APPENDIX S

BOSTON COLLEGE CONTENT ALIGNMENT STUDY

Findings from a Content Alignment Study of the 2017 Massachusetts Grades 3-8 English Language Arts and Mathematics Next-Generation MCAS Tests

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Executive Summary

This document presents findings from a content alignment study conducted by members of Boston College's Department of Measurement, Evaluation, Statistics, and Assessment. The study focuses on the content alignment of the 2017 Massachusetts Comprehensive Assessment System (MCAS) Grades 3-8 English Language Arts (ELA) and Mathematics tests to the then current 2011 state curriculum standards for ELA and mathematics.

The study was conducted during the fall of 2018 and employed four panels of between eight and nine Massachusetts educators. Two panels focused on the ELA tests and two panels focused on the mathematics tests. For each subject area, one panel focused on grades 3-5 and the second panel focused on grades 6-8. Each panel was composed of educators from different geographic regions of the state and included representatives from urban, suburban, and rural districts.

To examine content alignment, a modified version of the Webb Content Alignment methodology was employed. The three primary modifications included:

1. Use of a consensus method, as follows: If fewer than six panel members did not agree on a rating, the ratings were discussed and panel members were provided an opportunity to revise their ratings.
2. The state's cognitive levels were employed to code depth of knowledge (DOK) of standards and items instead of Webb's DOK levels.
3. To capture the standards addressed through the scoring of essay responses, the criteria employed during essay scoring were coded and combined with codes assigned to items to provide a more complete representation of content alignment.

Overall, the findings indicate a high degree of content alignment. For mathematics, over 90% of the domains assessed across the grade level tests showed high levels of alignment. For ELA, alignment was also found to be strong across grade levels and domains. When both the items and essay scoring criteria are considered, over 95% of the alignment considerations were deemed adequate. Only two domains, Grade 7 and 8 Reading Informational Text, were identified as candidates for improved alignment. In addition, analyses of the level of agreement among panel members ratings showed high levels of agreement for the vast majority of ratings following the consensus process.

In summary, while there are a few select opportunities to improve alignment, the results from the analyses presented in this report provide evidence of strong alignment across the vast majority of the tests examined.

Introduction

This report presents findings from a content alignment study for the Massachusetts Comprehensive Assessment System (MCAS) Grade 3-8 English Language Arts (ELA) and Mathematics tests. The study focused on the operational tests administered during the spring of 2017 and examined alignment of the test content with the corresponding state standards. The spring 2017 test was the first year of test administration for what the state of Massachusetts has termed Next-Generation MCAS. The spring 2017 MCAS tests were developed to align with the then current state standards, which had been adopted in 2011. Thus, the findings presented in this report document alignment of the Grade 3-8 ELA and Mathematics tests with the 2011 ELA and Mathematics state standards.

Information in this report is presented in 4 sections. Section 1 describes the methodology and procedures employed to examine alignment. Appendix M provides further details on the calculations and classification criteria employed for several of the alignment characteristics examined for this study. Section 2 presents findings for the Grade 3-8 Mathematics tests. Section 3 presents findings for the Grade 3-8 ELA tests. Section 4 provides a summary of findings and identifies opportunities to further strengthen content alignment.

It must be emphasized that these analyses focus on only a single year of test administration. For grades 3-8, the MCAS program partially releases operational items following test administration. Operational items are replaced each year. Given time constraints for test administration, each operational MCAS test is limited in the number of items that can be administered each year, which in turn constrains the ability to represent all content embodied in the state's standards in a single test. As an example, the grade 6 mathematics test contains 34 items while the state curriculum frameworks specify 46 standards, making it impossible to address all standards on a single year's operational test. The annual replacement of operational items, however, provides the testing program with the opportunity to increase representation of content embodied in the standards over time. Because the analyses presented here focus on only a single test administration, the findings are limited to the representation of a single year's tests as opposed to the body of tests employed by the program over multiple years. Nonetheless, as the results presented in Sections 2 and 3 indicate, the 2017 state tests provide solid representation of the corresponding state standards.

Section 1: Methodology and Procedures

Several methods have been developed to examine the alignment of test content with curricular content. As reported by the NAEP Governing Board (2009), the three most prevalent methods employed to examine the content alignment of achievement tests are Porter's (2002; 2006) Survey of Enacted Curriculum, Achieve, Inc.'s content alignment protocol (Rothman, Slattery, Vranek, & Resnick, 2002) and Webb's (2004) 4-component alignment method. All three methods share a similar focus on comparing the content of a test to the content of the standards assessed by the test. In addition, all three methods rely on judgment by experts who are familiar with the test items and the targeted standards.[1]

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[1] After the review of previously employed methodology was performed and a decision was made to use a modified version of Webb's method, we became aware of a then recently published method employed by Achieve to analyze the alignment of the ACT to the Common Core State Standards. This method was a modification of a methodology proposed by the Center for Assessment. Like other methods, it employs

A distinguishing aspect of Porter's method is the focus on the alignment of an achievement test with the curriculum that is actually enacted in the classroom. Porter's method recognizes that a school's curriculum is based on the state standards, but what is emphasized in the curriculum may result in differences between the body of standards to which students are intended to be exposed and the standards to which they are actually exposed. While enacted curriculum is an important consideration when a test is used to inform claims about school or teacher quality and/or impacts of instructional practices, documenting enacted curriculum across a state educational system is a challenging, expensive, and impractical endeavor. Moreover, given the state's effort to establish standards that define what students are expected to know and be able to do at a given grade level within a given content domain, and the subsequent purpose of developing tests to assess student achievement of those standards, a focus on enacted curriculum is less aligned with the purpose of the state tests than is a focus on the standards themselves.

Achieve Inc.'s method and Webb's method are similar in that they focus on four aspects of alignment between the items comprising an achievement test and the state standards assessed by the test. The aspects examined through each method, however, differ in minor ways. Both methods also employ panels of experts to examine the alignment of items with the state standards. In the Achieve method, the focus of analysis is on each item and the standard the item is intended to represent. In the Webb method, the targeted standard is not made known to the panelists and instead requires panelists to identify the standard with which the item aligns (in some cases more than one standard may be identified). In this way, the panelists are not clued as to what an item is intended to assess during their evaluation of the item and its alignment to the standards. A third difference between the two methods is the manner in which results are summarized. The Achieve method yields a narrative-based summary that provides a set of general statements about alignment. In contrast, Webb's method quantifies results and applies pre-specified criteria to evaluate the strength of alignment as indicated by the resulting quantification of judgments. A fourth aspect of the two methods worth noting is the frequency with which the Webb method has been employed by state testing programs to examine content alignment compared to the infrequency of use of the Achieve method. Perhaps due to the high frequency of use of the Webb's method, digital tools have been developed to support application of the Webb method, whereas no similar tools have been released for the Achieve method.

Given that the primary purpose of MCAS is to assess achievement of the state standards by students across the state, the quantifiable results, unbiased focus on item alignment with standards, the frequency of prior use, and the availability of digital tools to support implementation, this study opted to use the Webb method as a foundation for examining content alignment of the MCAS tests with the corresponding state standards.

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experts to make judgments about several aspects of test content including balance of representation, range of cognitive demand, assessment of specific content area skills, quality of items, and variety of item types. More information about the methodology can be found in Appendix B at http://www.achieve.org/files/ACTReport.pdf.

Overview of the Massachusetts State Standards

This study focuses on the alignment of the 2017 grades 3-8 mathematics and ELA tests with corresponding state standards. As noted above, the then current state standards used to inform development of the 2017 operational test items were established in 2011.

For both ELA and mathematics, the College and Career Readiness (CCR) standards anchor the Massachusetts' state standards and define general, cross-disciplinary literacy expectations that must be met for students to be prepared to enter college and workforce training programs ready to succeed. The pre-k –12 grade-specific standards define end-of-year expectations and a cumulative progression designed to enable students to meet college and career readiness expectations no later than the end of high school.

All MCAS ELA items are coded to the College and Career Readiness (CCR) Anchor Standards for Reading, Writing, and Language. Grade-level standards are considered in developing and reviewing each test question; however, MCAS questions are written to assess the broader skills of reading and writing that students in all grades are working towards and that are defined by the anchor standards. Students are not expected to know grade-specific content beyond their grade level, but the tests will include items that reflect an understanding of all of the grade-level standards up to and including the grade level being assessed.

As noted in the 2011 Framework, "CCR and grade-specific standards are necessary complements-the former providing broad standards, the latter providing additional specificity- that together define the skills and understandings that all students must demonstrate."

For each grade level, separate standards were established for each subject area. For each set of grade level standards, standards were sub-grouped into domains, with each grade level standards containing 4 or 5 domains. Within each domain, standards were then grouped by topic, with each topic typically containing 2-5 standards. In some cases, the standards within a topic were further divided into sub-standards.

As an example, Figure 1 displays a portion of the Grade 6 ELA standards and the Grade 6 Mathematics standards. Focusing on the ELA standards, Figure 1 begins by stating the grade level of the standard (Grade 6 [6]). Next, the domain is identified (Reading Standards for Literature [LIT]). The Topic is then specified (Key Ideas and Details [A]). Finally, the standard itself is detailed (Cite textual evidence…. [1]). In comparison, the portion of the Grade 6 Mathematics standards displayed is structured similarly, but extends the specification of the standard to the sub-standard level (Solve unit rate problems… [b]).

As described below, the Webb method requires panel members to identify the standard(s) assessed by each item. When doing so, panel members were asked to identify the lowest level of the standard associated with the item. In the example presented in Figure 1, this would result in panel members identifying the standard for ELA and the sub-standard for mathematics. For ease of reference, the remainder of the report employs the term "standard" to refer to the lowest level of specificity with which a learning outcome is described. In some cases, the term "standard" will refer to the standard-level (e.g., ELA example in Figure 1). In other cases, the term will refer to the sub-standard-level (e.g., mathematics example in Figure 1).

Figure 1: Sample Grade 6 ELA and Mathematics

Standards ELA Standard:

Grade 6 (Grade level [6])
  Reading Standards for Literature (Domain [6.LIT])
    A.ͼKey Ideas and Details (Topic [6.LIT.A])e
      1.ͼCite textual evidence to support analysis of what the text says … (Standarde
      [6.LIT.A.1])e

Mathematics:

Grade 6 (Grade level [6])
  Ratios and Proportional Relationships (Domain [6.RP])
    A.ͼUnderstand ratio concepts and use ratio reasoning…(Topic [6.RP.A])e
      3.ͼUse ratio and rate reasoning to solve real-world … (Standard [6.RP.A.3])e
        b.ͼSolve unit rate problems … (Sub-standard [6.RP.A.3.b])e

It is important to note that when developing the MCAS mathematics and ELA tests, the state identified a sub-set of ELA standards that cannot be feasibly assessed by a traditional test instrument. As a result, test items and tasks were not developed for these "non-assessable" ELA standards. For ELA, Speaking and Listening standards were deemed non-assessable and were instead intended to be assessed at the local level. IThe Webb methodology includes all standards established by the state when examining categorical concurrence and range of representation. Given that some of the standards considered through the Webb methodology were deemed "non-assessable" and therefore were intentionally not targeted by the MCAS tests, the Webb methodology may underestimate content coverage. To provide a more rounded evaluation of content coverage, both the percent of all standards addressed by a given test and the percent of standards deemed "assessable" addressed by a given test are presented.

For mathematics, the 2011 grade 5 standards included only one standard for the Number Sense domain. At the time the 2017 grade 5 mathematics test was developed, the state was planning to remove the Number Sense domain from the 2017 version of the Grade 5 standards. For this reason, the Number Sense domain was not a target for assessment in the 2017 grade 5 test and was excluded from the content alignment analysis.

Level of State Reporting Versus Webb Analysis
It is important to note that the level at which the state reports test results differs from the level at which content alignment was examined. For ELA, the state combines the Reading Standards for Literature and the Reading Standards for Information Text to provide a score report for a broader category of standards. In effect, the score report treats the standards under these two domains as one body of standards termed Reading. Separate score information is also provided for Writing. Similarly, when categorizing items for reporting purposes, items are placed into one of three domains: Reading, Writing, or Language. In contrast, the content alignment study reported on in this document examined standards under the two reading domains separately. For this reason, it is possible for the standards associated with the Reading for Literature to show strong alignment while the standards for Reading for

information Text to be weaker, and vice versa.

For mathematics, the state reports at the level of the standard (see Figure 1) and not at the sub-standard level.

It should be noted that in the remainder of this report, the term "standard" will always refer to the lowest level at which a student learning expectation is specified within a given domain. For ELA, the term "standard" used in this document is synonymous with the way in which the state uses the term for the ELA standard (see Figure 1). For mathematics, the term "standard" used in this document refers to the sub-standard specified for each domain (see Figure 1).

