATION FORMS.

GUIDELINES FOR NON-SCHOOL EMPLOYEE PANELIST NOMINATION

Refer to these guidelines for nomination of business professionals, parents, or other individuals who are not employed in any capacity by the public school system.

Qualifications of Nominees

- Must have familiarity with science content in the grade range for which they are being nominated to serve as a panelist.
- Should not be a current or former employee of the public school system.

Examples of Individuals to Consider

- A parent that is actively involved in his/her child's education and is familiar with science content.
- A local business person who considers individuals' science skills in the hiring process.
- A business professional who uses science skills in his/her daily work.
- Local school board members.

Number of Individuals to Nominate

- You may nominate up to three individuals
- If you nominate more than one individual as a potential panelist, at least one of those individuals must be a minority.

Before Making a Nomination(s)...

- Be sure to contact the individuals you wish to nominate to verify that they are interested in achievement level setting activities.
- Verify that nominees are available for **ALL conference dates from July 16, 2008, through July 18, 2008. It is imperative that panelists participate fully in all conference activities.**
- Let nominees know that a total of 45 panelists (11 of which will be non-school employees) will be selected from nominations we receive. All potential panelists will receive notice of the status of their nomination in early May.
- Let nominees know that they will receive a stipend of \$150 per day for their work if they are not otherwise being compensated by their employer. Participants will be reimbursed for mileage at the State's approved rate, lodging and meals not provided during the conference.

Completing the Nomination Form

- Please complete a separate nomination form for each individual nominated. Nomination forms may be duplicated.
- Forms must be fully completed in order to be placed in the pool for consideration. Please verify all information on each form prior to submitting nominations.
- Forms must be postmarked or faxed on or before April 21, 2008, in order to be placed in the pool for consideration. Forms postmarked or faxed after April 21, 2008, will NOT be accepted.

PLEASE CONTACT THE ASSESSMENT SECTION AT 573-751-3545 OR EMAIL map@dese.mo.gov IF YOU HAVE FURTHER QUESTIONS ABOUT COMPLETING NOMINATION FORMS.



MAP SCIENCE ACHIEVEMENT LEVEL SETTING CLASSROOM TEACHER NOMINATION

Directions

Complete this form for each individual you wish to nominate to serve as a panelist for MAP Science Achievement Level Setting. Please verify spelling of first and last name of the individual you are nominating, and ensure that all information is complete and accurate. You may duplicate this form if you would like to nominate more than one individual.

FAX OR MAIL: the completed form no later than April 21, 2008

FAX: (573) 526-0812

MAIL: **MO Department of Elementary and Secondary Education, Assessment Section**

P.O Box 480

Jefferson City, MO 65102

QUESTIONS: Call: (573) 751-3545 or Email: map@dese.mo.gov

Grade Level

GRADE RANGE FOR WHICH NOMINEE SHOULD SERVE AS A PANELIST (please check one):

Elementary (3-5) Middle (6-8) High School

Years teaching experience in grade range indicated above: _____

Participant Information

CURRENT NAME (LAST, FIRST, MIDDLE INITIAL) Please Print:

STREET ADDRESS:

CITY, STATE, ZIP CODE:

HOME E-MAIL ADDRESS

HOME PHONE NUMBER:

RACE/ETHNICITY (optional):

Asian/Pac Isl. Black Hispanic Native Am. Indian White

AREAS OF EXPERTISE (Mark all that apply):

Regular Education Special Education English Language Learners (ELL)

District Information

SCHOOL DISTRICT NAME:

COUNTY-DISTRICT CODE:

SCHOOL BUILDING NAME:

SCHOOL CODE:

SCHOOL EMAIL ADDRESS:

SCHOOL PHONE NUMBER

Experience/Expertise

Summarize the nominee's involvement in education initiatives that are pertinent to Science Achievement Level Setting (e.g., Show-Me Standards development/review, Grade-Level Expectations development/review, MAP development/scoring activities, MAP Regional Center professional development activities, EOC development activities)

Professional Organizations/Affiliations

Individual Providing Nomination

NAME/TITLE

PHONE NUMBER

E-MAIL ADDRESS

The Department of Elementary and Secondary Education does not discriminate on the basis of race, color, national origin, sex, disability, or age in its programs and activities. Inquiries related to Department programs may be directed to the Jefferson State Office Building, Title IX Coordinator, 5th floor, 205 Jefferson Street, Jefferson City, MO 65102-0480; telephone number 573-751-4212.