Overview of the Webb Method

The Webb method considers four aspects of alignment:

A. **Categorical Concurrence:** Focuses on the extent to which the categories of content covered by a set of standards corresponds with the categories of content covered by test items. For the analyses presented here, the domains covered by the standards represent the categories of the standards of interest. The primary question addressed through this aspect is the extent to which the items of the test address each domain addressed by the grade level content area standards.

B. **Depth of Knowledge Consistency:** Focuses on the extent to which the depth of knowledge at which each test item assesses a targeted standard aligns with the depth of knowledge associated with the standard itself. This aspect requires that the depth of knowledge required to achieve the standard be identified, the standard targeted by each item be identified, and the depth of knowledge at which the item address the targeted standard be determined. For each item, a comparison is then made between the depth of knowledge assigned to the item and the depth of knowledge assigned to the standard targeted by the item. Note that for the study presented here, depth of knowledge was defined by the Massachusetts' three cognitive levels which include: Level 1 – Identify and/or Recall; Level 2 – Infer/Analyze; and Level 3 – Evaluate/Apply (see Appendix N for a fuller description of each level).

C. **Range of Knowledge:** Focuses on the extent to which the full set of standards associated with a given domain are represented by the items targeting the given domain. Here the question is not whether the domain is represented, but instead the extent to which all of the standards associated with the domain are represented. As noted above, range of representation is influenced by the number of test items and the number of standards. Further, full range of representation is typically not possible to obtain when the number of standards exceeds the number of operational items comprising the test.

D. **Balance of Representation:** Focuses on the extent to which the standards addressed by the test items that target a given domain cover the standards in a balanced manner. In other words, given the standards within a domain that have been deemed to be addressed by items, are the standards represented evenly across the items.

For each aspect of alignment, the Webb methodology calculates a value that indicates the extent to which aspect of alignment has been met. Based on the value, the Webb methodology then categorizes the extent to which the aspect is met into three levels which are labeled "Yes," "Weak," and "No." "Yes" indicates that the aspect of alignment is fully satisfied and that the resulting test information is sufficient for representing student achievement with respect to the given aspect of alignment. "Weak" indicates representation that is also minimally acceptable for representing student achievement, but could be strengthened. "No" indicates that alignment with respect to the given aspect is not sufficient for adequately representing student achievement. In all cases, the aspects of alignment are examined at the domain level. Thus, the Webb methodology provides information about the extent to which coverage of each domain is sufficient to represent student achievement within that domain. Further details on the formulas used to calculate statistics for each aspect of alignment and the criteria used to categorize the level of alignment for each aspect are located in Appendix M.

In a standard application of the Webb method, panelists review standards and items individually and then code them accordingly. The panelists codes are then examined collectively to make judgements about each of these four aspects of content alignment.

The methodology employed for this study differed in that after panelists made their initial judgements, the panel leader examined ratings to identify standards and/or items for which fewer than 6 panelists (67-75% depending on the panel) agreed on a rating. Discussion then focused on each standard and/or item for which panel consensus (defined as 6 or more panelists agreeing on a code) was not reached. Panelists were then given a second opportunity to code the discrepant standard or item. The final ratings were then used to examine each aspect of content alignment.

It should be noted that this approach increased the level of agreement among panelists. However, because Webb's method for evaluating categorical concurrence, range of knowledge, and balance of representation considers all of the standards identified across all panelists, our approach likely suppressed the range and balance of representation that would have resulted had a consensus approach not been used. We opted to employ a consensus approach, however, because it allowed panelists to consider more deeply their decisions, listen to perspectives of others, and modify their ratings when they felt their initial judgements were inaccurate. As a result, the final ratings resulting from the consensus approach should contain less error and thus represent a higher level of accuracy in panelists ratings.

Our implementation of the Webb method entailed the following components:

1. **Panel selection:** Four panels were formed. Two panels focused on ELA and two focused on mathematics. For each content domain, one panel focused on grades 3-5 and the second on grades 6-8. Each panel contained 8 or 9 educators who worked with students in one or more grades addressed by their panel. All panel members also focused instruction on the subject area that was the focus of their panel (e.g., all Grade 3-5 ELA panel members worked with ELA students in grade 3, 4, and/or 5). Members of each panel were selected to represent the geographic/demographic diversity of the state and included eight educators from rural, eight educators from suburban and 13 educators from urban districts. Finally, all panel members had prior knowledge of the state standards associated with their grade level and content area.
2. **Pre-Materials:** All panel members were provided with informational materials prior to the panel meeting. These materials described the purpose of the study and introduced key concepts that were covered in greater detail during training.
3. **Whole-Group Training:** All panels were presented with background information on the purpose of the content alignment study, the definition of alignment employed for this study, definitions of depth of knowledge employed for this study, and the general procedures used to examine and judge alignment. Panelists also engaged in a consensus building activity designed to familiarize panelists with each other and to practice consensus building as a panel.
4. **Panel Training:** Each panel was led by a panel leader who provided additional training that focused on:
   a. Depth of Knowledge as it applied to the content area of focus by the panel
   b. Procedures for coding standards and items for depth of knowledge

    c. Practice coding sample standards and items for depth of knowledge
    d. Issues to consider when identifying the standard(s) addressed by a given item
    e. Practice identifying the standard addressed by sample items
    f. Procedures for discussing discrepancies and for moving towards consensus
    g. Use of the software employed to record depth of knowledge ratings and standard aligned with a given item

5. **Coding standards for Depth of Knowledge:** Panel members worked individually to examine each standard within a grade level and then assigned a depth of knowledge code to the standard. Panel members focused on only one grade level at a time. After all panel members completed their initial coding, the panel leader examined the level of agreement for each standard. Standards for which at least 6 panel members did not assign the same depth of knowledge were deemed to have not reached consensus agreement. These non-consensus standards were then discussed individually by the panel during which panel members were asked to make a case for each depth of knowledge assigned by one or more members. Additional discussion then occurred as needed before panel members were given an opportunity to recode the standard if desired. After all non-consensus standards were discussed and recoded, the resulting codes were employed to determine if panel consensus was reached and to determine the depth of knowledge of each standard. In cases where the panel consensus was not reached, the depth of knowledge level coded by the largest number of panel members was assigned to the standard. In cases of a tie, the higher level depth of knowledge was assigned per Webb's recommendation.

6. **Coding Standard Aligned to Item and Depth of Knowledge of Item:** Panel members worked individually to examine each item within a grade level and to identify the standard assessed by the item. As indicated above, panel members were instructed to code items to the lowest level of a given standard. In addition, panel members were instructed to only assign more than one standard to an item if they determined that both standards were addressed equally by the item. In this way, the procedures attempted to reduce over-stating representation of standards that might occur if any and all standards that seemed related to the item were identified. As the results presented in Sections 2 and 3, and in greater detail in Appendices A-L, indicate, assignment of more than one standard to an item occurred infrequently.

After panel members assigned one or more standards to an item, they then identified the depth of knowledge at which the item assessed the targeted standard. Once all panel members completed coding all items within a grade level, the panel leader examined the resulting codes to identify items for which panel consensus resulted for both standard alignment and depth of knowledge. Those items for which panel consensus was not reached were discussed in detail by the panel and panel members were given an opportunity to recode the item if desired. Once all non-consensus items were discussed and recoded, the resulting codes were used to determine if panel consensus was reached and to determine the standard(s) to which the item aligned and depth of knowledge at which the item assessed the standard. In cases where the panel consensus was not reached, the standard and/or depth of knowledge level coded by the largest number of panel members was assigned to the standard. In cases of a tie, both standards were assigned to the item and/or the higher level depth of knowledge was assigned per Webb's recommendation.

7. **Coding Writing Tasks:** In the ELA panels, writing tasks were examined separately from the main body of selected response, constructed response, and/or technology- enhanced items. This approach was adopted because alignment of a writing item is based both on the essay question itself (that is the type of writing the students are asked to produce) and the aspects of a student response that are considered during scoring. The aspects considered during scoring are specified in the scoring guide employed to by readers when scoring student responses. For this reason, identifying the standard(s) aligned with each essay-based writing item required panel members to focus on both the item itself and the accompanying scoring guide. To facilitate focus on the scoring guide, essay-based writing items were coded separately from the other item types.

    To identify the standards associated with the essay-based writing items, panel members first reviewed the essay question and coded it for the topic (e.g., writing type) associated with the question and the depth of knowledge at which that type of writing was assessed. Panel members then reviewed the scoring guide employed for essay-based items and identified the standard associated with each criterion included in the scoring guide. Because the same scoring guides were employed for all essay-based items within each grade cluster (e.g., grades 3-5 and grades 6-8), the process of coding standards aligned with the scoring criteria was performed only once within each cluster. The same procedures for examining consensus described above were employed.

8. **Post-Panel Survey:** After panel members completed coding all standards and items associated with their content area and grade span, they were asked to complete a survey that focused on the level of preparation for the procedures employed, utility of various materials and resources, their general impressions regarding alignment, and any concerns they had about the procedures employed for examining alignment or the alignment of the test items. As shown in Appendix O, panel members were overwhelmingly positive about their comfort with the procedures, utility of training and materials, and the level of alignment observed. While some suggestions were offered for ways to improve the process, no major concerns were identified that impact the resulting depth of knowledge and/or standards identified as aligned with the items.

9. **Analysis and Summary of Findings:** Once panel sessions were concluded, the tools built into the Webb alignment tool were used to generate reports that summarize results for each grade level and content area. In addition, custom reports were generated that detail the level of agreement that occurred based on the initial panel ratings and final ratings for each standard and item (see Appendices A-L). These reports were used to produce the summary tables presented in Sections 2 and 3.

Section 2: Mathematics Test Alignment

This section summaries findings from panel analyses of the MCAS 2017 Grade 3-8 mathematics operational test items. Each panel performed three types of analyses:

1. Depth of Knowledge required to achieve each standard
2. Standard(s) assessed by each item
3. Depth of Knowledge required by each item

For each analysis, panel members first worked individually to code the respective standards or items within a specific grade level. Panelists then discussed standards or items for which fewer than 6 panelists agreed. Panelists were then given an opportunity to recode the standard or item discussed. The final codes were used to generate the information presented in tables 1-9. Appendices A-F present results of the panel ratings at the individual standard and item levels.

Tables 1, 2 and 3 provide information about the consensus of panel judgments about the depth of knowledge required of standards and items, and the standard(s) to which items align for grades
3-8.

As seen in Table 1, consensus regarding the depth of knowledge required of each standard after the initial round ranged from 51% (grade 7) to 80% (grade 5). After discussing discrepant standards, consensus exceeded 90% for all grade levels. The final three columns indicate the percent of standards within each grade level that were associated with each depth of knowledge level. For all grade levels, the majority of standards were viewed as requiring a DOK of 2.
Between 23-37% of standards were categorized as DOK 1, and 9-18% of standards were DOK 3.

Table 1: Summary of DOK of Grade 3-8 Mathematics Standards

| | | | Standards: | DOK | | | |
Grade	Subject	# Standards	%Consensus - initial round	%Consensus - final round	% DOK 1	% DOK 2	% DOK 3
3	Math	33	64%	100%	36%	45%	18%
4	Math	35	57%	91%	34%	57%	9%
5	Math	35	80%	94%	37%	51%	11%
6	Math	46	65%	93%	35%	57%	9%
7	Math	39	51%	92%	23%	59%	18%
8	Math	33	64%	91%	24%	64%	12%

Table 2 focuses on the DOK of items. Consensus was less consistent across grade levels, but increased noticeably for the final round in each grade level. Note that Grade 3 and 6 were the first grade levels examined within the 3-5 and 6-8 panels, respectively. In both panels, these grade levels account for the lowest level of consensus. The last three columns indicate that 50% to 62% of the items were deemed to address knowledge at the lowest level, while 29-41% of the items were a level 2 depth of knowledge. 12% or fewer items were at level 3. Given that the majority of items employed on the mathematics tests are selected response, this pattern is not surprising. However, given that fewer than one third of the items are open-response, the fact that more than one-third of items are at a DOK of 2 or higher indicates that several selected-response items address knowledge at a higher level than recall and recognition.

Table 2: Summary of DOK of Grade 3-8 Mathematics Items

			Test Items:	DOK			
Grade	Subject	# Items	%Consensus - initial round	%Consensus - final round	% DOK 1	% DOK 2	% DOK 3
3	Math	34	65%	91%	59%	29%	12%
4	Math	34	74%	94%	59%	32%	9%
5	Math	34	76%	100%	53%	35%	12%
6	Math	34	56%	79%	56%	35%	9%
7	Math	34	68%	94%	50%	41%	9%
8	Math	34	74%	88%	62%	35%	3%

Table 3 summarizes the panels' assignment of standard(s) to items. Here again the level of consensus is noticeably higher during the final round and was very high for all grades except grade 6. The final column shows the percent of standards addressed by the items comprising each test. For all grades, except grade 6, the test items were found to address approximately two- thirds and nearly three-fourths of the standards. Grade 6 addressed half of the standards.

Table 3: Summary of Standards Aligned with Items for Grade 3-8 Mathematics

		Test Items:	Standards			
Grade	Subject	%Consensus - initial round	%Consensus - final round	# Standards Represented	Total # of Standards	% Standards Represented
3	Math	68%	100%	24	33	73%
4	Math	79%	97%	22	35	63%
5	Math	74%	97%	24	35	69%
6	Math	50%	79%	23	46	50%
7	Math	56%	100%	26	39	67%
8	Math	76%	97%	24	33	73%

Tables 4-9 present findings from the four aspects of content alignment examined by the Webb methodology. In each table, the first column displays the five domains of mathematics that are addressed by the respective grade's mathematics standards. Each domain contains several individual standards that address specific aspects of skill and knowledge within the domain. The second column, labeled Categorical Concurrence, indicates the extent to which the items comprising the test address standards within each domain. The third column indicates the extent to which the depth of knowledge assigned to each item aligned with the depth of knowledge assigned to the standard(s) identified as targeted by the item. The fourth column indicates the extent to which the various standards established within each domain were represented on the test. This column considers the extent to which each standard in a domain is addressed by one or more items. A key factor influencing range of knowledge covered by the test is the number of items comprising the test and the total number of facets represented within and across the domains. Below, findings for each grade level are presented separately.

Grade 3

Table 4 displays results of the Webb analyses for grade 3. Analyses of panel ratings indicate that categorical concurrence was found for four of the five domains, with Geometry not meeting requirements for categorical concurrence. Similarly, the items comprising the grade 3 mathematics tests were found to be of an appropriate depth of knowledge for four of five domains. Both range of knowledge and balance of representation were found for all domains. Overall, these findings indicate that the grade 3 mathematics test has strong content alignment with the grade 3 mathematics standards. Opportunities for improvement exist for categorical concurrence in the geometry domain and depth of knowledge consistency for number and operations – fractions domain.

Table 4: Grade 3 Webb Analyses Results

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
3.OA - Operations and Algebraic Thinking	YES	YES	YES	YES
3.NBT - Number and Operations in Base Ten	YES	YES	YES	YES
3.NF - Number and Operations—Fractions	YES	WEAK	YES	YES
3.MD - Measurement and Data	YES	YES	YES	YES
3.G - Geometry	NO	YES	YES	YES

Grade 4

Table 5 displays results of the Webb analyses for grade 4. Analyses of panel ratings indicate that categorical concurrence was found for all domains. The items comprising the grade 4 mathematics tests, however, were found to be of an aligned depth of knowledge for only two domains. For one domain, the depth of knowledge consistency was weak and for two domains it was poor. The range of representation was appropriate for all domains, and the balance of representation was appropriate for all but one domain. Overall, these findings indicate that the grade 4 mathematics test has strong concurrence, range, and balance of representation. The depth of knowledge required for items, however, provide opportunities for improvement for three of the five domains.

Table 5: Grade 4 Webb Analyses Results

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
4.OA - Operations and Algebraic Thinking	YES	YES	YES	YES
4.NBT - Number and Operations in Base Ten	YES	NO	YES	YES
4.NF - Number and Operations—Fractions .	YES	NO	YES	YES
4.MD - Measurement and Data	YES	WEAK	YES	WEAK
4.G - Geometry	YES	YES	YES	YES

Grade 5

Table 6 displays results of the Webb analyses for grade 5. Analyses of panel ratings indicate that categorical concurrence was found for all measured domains. The items comprising the grade 5 mathematics tests were found to be of an appropriate depth of knowledge for four domains. For one domain, the depth of knowledge consistency was weak. The range of knowledge was appropriate for all domains. The balance of representation was appropriate for four domains. For one domain, number and operations in base ten, balance of representation was weak. Overall, these findings indicate that the grade 5 mathematics test has adequate alignment for all domains. There is, however, an opportunity to further strengthen alignment by examining the depth of knowledge of the Number and Operations – Fraction items and the balance of representation of the Number and Operations in Base Ten items.

Table 6: Grade 5 Webb Analyses Results

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
5.OA - Operations and Algebraic Thinking	YES	YES	YES	YES
5.NBT - Number and Operations in Base Ten	YES	YES	YES	WEAK
5.NF - Number and Operations—Fractions	YES	WEAK	YES	YES
5.MD - Measurement and Data	YES	YES	YES	YES
5.G - Geometry	YES	YES	YES	YES

Grade 6

Table 7 displays results of the Webb analyses for grade 6. Analyses of panel ratings indicate that categorical concurrence and depth of knowledge consistency was found for all domains. The range of representation was appropriate for three domains. For statistics and probability, range of representation was weak, and for the number system it was poor. Balance of representation was found for only two domains. The remaining three domains had weak balance of representation. Overall, both categorical concurrence and depth of knowledge consistency were adequate for all domains. Range of knowledge was adequate for three domains and balance of representation was adequate for two domains. This suggests that while all of the domains are well represented at a corresponding depth of knowledge, for some domains some standards are not well covered and some standards are given more emphasis than others.

Table 7: Grade 6 Webb Analyses Results

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
6.RP - Ratios and Proportional Relationships	YES	YES	YES	WEAK
6.NS - The Number System	YES	YES	NO	WEAK
6.EE - Expressions and Equations	YES	YES	YES	WEAK
6.G - Geometry	YES	YES	YES	YES
6.SP - Statistics and Probability	YES	YES	WEAK	YES

Grade 7

Table 8 displays results of the Webb analyses for grade 7. Analyses of panel ratings indicate that categorical concurrence was acceptable for all domains. Depth of knowledge consistency was also acceptable for all domains except expressions and equations, which was deemed to be weak. The range of knowledge was appropriate for four of the five domains. For statistics and probability, range of representation was weak. Balance of representation was also found for four domains. For ratios and proportional relationships, balance of representation was weak. Overall, these findings indicate that the grade 8 mathematics test has adequate alignment for all domains. There are opportunities for improvement to the depth of knowledge in expressions and equations, the range of knowledge covered in statistics and probability, and the balance of representation in ratio and proportional relationships.

Table 8: Grade 7 Webb Analyses Results

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
7.RP - Ratios and Proportional Relationships	YES	YES	YES	WEAK
7.NS - The Number System .	YES	YES	YES	YES
7.EE - Expressions and Equations	YES	WEAK	YES	YES
7.G - Geometry	YES	YES	YES	YES
7.SP - Statistics and Probability	YES	YES	WEAK	YES

Grade 8

Table 9 displays results of the Webb analyses for grade 8. Analyses of panel ratings indicate that categorical concurrence was acceptable for three domains but was poor for two domains. Depth of knowledge consistency was also acceptable for three domains but poor for two domains. The range of knowledge was appropriate for all domains. Balance of representation was found for four domains. For the functions domain, balance of representation was weak. Overall, these findings indicate that alignment was strong for two domains, namely expressions and equations and geometry. The three remaining domains each have opportunities for improvement. For the number system, categorical concurrence was poor. For functions, depth of knowledge consistency was poor and balance of representation was weak. For statistics and probability, both categorical concurrence and depth of knowledge consistency were poor.

Table 9: Grade 8 Webb Analyses Results

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
8.NS - The Number System	NO	YES	YES	YES
8.EE - Expressions and Equations	YES	YES	YES	YES
8.F - Functions	YES	NO	YES	WEAK
8.G - Geometry	YES	YES	YES	YES
8.SP - Statistics and Probability	NO	NO	YES	YES

Summary of Webb Analyses

One way to summarize findings across the mathematics tests is to examine the number of cells for which alignment was deemed acceptable. Across grade levels, 30 domains were examined. For each domain, four aspects of content alignment were considered. This yields 120 independent considerations of alignment. Of these 120 considerations, 99 (83%) were deemed acceptable, 13 (11%) were deemed weak, and 8 (7%) were deemed poor. While weak indicates some opportunity for improvement, Webb considers weak as an indication of alignment. Thus, 93% of the alignment considerations across grade levels were deemed adequate. This indicates a high degree of alignment between the content of the grade 3-8 mathematics tests and the corresponding mathematics standards. Attention might be paid to grade 8 statistics and probability for which two of the four aspects of alignment were poor. Overall, however, the grade 3-8 mathematics tests should be viewed as having strong alignment with the state standards.

Section 3: ELA Test Alignment

This section summaries findings from panel analyses of the MCAS 2017 Grade 3-8 ELA operational test items. Each panel performed three types of analyses:

1. Depth of Knowledge required to achieve each standard
2. Standard(s) assessed by each item
3. Depth of Knowledge required by each item

For each analysis, panel members first worked individually to code the respective standards or items within a specific grade level. Panelists then discussed standards or items for which fewer than 6 panelists agreed. Panelists were then given an opportunity to recode the standard or item discussed. The final codes were used to generate the information presented in tables 10-20. Appendices G-L present results of the panel ratings at the individual standard and item levels.

In addition, the ELA panels also identified the standard(s) assessed through each criterion used to assess essays produced in response to the writing items contained on each test. For this process, panel members worked individually using a coding sheet in which each writing and language standard was listed. Panel members were then asked to focus on a given criterion and to mark each standard that was associated with the criterion. In many cases, the criterion addressed more than one standard and as a result panel members marked multiple standards for each criterion. Because all criterion were applied when assessing an essay response, the standard was deemed to be assessed if one or more criterion was identified as considering the standard. Due to time constraints, a consensus process was not employed for this coding activity. As a result, the initial codes recorded by panel members were used as their final codes.

Table 10, 11 and 12 provide information about the consensus of panel judgments about the depth of knowledge required of standards and items, and the standard(s) to which items align for grades 3-8. Table 13 and 14 provide information about the consensus of panel judgments for the standards addressed through the essay scoring guides.

As seen in Table 10, consensus regarding the depth of knowledge required of each standard after the initial round ranged from 45% (grade 3) to 90% (grade 7). After discussing discrepant standards, consensus met or exceeded 89% for all grade levels. The final three columns indicate the percent of standards within each grade level that were associated with each depth of knowledge level. For grades 3-5, the vast majority of standards were viewed as requiring a DOK of 2. Between 2-8% of standards were categorized as DOK 1, and 11-24% of standards were DOK 3. For grades 6-8 approximately half of the standards were identified as DOK 3, 39-48% were DOK 2, and a small percentage were DOK 1.

Table 10: Summary of DOK of Grade 3-8 ELA Standards

			Standards: DOK				
Grade	Subject	# Standards	%Consensus - initial round	%Consensus - final round	% DOK 1	% DOK 2	% DOK 3
3	ELA	62	45%	97%	8%	81%	11%
4	ELA	65	68%	89%	2%	78%	20%
5	ELA	62	68%	100%	5%	71%	24%
6	ELA	62	47%	94%	5%	48%	47%
7	ELA	59	90%	100%	3%	42%	54%
8	ELA	61	87%	100%	3%	39%	57%

Table 11 focuses on the DOK of items. Consensus ranged from 64% to 88% during the initial round and exceeded 90% during the final round. The last three columns indicate that a substantial percentage of items in grades 3-5 were DOK 2. Between 8-17% were deemed DOK 3. For grades 6-8 just over half the items were DOK 2 and between 32-40% were DOK 3. For grade 3, 28% of items were DOK 1. For the remaining grades 8% or fewer were DOK 1. These patterns indicate that the DOK for the vast majority of ELA items were deemed to be at a higher level than simple recall and recognition.

Table 11: Summary of DOK of Grade 3-8 ELA Items

			Test Items:	DOK			
Grade	Subject	# Items	%Consensus - initial round	%Consensus - final round	% DOK 1	% DOK 2	% DOK 3
3	ELA	25	72%	100%	28%	64%	8%
4	ELA	25	88%	92%	4%	84%	12%
5	ELA	24	79%	100%	8%	75%	17%
6	ELA	25	64%	96%	8%	56%	36%
7	ELA	25	64%	100%	8%	60%	32%
8	ELA	25	68%	96%	0%	60%	40%

Table 12 summarizes the panels assignment of standard(s) to items. Here again the level of consensus is noticeably higher during the final round and was very high for all grades except grade 4 and 5. The final column shows the percent of standards addressed by the items comprising each test. Across all grades, this percentage is relatively low and ranges from 20-27%. Note, however, that Table 12 presents findings for the items only and does not consider the standards addressed in the scoring guides employed to assess essay responses. Of the total body of grade-level ELA standards, approximately 70% focus on writing and language standards which are not addressed directly by the items, but through the scoring guides. In addition, approximately 10% of the ELA standards were identified by the state as non-assessable.