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MISSOURI DEPARTMENT OF ELEMENTARY AND SECONDARY EDUCATION
 DIVISION OF SCHOOL IMPROVEMENT – ASSESSMENT SECTION
**MAP SCIENCE ACHIEVEMENT LEVEL SETTING NON-TEACHER EDUCATOR
 NOMINATION (INCLUDING POST-SECONDARY EDUCATOR)**

Directions

Complete this form for each individual you wish to nominate to serve as a panelist for MAP Science Achievement Level Setting. Please verify spelling of first and last name of the individual you are nominating, and ensure that all information is complete and accurate. You may duplicate this form if you would like to nominate more than one individual.

FAX OR MAIL the completed form no later than **April 21, 2008**, to the Missouri Assessment Program
 FAX: (573) 526-0812
 MAIL: MO Department of Elementary and Secondary Education, Assessment Section
 P.O. Box 480
 Jefferson City, MO 65102

QUESTIONS: Call: (573) 751-3545 or Email: map@dese.mo.gov

Grade Level

GRADE RANGE FOR WHICH NOMINEE SHOULD SERVE AS A PANELIST (please check one):
 Elementary (3-5) Middle (6-8) High School

Participant Information

CURRENT NAME (LAST, FIRST, MIDDLE INITIAL) Please Print:

STREET ADDRESS:

CITY, STATE, ZIP CODE:

HOME E-MAIL ADDRESS

HOME PHONE NUMBER:

RACE/ETHNICITY (optional): Asian/Pac Isl. Black Hispanic
 Native Am. Indian White

GENDER: Male Female

District Information (If nominee is a post-secondary educator, please provide name of institution.)

SCHOOL DISTRICT NAME:

COUNTY-DISTRICT CODE:

SCHOOL BUILDING NAME:

SCHOOL CODE:

SCHOOL EMAIL ADDRESS:

SCHOOL PHONE NUMBER

Experience/Expertise

Summarize the nominee's involvement in education initiatives that are pertinent to Science Achievement Level Setting (e.g., Show-Me Standards development/review, Grade-Level Expectations development/review, MAP development/scoring activities, MAP Regional Center professional development activities, EOC development activities)

OF YEARS IN CURRENT POSITION: _____

PREVIOUS TEACHING EXPERIENCE
 Grade Level(s): _____ Years: _____ Subject Area(s): _____

AREAS OF EXPERTISE (Mark all that apply):

Regular Education Special Education English Language Learners (ELL)

Professional Organizations/Affiliations

Individual Providing Nomination

NAME/TITLE

PHONE NUMBER

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MISSOURI DEPARTMENT OF ELEMENTARY AND SECONDARY EDUCATION
 DIVISION OF SCHOOL IMPROVEMENT – ASSESSMENT SECTION
MAP SCIENCE ACHIEVEMENT LEVEL SETTING NON-SCHOOL EMPLOYEE
NOMINATION

Directions

Complete this form for each individual you wish to nominate to serve as a panelist for MAP Science Achievement Level Setting. Please verify spelling of first and last name of the individual you are nominating, and ensure that all information is complete and accurate. You may duplicate this form if you would like to nominate more than one individual.

FAX OR MAIL the completed form no later than **April 21, 2008**, to the Missouri Assessment Program **(573) 526-0812**

FAX: (573) 526-0812

MAIL: MO Department of Elementary and Secondary Education, Assessment Section

P.O. Box 480

Jefferson City, MO 65102

QUESTIONS: Call: (573) 751-3545 or Email: map@dese.mo.gov

Grade Level

GRADE RANGE FOR WHICH NOMINEE SHOULD SERVE AS A PANELIST (please check one):

Elementary (3-5) Middle (6-8) High School

Participant Information

CURRENT NAME (LAST, FIRST, MIDDLE INITIAL) Please Print:

OCCUPATION

STREET ADDRESS:

CITY, STATE, ZIP CODE:

HOME E-MAIL ADDRESS

HOME PHONE NUMBER:

RACE/ETHNICITY (optional): Asian/Pac Isl. Black Hispanic

GENDER: Male Female

Native Am. Indian White

Experience/Expertise

Explain why you believe this individual would be an asset to the Science Achievement Level Setting Panel:

Professional Organizations/Affiliations

Individual Providing Nomination

NAME/TITLE

PHONE NUMBER

SCHOOL DISTRICT

E-MAIL ADDRESS

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