Table 12: Summary of Standards Aligned with Items for Grade 3-8 ELA

		Test Items:	Standards			
Grade	Subject	%Consensus - initial round	%Consensus - final round	# Standards Represented	Total # of Standards	% Standards Represented
3	ELA	56%	88%	16	62	26%
4	ELA	36%	76%	16	65	25%
5	ELA	40%	76%	16	62	26%
6	ELA	44%	92%	17	62	27%
7	ELA	44%	96%	12	59	20%
8	ELA	60%	100%	13	61	21%

Table 13 summarizes the panel ratings for standards addressed by the scoring guide. These analyses focus solely on the writing and language standards and indicates that there was generally a high level of agreement among panel members. Where disagreement did occur, the standards generally focused on vocabulary for which approximately one-third of the panel members felt vocabulary was addressed in the scoring criteria and the others did not. Table 13 also shows that the vast majority of writing and language standards are considered by one or more criterion employed to score essay responses.

Table 13: Summary of Grade 3-5 and Grade 6-8 Scoring Guide Analyses

	# Standards	% Consensus	# Represented	% Represented
Grade 3-5				
Writing	21	95%	19	90%
Language	28	79%	17	60%
Grade 6-8				
Writing	25	100%	25	100%
Language	18	90%	9	50%

Table 14 displays the percent of standards addressed by items and/or scoring guide. For this table, findings from the item analyses presented in Table 12 were combined with findings from the scoring guide analyses presented in Table 13. Table 14 displays the number and percent of standards addressed by the items and/or scoring guide. For all grade levels, Table 14 shows that across the items and essay scoring criteria, 73-80% of the standards are addressed in grades 3-8, and 61% are addressed in grades 7 and 8. These percentages increase further when those standards that are identified as non-assessable are removed from consideration.

Table 14: Percent of Standards Addressed by Grade 3-8 ELA Items and/or Scoring Guides

Grade	Total # Standards	# Assessable Standards	# Standards Addressed	% Total Addressed	% Assessable Addressed
3	65	58	52	80%	90%
4	63	52	47	75%	90%
5	61	52	45	74%	87%
6	62	53	45	73%	85%
7	59	50	36	61%	72%
8	59	50	36	61%	72%

Tables 15-20 present findings from the four aspects of content alignment examined by the Webb methodology. In each table, the first column displays each domain addressed by the respective grade level ELA standards. Each domain contains several individual standards that address specific aspects of skill and knowledge within the domain. The second column, labeled Categorical Concurrence, indicates the extent to which the items comprising the test address standards within each domain. The third column indicates the extent to which the depth of knowledge assigned to each item aligned with the depth of knowledge assigned to the standard(s) identified as targeted by the item. The fourth column indicates the extent to which the various standards established within each domain were represented on the test. This column considers the extent to which each standard in a domain is addressed by one or more items. A key factor influencing range of knowledge covered by the test is the number of items

comprising the test and the total number of standards represented within and across the domains.

Below, findings for each grade level are presented separately. It should also be noted that the Webb analyses only considers panel ratings for test items and does not factor in panel ratings for the essay scoring guide criteria. For this reason, coverage of writing and language standards are understated in the Webb analyses.

Grade 3

Table 15 displays results of the Webb analyses for grade 3. Analyses of panel ratings indicates that categorical concurrence was found for three of the four domains, with Language not meeting requirements for categorical concurrence. The items comprising the grade 3 ELA tests were found to be of an appropriate depth of knowledge for all domains. Range of representation was found for the domains that focus on reading. As expected, range of knowledge was not found for writing and language. Balance of representation, however, was found for all domains. Given that the scoring criteria for the essay items were not included in these analyses, these findings provide evidence that the grade 3 ELA test has strong alignment for the reading domains and moderate alignment for writing and language. As shown in Table 13, when the scoring criteria ratings are considered, alignment of writing and language is also deemed strong.

Table 15: Grade 3 Webb Analyses Results

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
3.LIT - Reading Standards for Literature	YES	YES	YES	YES
3.INF - Reading Standards for Informational Text	YES	YES	YES	YES
3.W - Writing Standards	YES	YES	NO	YES
3.L - Language Standards	NO	YES	NO	YES

Grade 4

Table 16 displays results of the Webb analyses for grade 4. Analyses of panel ratings indicates that categorical concurrence and depth of knowledge consistency were for found for all domains. The range of knowledge was appropriate for reading of informational text, but it was weak for reading literature. As anticipated, range of knowledge was low for writing and language. Balance of representation, however, was appropriate for three domains and weak for language. Given that the scoring criteria for the essay items were not included in these analyses, these findings provide evidence that the grade 4 ELA test has alignment for the reading domains and moderate alignment for writing and language. As shown in Table 13, when the scoring criteria ratings are considered, alignment of writing and language is also deemed strong. An opportunity to further strengthen alignment may exist by expanding the range of knowledge addressed for the reading literature standards.

Table 16: Grade 4 Webb Analyses Results

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
4.LIT - Reading Standards for Literature	YES	YES	WEAK	YES
4.INF - Reading Standards for Informational Text	YES	YES	YES	YES
4.W - Writing Standards	YES	YES	NO	YES
4.L - Language Standards	YES	YES	NO	WEAK

Grade 5

Table 17 displays results of the Webb analyses for grade 5. Analyses of panel ratings indicates that categorical concurrence was found for three domains, but not for language. Depth of knowledge consistency was for found for all domains. The range of knowledge was appropriate for reading of literature text, but it was weak for informational text. As anticipated, range of knowledge was low for writing and language. Balance of representation, however, was appropriate for three domains and weak for language. Given that the scoring criteria for the essay items were not included in these analyses, these findings provide evidence that the grade 5 ELA test has alignment for the reading domain and moderate alignment for writing and language. As shown in Table 13, when the scoring criteria ratings are considered, alignment of writing and language is also deemed strong. An opportunity to further strengthen alignment may exist by expanding the range of knowledge addressed for the reading informational text standards.

Table 17: Grade 5 Webb Analyses Results

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
5.LIT - Reading Standards for Literature	YES	YES	YES	YES
5.INF - Reading Standards for Informational Text	YES	YES	WEAK	YES
5.W - Writing Standards	YES	YES	NO	YES
5.L - Language Standards	NO	YES	NO	YES

Grade 6

Table 18 displays results of the Webb analyses for grade 6. Analyses of panel ratings indicates that categorical concurrence was found for three domains, but not for language. Depth of knowledge consistency was for found for all domains. The range of knowledge was appropriate for both reading domains. As anticipated, range of knowledge was low for writing and language. Balance of representation, however, was appropriate for three domains and weak for language. Given that the scoring criteria for the essay items were not included in these analyses, these findings provide evidence that the grade 6 ELA test has alignment for the reading domains and moderate alignment for writing and language. As shown in Table 13, when the scoring criteria ratings are considered, alignment of writing and language is also deemed strong.

Table 18: Grade 6 Webb Analyses Results

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
6.LIT - Reading Standards for Literature	YES	YES	YES	YES
6.INF - Reading Standards for Informational Text	YES	YES	YES	YES
6.W - Writing Standards	YES	YES	NO	YES
6.L - Language Standards	NO	YES	NO	YES

Grade 7

Table 19 displays results of the Webb analyses for grade 7. Analyses of panel ratings indicates that categorical concurrence was found for two domains, but not for reading informational text and language. Depth of knowledge consistency was for found for all domains. The range of knowledge was appropriate for the reading literature domain, but not for reading informational text. As anticipated, range of knowledge was also low for writing and language. Balance of representation, however, was appropriate for all four domains. Given that the scoring criteria for the essay items were not included in these analyses, these findings provide evidence that the grade 7 ELA test has alignment for the reading literature domain. There is a need, however, to strengthen alignment for reading informational text. As shown in Table 13, when the scoring criteria ratings are considered, alignment of writing and language is also deemed strong.

Table 19: Grade 7 Webb Analyses Results

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
7.LIT - Reading Standards for Literature	YES	YES	YES	YES
7.INF - Reading Standards for Informational Text	NO	YES	NO	YES
7.W - Writing Standards	YES	YES	NO	YES
7.L - Language Standards	NO	YES	NO	YES

Grade 8

Table 20 displays results of the Webb analyses for grade 8. Analyses of panel ratings indicates that categorical concurrence was found for two domains, but not for reading informational text and language. Depth of knowledge consistency was for found for three domains, but not for reading informational text. The range of knowledge was appropriate for the reading literature domain, but not for reading informational text. As anticipated, range of knowledge was also low for writing and language. Balance of representation was appropriate for three domains but was weak for reading literature. Given that the scoring criteria for the essay items were not included in these analyses, these findings provide evidence that the grade 7 ELA test has moderate alignment for the reading literature domain. There is a need, however, to strengthen alignment for reading informational text. As shown in Table 13, when the scoring criteria ratings are considered, alignment of writing and language is also deemed strong.

Table 20: Grade 8 Webb Analyses Results

Standards	Alignment Criteria			
	Categorical Concurrence	Depth-of-Knowledge Consistency	Range of Knowledge	Balance of Representation
8.LIT - Reading Standards for Literature	YES	YES	YES	WEAK
8.INF - Reading Standards for Informational Text	NO	NO	NO	YES
8.W - Writing Standards	YES	YES	NO	YES
8.L - Language Standards	NO	YES	NO	YES

Summary of Webb Analyses for ELA

One way to summarize findings across the ELA tests is to examine the number of cells for which alignment was deemed acceptable. Across grade levels, 24 domains were examined. For each domain, four aspects of content alignment were considered. This yields 96 independent considerations of alignment. Of these 96 considerations, 70 (73%) were deemed acceptable, 4 (4%) were deemed weak, and 22 (23%) were deemed poor. However, when the essay scoring criteria ratings are considered in the analyses, the number of considerations deemed poor decreased to 5 (5%) and the number deemed acceptable increases to 87 (91%). While weak alignment indicates some opportunity for improvement, Webb considers weak as an indication of alignment. Thus, when the scoring criteria are considered, 95% of the alignment considerations across grade levels were deemed adequate. This indicates a high degree of alignment between the content of the grade 3-8 ELA tests and the corresponding ELA standards. It should be noted that two domains (Grade 7 and Grade 8 reading informational text) account for all five of the considerations that were deemed poor. This suggests a need to carefully examine the reading passages and corresponding items employed for the grade 7 and 8 tests to understand why alignment is problematic for this domain. Overall, however, the grade 3-8 ELA test items should be viewed as having strong alignment with the state ELA standards. Further, when the essay scoring criteria are included in the analyses, the grade 3-8 ELA tests should viewed as having strong alignment with all of the state's grade 3-8 ELA standards.

Section 4: Summary of Findings

The study presented here examined the content alignment of the MCAS 2017 grade 3-8 ELA and mathematics tests. Specifically, the content of each test was compared to the content of the then current 2011 state standards for ELA and mathematics. To examine content alignment, a modified version of the Webb content alignment methodology was employed.

For this methodology, panels of 8-9 educators examined the state standards and coded each depth of knowledge for each standard. Depth of knowledge was defined by the state's 3-tier cognitive levels employed to guide item development. Panel members also examined each test item and identified the standard(s) addressed by the item. In addition, panel members identified the depth of knowledge at which each item addressed the aligned standard. After performing these ratings independently, panel members discussed discrepant codes. For this study, a discrepant code was defined as one for which fewer than six panel members provided the same code. After discussing discrepant codes, panel members were provided an opportunity to modify their code(s) if desired. The final codes were used to calculate statistics representing the various aspects of alignment examined through the Webb methodology. These aspects include Categorical Concurrence, Depth of Knowledge Alignment, Range of Knowledge, and Balance of Representation. Pre-defined criteria were used to categorize the extent to which each aspect of alignment was satisfied.

In general, the final codes awarded by panels resulted in a high level of consensus among panel members. For ELA, consensus for panel members ratings of the depth of knowledge of standards exceeded 90% for all grades except grade 4 (89%). Consensus for ratings of the depth of knowledge of items exceeded 90% for all grades. Consensus for alignment of items to standards was less consistent, but exceeded 90% for grades 6-8. For grades 3-6, consensus was 76% for grades 4 and 5, and 88% for grade 3. While there were a few opportunities for improvement in consensus among panel members, in the vast majority of cases the threshold for consensus was reached.

For mathematics, the percentage of standards for which depth of knowledge ratings reached consensus exceeded 90% for all grade levels. Similarly, the percentage of items for which depth of knowledge ratings reached consensus exceeded 90% for all grade levels except grade 8 (88%). Finally, the percentage of items for which the standard(s) identified as aligned with the item reached consensus also exceeded 95% for all grades except grade 6 (79%).

As described in greater detail in Section 3, the state's ELA standards focus on reading of two different types of text. The vast majority of test items are designed to align with these reading and language standards. However, the state standards also include a substantial number of standards that focus on writing skills. These writing skills are divided into two domains, labeled Writing and Language. To assess these standards, the state includes multiple extended writing tasks on each grade level test. The writing tasks are designed to assess different types of writing represented in the standards. Student writing samples are scored using a holistic scoring guide that considers several different aspects of writing that are represented in the Writing and Language standards. For this reason, review of the writing essay question alone does not provide insight into which Writing and Language standards are considered during scoring of a written response. In addition, the scoring guide must be examined to identify the

standards that are assessed through the scoring of students' written responses. To capture both the standards assessed through the test items and the standards assessed through the written responses, content alignment of the ELA tests was examined through a two- step process. First, the same procedures employed for mathematics were used to code the alignment of ELA test items to the corresponding ELA standards. Second, the panels examined the scoring guides employed to score written responses and identified the standards addressed during the scoring process. Codes from the two steps were examined separately and then combined to produce an overall evaluation of the alignment of the ELA tests.

As shown in Section 3, the percent of all standards addressed by the items ranged from 20-27%. Note that because a few items addressed a writing or language standard, the percentage of coverage for items was based on the total number of Reading, Writing, and Language standards. The percent of standards addressed through the scoring guides for the written responses exceeded 90% for Writing and ranged from 50-60% for Language. When the standards assessed through the items and the scoring guides are combined, the percent of standards assessed by the ELA tests ranged from 61-80%. It should be noted that during the test development process, the state identified approximately a dozen Speaking, Listening, and Foundational Skills standards in each grade level that were not assessable through an on-demand test. These standards were intended to be assessed at the local level. When these standards are removed from the calculations, the percentage of standards addressed by the ELA tests increases to 72-90%.

As reported in detail in Section 3, the Webb analyses indicate strong content alignment for the two reading domains for grades 3-6. For grades 7 and 8, coverage of the reading literature standards is also strong. For the reading informational text standards, alignment was notably weaker. For this reason, the state is encouraged to review the passages and items employed to assess the reading informational text standards for grades 7 and 8. It should be noted that the Webb analyses only considers panel ratings for test items and does not factor in panel ratings for the essay scoring guide criteria. For this reason, coverage of writing and language standards are understated in the Webb analyses. Nonetheless, the analyses indicate that the various types of writing addressed by the state standards are well represented by the writing tasks employed for each grade level test. As noted above, the scoring guides used to score written responses did represent the majority of language and writing standards. Collectively, then, the analyses presented here provide evidence that the content alignment of the grade 3-6 ELA tests with the respective state standards is strong. For grades 7 and 8, alignment is also strong for all domains except reading informational text.

As reported more fully in Section 2, content alignment for mathematics was generally strong. For all grade levels, the vast majority of aspects of alignment were met for each content domain covered by the standards. In addition, the depth of knowledge at which the items assessed the targeted standard was generally aligned. Similarly, the range of knowledge and depth of representation was adequate for the vast majority of grade level domains. There is room for improvement for Grade 8 Statistics and Probability. It should also be noted that the Webb methodology views aspects of alignment categorized as "Weak" as acceptable. Such categorizations, however, indicate potential opportunities for improving alignment. For this reason, the state is also encouraged to review the few domains identified as "Weak" and to consider whether opportunities exist to strengthen alignment for these domains. Collectively

the findings from the modified Webb alignment study presented in this report provide evidence of solid alignment of the grade 3-8 mathematics tests with the corresponding standards. This finding is particularly noteworthy given that this study focused on only one year's test. It is anticipated that inclusion of additional versions of the test developed during subsequent years will further strengthen claims about the content alignment of the MCAS grade 3-8 mathematics tests.

In summary, the analyses presented here provide evidence of strong alignment for both the ELA and mathematics tests. For ELA, 96 independent considerations of content alignment were made across the grade levels and categories of alignment. Of these, 95% met or exceeded the threshold established by Webb for content alignment. For mathematics, 120 content alignment considerations were made of which 93% met or exceeded Webb's threshold. Collectively, this indicates a high level of alignment for both content areas.

Appendix A - Summary of Panel Decisions ELA Grade 3

Table A1: Evaluation of DOK for each standard

Table A2: Evaluation of DOK for each item

Table A3: Evaluation of Standards Associated with each item

Table A4: Representation of Standards in MCAS

Table A5: Proportion of standards represented in MCAS

Table A1
Evaluation of DOK for each standard - ELA Grade 3

Standard	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
3.LIT	-	0	-		-	0	-	
3.LIT.A	-	0	-		-	0	-	
3.LIT.A.1	NO	4	1	2	YES	6	2	
3.LIT.A.2	YES	7	2		YES	7	2	
3.LIT.A.3	YES	8	2		YES	8	2	
3.LIT.B	-	0	-		-	0	-	
3.LIT.B.4	YES	7	2		YES	7	2	
3.LIT.B.5	NO	5	2		YES	8	2	
3.LIT.B.6	YES	8	3		YES	8	3	
3.LIT.C	-	0	-		-	0	-	
3.LIT.C.7	YES	8	2		YES	8	2	
3.LIT.C.8	YES	8	1		YES	8	1	
3.LIT.C.9	YES	7	3		YES	7	3	
3.LIT.D	-	0	-		-	0	-	
3.LIT.D.10	NO	4	3		YES	7	2	
3.INF	-	0	-		-	0	-	
3.INF.A	-	0	-		-	0	-	
3.INF.A.1	NO	4	1	2	YES	6	2	
3.INF.A.2	YES	6	2		YES	7	2	
3.INF.A.3	YES	6	2		YES	6	2	
3.INF.B	-	0	-		-	0	-	
3.INF.B.4	YES	6	2		YES	6	2	
3.INF.B.5	NO	5	2		YES	6	2	
3.INF.B.6	YES	8	3		YES	8	3	
3.INF.C	-	0	-		-	0	-	
3.INF.C.7	YES	6	2		YES	6	2	
3.INF.C.8	NO	5	2		YES	8	2	
3.INF.C.9	YES	6	3		YES	6	3	
3.INF.D	-	0	-		-	0	-	
3.INF.D.10	NO	4	3		YES	7	2	
3.W	-	0	-		-	0	-	
3.W.A	-	0	-		-	0	-	
3.W.A.1	-	0	-		-	0	-	
3.W.A.1.a	NO	5	2		YES	7	2	
3.W.A.1.b	NO	4	3		YES	8	2	
3.W.A.1.c	YES	6	1		YES	7	2	
3.W.A.1.d	YES	6	2		YES	7	2	
3.W.A.2	-	0	-		-	0	-	
3.W.A.2.a	NO	4	2		YES	8	2	
3.W.A.2.b	NO	3	2	3	YES	6	2	
3.W.A.2.c	NO	5	1		YES	8	2	
3.W.A.2.d	YES	7	2		YES	7	2	
3.W.A.3	-	0	-		-	0	-	
3.W.A.3.a	NO	5	3		YES	7	3	
3.W.A.3.b	YES	6	2		NO	5	2	
3.W.A.3.c	YES	6	1		YES	8	2	
3.W.A.3.d	NO	4	2		YES	8	2	
3.W.A.3.e	NO	5	3		YES	6	3	
3.W.B	-	0	-		-	0	-	
3.W.B.4	NO	4	2		YES	6	2	
3.W.B.5	NO	5	2		YES	6	2	
3.W.B.6	YES	6	1		NO	5	1	
3.W.C	-	0	-		-	0	-	
3.W.C.7	YES	7	3		YES	7	3	
3.W.C.8	NO	4	2		YES	7	2	
3.W.D	-	0	-		-	0	-	
3.W.D.10	NO	4	2		YES	6	2	
3.L	-	0	-		-	0	-	
3.L.A	-	0	-		-	0	-	
3.L.A.1	-	0	-		-	0	-	
3.L.A.1.a	NO	5	2		YES	6	2	
3.L.A.1.b	NO	5	2		YES	8	2	
3.L.A.1.c	NO	4	1	2	YES	7	2	
3.L.A.1.d	NO	5	2		YES	8	2	
3.L.A.1.e	NO	5	2		YES	8	2	
3.L.A.1.f	NO	5	2		YES	7	2	
3.L.A.1.g	YES	6	2		YES	8	2	
3.L.A.1.h	YES	6	2		YES	8	2	
3.L.A.1.i	NO	4	2		YES	8	2	
3.L.A.2	-	0	-		-	0	-	
3.L.A.2.a	YES	6	1		YES	8	1	
3.L.A.2.b	NO	5	1		YES	7	1	
3.L.A.2.c	NO	4	1	2	YES	7	2	
3.L.A.2.d	NO	4	1	2	YES	8	2	
3.L.A.2.e	NO	5	1		YES	8	2	
3.L.A.2.f	NO	4	1	2	YES	7	2	
3.L.A.2.g	NO	4	1	2	YES	8	1	
3.L.B	-	0	-		-	0	-	
3.L.B.3	-	0	-		-	0	-	
3.L.B.3.a	YES	6	2		YES	6	2	
3.L.B.3.b	NO	5	1		YES	6	2	
3.L.C	-	0	-		-	0	-	
3.L.C.4	-	0	-		-	0	-	
3.L.C.4.a	YES	7	2		YES	7	2	
3.L.C.4.b	YES	6	2		YES	6	2	
3.L.C.4.c	YES	6	2		YES	7	2	
3.L.C.4.d	NO	5	1		YES	6	2	
3.L.C.5	-	0	-		-	0	-	
3.L.C.5.a	YES	6	2		YES	6	2	
3.L.C.5.b	NO	4	1		YES	8	2	
3.L.C.5.c	YES	6	2		YES	7	2	
3.L.C.6	NO	5	2		YES	6	2	
Total	65				65			
Consensus	29				63			
% Consensus	45%				97%			

Table A2
Evaluation of DOK for each item - ELA Grade 3

Item	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
1	YES	8	2		YES	8	2	
2	YES	8	2		YES	8	2	
3	YES	7	2		YES	7	2	
4	YES	7	2		YES	7	2	
5	YES	8	3		YES	8	3	
6	YES	8	1		YES	8	1	
7	YES	8	2		YES	8	2	
8	YES	8	2		YES	8	2	
9	NO	5	2		YES	7	2	
10	NO	4	1	2	YES	7	1	
11	YES	8	1		YES	8	1	
12	YES	6	2		YES	6	2	
13	NO	4	2	3	YES	7	2	
14	YES	8	1		YES	8	1	
15	YES	6	1		YES	6	1	
16	NO	5	2		YES	6	2	
17	YES	6	2		YES	6	2	
18	NO	5	2		YES	7	2	
19	NO	5	2		YES	7	2	
20	YES	7	2		YES	7	2	
21	YES	8	1		YES	8	1	
22	NO	5	2		YES	7	2	
23	YES	6	2		YES	6	2	
24	YES	8	1		YES	8	1	
25	YES	6	3		YES	6	3	
Total	25				25			
Consensus	18				25			
% Consensus	72%				100%			

Table A3
Evaluation of Standards Associated with each item - ELA Grade 3

| Item | Initial Round | | | | Final Round | | | |
	Consensus	Reviewers	Standard	2nd Stdrd	Consensus	Reviewers	Standard	2nd Stdrd
1	YES	7	3.LIT.A.3		YES	7	3.LIT.A.3	
2	NO	4	3.LIT.A.1		NO	5	3.LIT.A.2	
3	YES	8	3.LIT.A.2		YES	8	3.LIT.A.2	
4	YES	7	3.LIT.C.7		YES	7	3.LIT.C.7	
5	YES	7	3.W.A.3		YES	7	3.W.A.3	
6	NO	5	3.LIT.C.8		YES	8	3.LIT.C.8	
7	YES	6	3.LIT.A.3		YES	6	3.LIT.A.3	
8	NO	5	3.LIT.B.4		YES	6	3.LIT.B.4	
9	YES	6	3.LIT.C.9		YES	6	3.LIT.C.9	
10	YES	7	3.L.A.1.a		YES	7	3.L.A.1.a	
11	YES	8	3.L.A.1.a		YES	8	3.L.A.1.a	
12	NO	3	3.L.A.1.a		YES	7	3.L.A.1.a	
13	NO	4	3.LIT.A.1		YES	7	3.LIT.A.1	
14	YES	7	3.INF.A.1		YES	6	3.INF.A.1	
15	YES	7	3.INF.A.1		YES	7	3.INF.A.1	
16	NO	3	3.INF.A.1	3.INF.B.6	NO	5	3.INF.B.6	
17	YES	6	3.INF.C.8		YES	6	3.INF.C.8	
18	NO	4	3.INF.A.1		NO	5	3.INF.A.1	
19	YES	7	3.INF.A.1		YES	7	3.INF.A.1	
20	NO	4	3.INF.B.5		YES	7	3.INF.A.2	3.INF.B.5
21	NO	5	3.INF.B.5		YES	6	3.INF.B.5	
22	NO	4	3.INF.A.2		YES	8	3.INF.A.2	
23	NO	5	3.INF.B.4		YES	8	3.L.C.4.a	
24	YES	7	3.L.A.1.a		YES	7	3.L.A.1.a	
25	YES	6	3.W.A.2		YES	6	3.W.A.2	
Total	25				25			
Consensus	14				22			
% Consensus	56%				88%			

Table A4
Representation of Standards in MCAS - ELA Grade 3

Standard	Unassessed Standards	Representation Items	Rubric
3.LIT			-
3.LIT.A			-
3.LIT.A.1		1	-
3.LIT.A.2		1	-
3.LIT.A.3		1	-
3.LIT.B			-
3.LIT.B.4		1	-
3.LIT.B.5			-
3.LIT.B.6			-
3.LIT.C			-
3.LIT.C.7		1	-
3.LIT.C.8		1	-
3.LIT.C.9		1	-
3.LIT.D			-
3.LIT.D.10	x		-
3.INF			-
3.INF.A			-
3.INF.A.1		1	-
3.INF.A.2		1	-
3.INF.A.3			-
3.INF.B			-
3.INF.B.4			-
3.INF.B.5		1	-
3.INF.B.6		1	-
3.INF.C			-
3.INF.C.7			-
3.INF.C.8		1	-
3.INF.C.9			-
3.INF.D			-
3.INF.D.10	x		-
3.W			-
3.W.A			
3.W.A.1			
3.W.A.1.a			1
3.W.A.1.b			1
3.W.A.1.c			1
3.W.A.1.d			1
3.W.A.2		1	
3.W.A.2.a			1
3.W.A.2.b			1
3.W.A.2.c			1
3.W.A.2.d			1
3.W.A.3		1	
3.W.A.3.a			1
3.W.A.3.b			1
3.W.A.3.c			1
3.W.A.3.d			1
3.W.A.3.e			1
3.W.B			
3.W.B.4			1
3.W.B.5	x		
3.W.B.6	x		1
3.W.C			
3.W.C.7	x		1
3.W.C.8	x		1
3.W.D			
3.W.D.10	x		1
3.L			
3.L.A			
3.L.A.1			
3.L.A.1.a		1	1
3.L.A.1.b			1
3.L.A.1.c			1
3.L.A.1.d			1
3.L.A.1.e			1
3.L.A.1.f			1
3.L.A.1.g			1
3.L.A.2			
3.L.A.2.a			1
3.L.A.2.b			1
3.L.A.2.c			1
3.L.A.2.d			1
3.L.A.2.e			1
3.L.A.2.f			1
3.L.A.2.g			1
3.L.B			
3.L.B.3			
3.L.B.3.a			1
3.L.B.3.b			1
3.L.C			
3.L.C.4			
3.L.C.4.a		1	1
3.L.C.4.b			1
3.L.C.4.c			1
3.L.C.4.d			1
3.L.C.5			
3.L.C.5.a			1
3.L.C.5.b			1
3.L.C.5.c			1
3.L.C.6			1

Table A5
Porportion of standards represented in MCAS - ELA Grade 3

	Total Standards	Items	Rubric	Represented	Percent
ALL STANDARDS					
Literature	10	7	0	7	70%
Information	10	5	0	5	50%
Writing	19	0	18	18	95%
Language	26	2	24	24	92%
	65	14	42	56	86%
ASSESSED STANDARDS ONLY					
Literature	9	7	0	7	78%
Information	9	5	0	5	56%
Writing	14	0	14	14	100%
Language	26	2	24	24	92%
	58	14	38	52	90%

Key:

x   Standards that MCAS is not designed to assess

1   Standards represented in MCAS by either an item or a criterion in the scoring rubrics

Appendix S—Boston College Content Alignment Study   `40`

Appendix B - Summary of Panel Decisions ELA Grade 4

Table B1: Evaluation of DOK for each standard

Table B2: Evaluation of DOK for each item

Table B3: Evaluation of Standards Associated with each item

Table B4: Representation of Standards in MCAS

Table B5: Porportion of standards represented in MCAS

Table B1
Evaluation of DOK for each standard - ELA Grade 4

Standard	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
4.LIT	-	0	-		-	0	-	
4.LIT.A	-	0	-		-	0	-	
4.LIT.A.1	YES	8	2		YES	8	2	
4.LIT.A.2	YES	7	2		YES	7	2	
4.LIT.A.3	YES	6	2		YES	6	2	
4.LIT.B	-	0	-		-	0	-	
4.LIT.B.4	YES	7	2		YES	7	2	
4.LIT.B.5	NO	5	2		YES	7	2	
4.LIT.B.6	YES	8	3		YES	8	3	
4.LIT.C	-	0	-		-	0	-	
4.LIT.C.7	YES	6	2		YES	6	2	
4.LIT.C.8	NO	4	2	3	YES	6	3	
4.LIT.C.9	YES	6	3		YES	6	3	
4.LIT.D	-	0	-		-	0	-	
4.LIT.D.10	NO	5	2		NO	5	3	
4.INF	-	0	-		-	0	-	
4.INF.A	-	0	-		-	0	-	
4.INF.A.1	YES	8	2		YES	8	2	
4.INF.A.2	YES	8	2		YES	8	2	
4.INF.A.3	NO	4	2	3	YES	7	2	
4.INF.B	-	0	-		-	0	-	
4.INF.B.4	YES	8	2		YES	8	2	
4.INF.B.5	NO	5	2		YES	8	2	
4.INF.B.6	YES	6	3		YES	6	3	
4.INF.C	-	0	-		-	0	-	
4.INF.C.7	YES	7	2		YES	7	2	
4.INF.C.8	NO	4	2	3	NO	5	3	
4.INF.C.9	YES	8	3		YES	8	3	
4.INF.D	-	0	-		-	0	-	
4.INF.D.10	NO	5	2		NO	5	3	
4.W	-	0	-		-	0	-	
4.W.A	-	0	-		-	0	-	
4.W.A.1	-	0	-		-	0	-	
4.W.A.1.a	YES	6	2		YES	6	2	
4.W.A.1.b	YES	6	2		YES	6	2	
4.W.A.1.c	YES	8	2		YES	8	2	
4.W.A.1.d	NO	5	2		YES	8	2	
4.W.A.2	-	0	-		-	0	-	
4.W.A.2.a	NO	5	3		YES	6	3	
4.W.A.2.b	NO	4	2	3	NO	4	2	3
4.W.A.2.c	YES	8	2		YES	8	2	
4.W.A.2.d	YES	8	2		YES	8	2	
4.W.A.2.e	NO	5	2		YES	8	2	
4.W.A.3	-	0	-		-	0	-	
4.W.A.3.a	NO	4	2	3	NO	5	2	
4.W.A.3.b	NO	5	2		NO	4	2	3
4.W.A.3.c	YES	6	2		YES	6	2	
4.W.A.3.d	NO	5	2		YES	7	2	
4.W.A.3.e	YES	6	2		YES	7	2	
4.W.A.3.f	YES	6	2		YES	6	2	
4.W.B	-	0	-		-	0	-	
4.W.B.4	NO	4	2	3	YES	6	3	
4.W.B.5	YES	7	2		YES	7	2	
4.W.B.6	YES	6	2		YES	6	2	
4.W.C	-	0	-		-	0	-	
4.W.C.7	YES	7	3		YES	7	3	
4.W.C.8	NO	5	2		NO	4	2	3
4.W.C.9	-	0	-		-	0	-	
4.W.C.9.a	NO	4	2	3	YES	8	3	
4.W.C.9.b	NO	5	3		YES	8	3	
4.W.D	-	0	-		-	0	-	
4.W.D.10	YES	8	2		YES	8	2	
4.L	-	0	-		-	0	-	
4.L.A	-	0	-		-	0	-	
4.L.A.1	-	0	-		-	0	-	
4.L.A.1.a	YES	8	2		YES	8	2	
4.L.A.1.b	YES	8	2		YES	8	2	
4.L.A.1.c	YES	7	2		YES	7	2	
4.L.A.1.d	YES	6	2		YES	6	2	
4.L.A.1.e	YES	8	2		YES	8	2	
4.L.A.1.f	YES	7	2		YES	7	2	
4.L.A.1.g	YES	6	2		YES	6	2	
4.L.A.1.h	YES	7	1		YES	7	1	
4.L.A.2	-	0	-		-	0	-	
4.L.A.2.a	NO	5	2		YES	6	2	
4.L.A.2.b	YES	6	2		YES	6	2	
4.L.A.2.c	YES	8	2		YES	8	2	
4.L.A.2.d	YES	6	2		YES	6	2	
4.L.B	-	0	-		-	0	-	
4.L.B.3	-	0	-		-	0	-	
4.L.B.3.a	YES	8	2		YES	8	2	
4.L.B.3.b	YES	6	2		YES	6	2	
4.L.B.3.c	YES	7	2		YES	7	2	
4.L.C	-	0	-		-	0	-	
4.L.C.4	-	0	-		-	0	-	
4.L.C.4.a	YES	7	2		YES	7	2	
4.L.C.4.b	YES	8	2		YES	8	2	
4.L.C.4.c	NO	5	2		YES	8	2	
4.L.C.5	-	0	-		-	0	-	
4.L.C.5.a	YES	7	2		YES	7	2	
4.L.C.5.b	YES	8	2		YES	8	2	
4.L.C.5.c	YES	7	2		YES	7	2	
4.L.C.6	NO	5	2		YES	7	2	
Total	65				65			
Consensus	44				58			
% Consensus	68%				89%			

Table B2
Evaluation of DOK for each item - ELA Grade 4

Item	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
1	NO	5	2		YES	8	2	
2	YES	8	2		YES	8	2	
3	YES	8	2		YES	8	2	
4	YES	6	2		YES	6	2	
5	YES	8	3		YES	8	3	
6	YES	8	2		YES	8	2	
7	YES	8	2		YES	8	2	
8	YES	8	2		YES	8	2	
9	YES	8	2		YES	8	2	
10	YES	8	2		YES	8	2	
11	YES	7	2		YES	7	2	
12	YES	8	2		YES	8	2	
13	YES	6	3		YES	7	3	
14	NO	5	2		NO	5	1	
15	NO	5	2		YES	8	2	
16	YES	8	2		YES	7	2	
17	YES	8	2		YES	7	2	
18	YES	8	2		YES	8	2	
19	YES	7	2		YES	7	2	
20	YES	7	2		YES	7	2	
21	YES	6	2		NO	5	2	
22	YES	8	2		YES	8	2	
23	YES	8	2		YES	8	2	
24	YES	8	2		YES	8	2	
25	YES	8	3		YES	7	3	
Total	25				25			
Consensus	22				23			
% Consensus	88%				92%			

Table B3
Evaluation of Standards Associated with each item - ELA Grade 4

Item	Initial Round				Final Round			
	Consensus	Reviewers	Standard	2nd Stdrd	Consensus	Reviewers	Standard	2nd Stdrd
1	NO	4	4.LIT.A.1	4.LIT.A.3	NO	5	4.LIT.A.1	4.LIT.A.3
2	YES	8	4.LIT.A.3		YES	7	4.LIT.A.3	
3	NO	5	4.LIT.B.4		YES	7	4.LIT.C.8	
4	YES	8	4.LIT.A.2		YES	7	4.LIT.A.2	
5	YES	7	4.W.A.3		YES	7	4.W.A.3	
6	NO	4	4.LIT.A.1		YES	8	4.LIT.B.4	
7	NO	4	4.LIT.A.1		YES	6	4.LIT.A.2	
8	NO	5	4.LIT.A.3		YES	7	4.LIT.A.3	
9	YES	7	4.INF.A.2		YES	6	4.INF.A.2	
10	NO	3	4.INF.A.1	4.INF.A.2	NO	4	4.INF.A.3	
11	NO	3	4.LIT.A.1	4.INF.C.8	YES	8	4.INF.C.8	
12	NO	5	4.INF.B.4		YES	7	4.INF.B.4	4.L.C.4.a
13	NO	4	4.INF.C.9		YES	8	4.INF.C.9	
14	NO	3	4.LIT.A.1	4.INF.A.1	NO	5	4.INF.A.1	
15	NO	4	4.INF.A.1		YES	8	4.INF.A.1	
16	NO	4	4.L.B.3.b		YES	8	4.L.B.3.b	
17	YES	6	4.INF.A.2		NO	5	4.INF.A.2	
18	NO	5	4.INF.A.1		YES	6	4.INF.A.1	
19	NO	5	4.L.B.3.a		YES	8	4.L.B.3.a	
20	YES	6	4.INF.A.2		YES	8	4.INF.A.2	
21	YES	6	4.INF.C.8		NO	5	4.INF.C.8	
22	NO	5	4.L.C.4.a		YES	8	4.L.C.4.a	4.INF.B.4
23	YES	6	4.L.C.4.a		YES	6	4.L.C.4.a	
24	NO	4	4.INF.B.4		YES	8	4.L.C.4.a	
25	YES	6	4.W.A.2		NO	5	4.W.A.2	
Total	25				25			
Consensus	9				19			
% Consensus	36%				76%			

Table B4
Representation of Standards in MCAS – ELA Grade 4

Standard	Unassessed Standards	Representation Items	Rubric
4.LIT			-
4.LIT.A			-
4.LIT.A.1		1	-
4.LIT.A.2		1	-
4.LIT.A.3		1	-
4.LIT.B			-
4.LIT.B.4		1	-
4.LIT.B.5			-
4.LIT.B.6			-
4.LIT.C			-
4.LIT.C.7			-
4.LIT.C.8		1	-
4.LIT.C.9			-
4.LIT.D			-
4.LIT.D.10	x		-
4.INF			-
4.INF.A			-
4.INF.A.1		1	-
4.INF.A.2		1	-
4.INF.A.3		1	-
4.INF.B			-
4.INF.B.4		1	-
4.INF.B.5			-
4.INF.B.6			-
4.INF.C			-
4.INF.C.7			-
4.INF.C.8		1	-
4.INF.C.9		1	-
4.INF.D			-
4.INF.D.10	x		-
4.W			-
4.W.A			
4.W.A.1			
4.W.A.1.a			1
4.W.A.1.b			1
4.W.A.1.c			1
4.W.A.1.d			1
4.W.A.2		1	
4.W.A.2.a			1
4.W.A.2.b			1
4.W.A.2.c			1
4.W.A.2.d			1
4.W.A.2.e			
4.W.A.3		1	
4.W.A.3.a			1
4.W.A.3.b			1
4.W.A.3.c			1
4.W.A.3.d			1
4.W.A.3.e			1
4.W.A.3.f			
4.W.B			
4.W.B.4			1
4.W.B.5	x		
4.W.B.6	x		1
4.W.C			
4.W.C.7	x		1
4.W.C.8	x		1
4.W.C.9			
4.W.C.9.a	x		
4.W.C.9.b	x		
4.W.D			
4.W.D.10	x		1
4.L			
4.L.A			
4.L.A.1			
4.L.A.1.a			1
4.L.A.1.b			1
4.L.A.1.c			1
4.L.A.1.d			1
4.L.A.1.e			1
4.L.A.1.f			1
4.L.A.1.g			1
4.L.A.2			
4.L.A.2.a			1
4.L.A.2.b			1
4.L.A.2.c			1
4.L.A.2.d			1
4.L.B			
4.L.B.3			
4.L.B.3.a		1	1
4.L.B.3.b		1	1
4.L.B.3.c			
4.L.C			
4.L.C.4			
4.L.C.4.a		1	1
4.L.C.4.b			1
4.L.C.4.c			1
4.L.C.5			
4.L.C.5.a			1
4.L.C.5.b			1
4.L.C.5.c			1

Table B5
Porportion of standards represented in MCAS - ELA Grade 4

	Total Standards	Items	Rubric	Represented	Percent
ALL STANDARDS					
Literature	10	5	0	5	50%
Information	10	6	0	6	60%
Writing	23	0	18	18	78%
Language	20	3	19	19	95%
	63	14	37	51	81%
ASSESSED STANDARDS ONLY					
Literature	9	5	0	5	56%
Information	9	6	0	6	67%
Writing	16	0	14	14	88%
Language	18	3	19	19	106%
	52	14	33	47	90%

Key:

x	Standards that MCAS is not designed to assess
1	Standards represented in MCAS by either an item or a criterion in the scoring rubrics

Appendix C - Summary of Panel Decisions ELA Grade 5

Table C1: Evaluation of DOK for each standard

Table C2: Evaluation of DOK for each item

Table C3: Evaluation of Standards Associated with each item

Table C4: Representation of Standards in MCAS

Table C5: Porportion of standards represented in MCAS

Table C1
Evaluation of DOK for each standard - ELA Grade 5

Standard	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
5.LIT	-				-	0	-	
5.LIT.A	-				-	0	-	
5.LIT.A.1	NO				YES	6	2	
5.LIT.A.2	YES	Information Unavailable			YES	7	3	
5.LIT.A.3	NO	Group Leader re-wrote the Round 1			YES	8	3	
5.LIT.B	-	file with the results of Round 2,			-	0	-	
5.LIT.B.4	NO	although GL was able to retrieve what			YES	8	2	
5.LIT.B.5	YES	standards were revisited as part of the			YES	7	2	
5.LIT.B.6	YES	deliberations, there is no information			YES	8	3	
5.LIT.C	-	about the number of reviewers that			-	0	-	
5.LIT.C.7	NO	agreed on the first round per standard.			YES	7	2	
5.LIT.C.8	YES				YES	6	2	
5.LIT.C.9	YES				YES	7	3	
5.LIT.D	-				-	0	-	
5.LIT.D.10	NO				YES	7	2	
5.INF	-				-	0	-	
5.INF.A	-				-	0	-	
5.INF.A.1	YES				YES	7	2	
5.INF.A.2	YES				YES	7	2	
5.INF.A.3	YES				YES	6	2	
5.INF.B	-				-	0	-	
5.INF.B.4	YES				YES	8	2	
5.INF.B.5	YES				YES	6	3	
5.INF.B.6	YES				YES	6	3	
5.INF.C	-				-	0	-	
5.INF.C.7	YES				YES	6	2	
5.INF.C.8	NO				YES	8	3	
5.INF.C.9	YES				YES	7	3	
5.INF.D	-				-	0	-	
5.INF.D.10	NO				YES	7	2	
5.W	-				-	0	-	
5.W.A	-				-	0	-	
5.W.A.1	-				-	0	-	
5.W.A.1.a	NO				YES	8	2	
5.W.A.1.b	YES				YES	6	2	
5.W.A.1.c	YES				YES	8	2	
5.W.A.1.d	YES				YES	8	2	
5.W.A.2	-				-	0	-	
5.W.A.2.a	YES				YES	7	3	
5.W.A.2.b	NO				YES	8	2	
5.W.A.2.c	YES				YES	7	2	
5.W.A.2.d	YES				YES	8	2	
5.W.A.2.e	NO				YES	8	2	
5.W.A.3	-				-	0	-	
5.W.A.3.a	NO				YES	8	2	
5.W.A.3.b	YES				YES	6	3	
5.W.A.3.c	YES				YES	8	2	
5.W.A.3.d	YES				YES	8	2	
5.W.A.3.e	YES				YES	8	2	
5.W.A.3.f	NO				YES	8	3	
5.W.B	-				-	0	-	
5.W.B.4	YES				YES	6	3	
5.W.B.5	YES				YES	6	2	
5.W.B.6	YES				YES	7	2	
5.W.C	-				-	0	-	
5.W.C.7	YES				YES	7	3	
5.W.C.8	NO				YES	7	2	
5.W.C.9	-				-	0	-	
5.W.C.9.a	NO				YES	7	3	
5.W.C.9.b	NO				YES	6	3	
5.W.D	-				-	0	-	
5.W.D.10	YES				YES	7	2	
5.L	-				-	0	-	
5.L.A	-				-	0	-	
5.L.A.1	-				-	0	-	
5.L.A.1.a	YES				YES	8	2	
5.L.A.1.b	YES				YES	8	2	
5.L.A.1.c	YES				YES	8	2	
5.L.A.1.d	YES				YES	7	2	
5.L.A.1.e	YES				YES	8	2	
5.L.A.2	-				-	0	-	
5.L.A.2.a	NO				YES	8	1	
5.L.A.2.b	NO				YES	8	1	
5.L.A.2.c	NO				YES	8	1	
5.L.A.2.d	NO				YES	8	2	
5.L.A.2.e	NO				YES	8	2	
5.L.B	-				-	0	-	
5.L.A.3	-				-	0	-	
5.L.A.3.a	YES				YES	7	2	
5.L.B.3.b	YES				YES	6	2	
5.L.C	-				-	0	-	
5.L.C.4	-				-	0	-	
5.L.C.4.a	YES				YES	8	2	
5.L.C.4.b	YES				YES	8	2	
5.L.C.4.c	YES				YES	6	2	
5.L.C.5	-				-	0	-	
5.L.C.5.a	YES				YES	7	2	
5.L.C.5.b	YES				YES	7	2	
5.L.C.5.c	YES				YES	8	2	
5.L.C.6	YES				YES	8	2	
Total	62				62			
Consensus	42				62			
% Consensus	68%				100%			

Table C2
Evaluation of DOK for each item - ELA Grade 5

Item	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
1	NO	5	3		NO	5	3	
2	YES	8	2		YES	8	2	
3	YES	8	2		YES	8	2	
4	YES	8	2		YES	8	2	
5	YES	8	3		YES	8	3	
6	YES	7	2		YES	7	2	
7	YES	7	2		YES	7	2	
8	YES	8	2		YES	8	2	
9	YES	8	2		YES	8	2	
10	YES	8	2		YES	8	2	
11	NO	5	3		YES	8	3	
12	YES	8	3		YES	8	3	
13	YES	7	2		YES	7	2	
14	YES	7	2		YES	7	2	
15	YES	7	2		YES	7	2	
16	NO	5	2		YES	8	1	
17	NO	5	2		YES	6	1	
18	YES	6	2		YES	7	2	
19	YES	8	2		YES	8	2	
20	YES	6	2		YES	6	2	
21	NO	5	2	3	YES	8	2	
22	NO	4	2		YES	7	2	
23	YES	7	2		YES	7	2	
24	YES	8	2		YES	8	2	
25	YES	6	3		YES	6	3	
Total	25				25			
Consensus	19				24			
% Consensus	76%				96%			

Table C3
Evaluation of Standards Associated with each item - ELA Grade 5

Item	Initial Round				Final Round			
	Consensus	Reviewers	Standard	2nd Stdrd	Consensus	Reviewers	Standard	2nd Stdrd
1	YES	8	5.LIT.A.2		YES	8	5.LIT.A.2	
2	YES	6	5.LIT.A.1		YES	6	5.LIT.A.1	
3	YES	7	5.LIT.C.7		YES	7	5.LIT.C.7	
4	YES	8	5.LIT.B.4		YES	8	5.LIT.B.4	
5	NO	5	5.W.A.3		YES	8	5.W.A.3	
6	NO	2	5.LIT.A.1	5.LIT.B.6	NO	3	5.LIT.A.1	5.LIT.B.6
7	NO	5	5.LIT.B.4		NO	5	5.L.A.1	
8	YES	7	5.LIT.B.4		YES	7	5.LIT.B.4	
9	NO	4	5.LIT.A.2		YES	8	5.LIT.A.2	
10	NO	4	5.LIT.B.4		YES	7	5.LIT.B.4	
11	YES	7	5.LIT.A.3		YES	7	5.LIT.A.3	
12	NO	4	5.W.A.2		YES	8	5.W.A.2	
13	NO	2	5.INF.A.3	5.INF.C.8	NO	2	5.L.A.3.a	
14	YES	6	5.INF.A.1		NO	5	5.INF.A.1	
15	NO	4	5.INF.A.2		NO	5	5.INF.A.2	
16	NO	4	5.INF.A.3		YES	6	5.INF.A.3	
17	NO	5	5.INF.A.1		YES	7	5.INF.A.1	
18	NO	3	5.INF.A.3		YES	8	5.INF.A.3	
19	NO	5	5.INF.A.1		YES	7	5.INF.A.1	
20	YES	6	5.INF.A.1		YES	6	5.INF.A.1	
21	NO	5	5.INF.A.1		NO	5	5.INF.A.1	
22	YES	6	5.INF.C.8		YES	6	5.INF.C.8	
23	YES	7	5.INF.B.4		YES	8	5.INF.B.4	
24	NO	5	5.INF.B.4		YES	7	5.L.C.4.a	5.INF.B.4
25	NO	5	5.W.A.2		YES	8	5.W.A.2	
Total	25				25			
Consensus	10				19			
% Consensus	40%				76%			

Table C4
Representation of Standards in MCAS - ELA Grade 5

Standard	Unassessed Standards	Representation Items	Representation Rubric
5.LIT			-
5.LIT.A			-
5.LIT.A.1		1	-
5.LIT.A.2		1	-
5.LIT.A.3		1	-
5.LIT.B			-
5.LIT.B.4		1	-
5.LIT.B.5			-
5.LIT.B.6		1	-
5.LIT.C			-
5.LIT.C.7		1	-
5.LIT.C.8			-
5.LIT.C.9			-
5.LIT.D			-
5.LIT.D.10	x		-
5.INF			-
5.INF.A			-
5.INF.A.1		1	-
5.INF.A.2		1	-
5.INF.A.3		1	-
5.INF.B			-
5.INF.B.4		1	-
5.INF.B.5			-
5.INF.B.6			-
5.INF.C			-
5.INF.C.7			-
5.INF.C.8		1	-
5.INF.C.9			-
5.INF.D			-
5.INF.D.10	x		-
5.W			
5.W.A			
5.W.A.1			
5.W.A.1.a			1
5.W.A.1.b			1
5.W.A.1.c			1
5.W.A.1.d			1
5.W.A.2		1	
5.W.A.2.a			1
5.W.A.2.b			1
5.W.A.2.c			1
5.W.A.2.d			1
5.W.A.2.e			
5.W.A.3		1	
5.W.A.3.a			1
5.W.A.3.b			1
5.W.A.3.c			1
5.W.A.3.d			1
5.W.A.3.e			1
5.W.A.3.f			
5.W.B			
5.W.B.4			1
5.W.B.5	x		
5.W.B.6	x		1
5.W.C			
5.W.C.7	x		1
5.W.C.8	x		1
5.W.C.9			
5.W.C.9.a	x		
5.W.C.9.b	x		
5.W.D			
5.W.D.10	x		1
5.L			
5.L.A			
5.L.A.1		1	
5.L.A.1.a			1
5.L.A.1.b			1
5.L.A.1.c			1
5.L.A.1.d			1
5.L.A.1.e			1
5.L.A.2			
5.L.A.2.a			1
5.L.A.2.c			1
5.L.A.2.d			1
5.L.A.2.e			1
5.L.B			
5.L.A.3			
5.L.A.3.a		1	1
5.L.B.3.b			1
5.L.C			
5.L.C.4			
5.L.C.4.a		1	1
5.L.C.4.b			1
5.L.C.4.c			1
5.L.C.5			
5.L.C.5.a			1
5.L.C.5.b			1
5.L.C.5.c			1
5.L.C.6			1
Total Consensus			

Table C5
Porportion of standards represented in MCAS - ELA Grade 5

	Total Standards	Items	Rubric	Represented	Percent
ALL STANDARDS					
Literature	10	6	0	6	60%
Information	10	5	0	5	50%
Writing	23	0	18	18	78%
Language	18	2	18	18	100%
	61	13	36	49	80%
ASSESSED STANDARDS ONLY					
Literature	9	6	0	6	67%
Information	9	5	0	5	56%
Writing	16	0	14	14	88%
Language	18	2	18	18	100%
	52	13	32	45	87%

Key:

x	Standards that MCAS is not designed to assess
1	Standards represented in MCAS by either an item or a criterion in the scoring rubrics

Appendix S—Boston College Content Alignment Study

Appendix D - Summary of Panel Decisions ELA Grade 6

Table D1: Evaluation of DOK for each standard

Table D2: Evaluation of DOK for each item

Table D3: Evaluation of Standards Associated with each item

Table D4: Representation of Standards in MCAS

Table D5: Porportion of standards represented in MCAS

Table D1
Evaluation of DOK for each standard - ELA Grade 6

	Initial Round				Final Round			
Standard	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
6.LIT	-	0	-		-	0	-	
6.LIT.A	-	0	-		-	0	-	
6.LIT.A.1	YES	8	2		YES	8	2	
6.LIT.A.2	NO	4	2	3	YES	8	3	
6.LIT.A.3	YES	7	2		YES	7	2	
6.LIT.B	-	0	-		-	0	-	
6.LIT.B.4	YES	6	2		YES	6	2	
6.LIT.B.5	NO	4	2	3	YES	6	3	
6.LIT.B.6	NO	4	2	3	YES	6	2	
6.LIT.C	-	0	-		-	0	-	
6.LIT.C.7	YES	6	3		YES	6	3	
6.LIT.C.8	YES	7	1		YES	7	1	
6.LIT.C.9	YES	7	3		YES	7	3	
6.LIT.D	-	0	-		-	0	-	
6.LIT.D.10	NO	3	1	3	YES	8	2	
6.INF	-	0	-		-	0	-	
6.INF.A	-	0	-		-	0	-	
6.INF.A.1	YES	8	2		YES	8	2	
6.INF.A.2	YES	6	2		YES	7	2	
6.INF.A.3	YES	7	2		YES	7	2	
6.INF.B	-	0	-		-	0	-	
6.INF.B.4	YES	8	2		YES	8	2	
6.INF.B.5	NO	5	2		YES	6	2	
6.INF.B.6	NO	5	2		YES	6	2	
6.INF.C	-	0	-		-	0	-	
6.INF.C.7	YES	8	3		YES	8	3	
6.INF.C.8	YES	7	3		YES	7	3	
6.INF.C.9	YES	6	3		YES	6	3	
6.INF.D	-	0	-		-	0	-	
6.INF.D.10	NO	4	2		YES	8	2	
6.W	-	0	-		-	0	-	
6.W.A	-	0	-		-	0	-	
6.W.A.1	-	0	-		-	0	-	
6.W.A.1.a	YES	6	3		YES	7	3	
6.W.A.1.b	YES	7	3		YES	8	3	
6.W.A.1.c	NO	4	3		YES	7	2	
6.W.A.1.d	NO	4	2		YES	7	2	
6.W.A.1.e	NO	5	3		YES	6	3	
6.W.A.2	-	0	-		-	0	-	
6.W.A.2.a	YES	6	3		YES	7	3	
6.W.A.2.b	NO	5	3		YES	7	3	
6.W.A.2.c	NO	3	2	3	YES	8	2	
6.W.A.2.d	NO	3	2	3	YES	7	3	
6.W.A.2.e	NO	4	2		YES	7	2	
6.W.A.2.f	NO	5	3		YES	6	3	
6.W.A.3	-	0	-		-	0	-	
6.W.A.3.a	NO	5	3		YES	8	3	
6.W.A.3.b	NO	5	3		YES	7	3	
6.W.A.3.c	NO	5	2		YES	7	2	
6.W.A.3.d	NO	5	3		YES	8	3	
6.W.A.3.e	NO	4	2	3	YES	6	3	
6.W.A.3.f	YES	7	3		YES	7	3	
6.W.B	-	0	-		-	0	-	
6.W.B.4	YES	7	3		YES	7	3	
6.W.B.5	NO	5	3		YES	6	3	
6.W.B.6	NO	4	3		YES	7	2	
6.W.C	-	0	-		-	0	-	
6.W.C.7	YES	7	3		YES	7	3	
6.W.C.8	YES	8	3		YES	8	3	
6.W.C.9	-	0	-		-	0	-	
6.W.C.9.a	YES	7	3		YES	7	3	
6.W.C.9.b	YES	8	3		YES	8	3	
6.W.D	-	0	-		-	0	-	
6.W.D.10	YES	6	3		YES	6	3	
6.L	-	0	-		-	0	-	
6.L.A	-	0	-		-	0	-	
6.L.A.1	-	0	-		-	0	-	
6.L.A.1.a	NO	5	2		YES	8	2	
6.L.A.1.b	NO	5	2		YES	8	2	
6.L.A.1.c	NO	5	2		YES	8	2	
6.L.A.1.d	YES	6	2		YES	8	2	
6.L.A.1.e	NO	4	3		YES	7	3	
6.L.A.2	-	0	-		-	0	-	
6.L.A.2.a	NO	5	2		YES	8	2	
6.L.A.2.b	NO	4	1	2	YES	8	2	
6.L.B	-	0	-		-	0	-	
6.L.B.3	-	0	-		-	0	-	
6.L.B.3.a	NO	5	3		YES	8	3	
6.L.B.3.b	NO	4	2	3	YES	7	3	
6.L.C	-	0	-		-	0	-	
6.L.C.4	-	0	-		-	0	-	
6.L.C.4.a	YES	8	2		YES	8	2	
6.L.C.4.b	YES	6	2		YES	6	2	
6.L.C.4.c	NO	5	1		YES	7	1	
6.L.C.4.d	NO	5	1		YES	8	1	
6.L.C.5	-	0	-		-	0	-	
6.L.C.5.a	YES	6	2		YES	6	2	
6.L.C.5.b	YES	6	2		YES	6	2	
6.L.C.5.c	NO	5	2		YES	8	2	
6.L.C.6	YES	6	2		YES	6	2	
Total	62				62			
Consensus	29				62			
% Consensus	47%				100%			

Table D2
Evaluation of DOK for each item - ELA Grade 6

Item	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
1	NO	5	2		YES	8	2	
2	YES	6	2		YES	6	2	
3	YES	6	3		YES	6	3	
4	YES	7	3		YES	7	3	
5	YES	8	3		YES	8	3	
6	YES	6	1		YES	8	1	
7	NO	5	2		YES	7	3	
8	YES	8	2		YES	7	2	
9	YES	7	2		YES	7	2	
10	NO	3	1	2	YES	8	2	
11	NO	5	2		YES	8	2	
12	NO	5	2		YES	8	2	
13	NO	5	2		YES	7	3	
14	YES	7	3		YES	7	3	
15	YES	7	3		YES	7	3	
16	NO	5	2		YES	6	2	
17	YES	8	2		YES	8	2	
18	YES	7	2		YES	7	2	
19	YES	8	2		YES	8	2	
20	YES	6	2		YES	7	2	
21	YES	6	2		YES	6	2	
22	NO	5	3		YES	8	3	
23	NO	4	1	2	YES	7	1	
24	YES	6	2		NO	5	2	
25	YES	7	3		YES	7	3	
Total	25				25			
Consensus	16				24			
% Consensus	64%				96%			

Table D3
Evaluation of Standards Associated with each item - ELA Grade 6

Item	Initial Round				Final Round			
	Consensus	Reviewers	Standard	2nd Stdrd	Consensus	Reviewers	Standard	2nd Stdrd
1	YES	7	6.LIT.B.6		YES	7	6.LIT.B.6	6.LIT.B.6
2	YES	8	6.LIT.A.2		YES	8	6.LIT.A.2	6.LIT.A.1
3	NO	5	6.LIT.A.1	6.LIT.B.5	YES	8	6.LIT.A.1	6.LIT.B.5
4	YES	7	6.LIT.A.2		YES	8	6.LIT.A.2	6.LIT.A.1
5	YES	7	6.W.A.3		YES	7	6.W.A.3	
6	NO	5	6.INF.A.1		YES	8	6.INF.A.1	
7	NO	4	6.INF.B.5		NO	5	6.INF.B.5	
8	NO	5	6.INF.B.4		YES	8	6.INF.B.4	6.L.C.4.a
9	NO	3	6.INF.B.4		YES	8	6.INF.A.3	
10	NO	5	6.INF.C.7		YES	7	6.INF.C.7	
11	NO	5	6.INF.A.1		YES	8	6.INF.A.1	
12	NO	4	6.INF.A.2		YES	6	6.INF.A.2	
13	NO	2	6.INF.C.9		YES	8	6.INF.C.9	
14	NO	4	6.INF.C.9		YES	7	6.INF.C.9	
15	YES	8	6.W.A.2		YES	7	6.W.A.2	
16	NO	4	6.LIT.B.5		YES	8	6.LIT.B.5	
17	NO	4	6.LIT.A.1		YES	8	6.LIT.A.1	
18	YES	7	6.LIT.B.5		YES	7	6.LIT.B.5	
19	NO	5	6.LIT.A.2		YES	6	6.LIT.A.2	
20	YES	7	6.LIT.B.5		YES	8	6.LIT.B.5	
21	NO	5	6.LIT.A.3		YES	8	6.LIT.A.3	
22	YES	6	6.LIT.A.3		YES	6	6.LIT.A.3	
23	YES	8	6.L.A.2.a		YES	8	6.L.A.2.a	
24	YES	6	6.LIT.B.4		NO	5	6.LIT.B.4	
25	YES	7	6.W.A.2		YES	7	6.W.A.2	
Total	25				25			
Consensus	11				23			
% Consensus	44%				92%			

Table D4
Representation of Standards in MCAS - ELA Grade 6

Standard	Unassessed Standards	Items	Rubric
6.LIT			-
6.LIT.A			-
6.LIT.A.1		1	-
6.LIT.A.2		1	-
6.LIT.A.3		1	-
6.LIT.B			-
6.LIT.B.4		1	-
6.LIT.B.5		1	-
6.LIT.B.6		1	-
6.LIT.C			-
6.LIT.C.7			-
6.LIT.C.8			-
6.LIT.C.9			-
6.LIT.D			-
6.LIT.D.10	x		-
6.INF			-
6.INF.A			-
6.INF.A.1		1	-
6.INF.A.2		1	-
6.INF.A.3		1	-
6.INF.B			-
6.INF.B.4		1	-
6.INF.B.5		1	-
6.INF.B.6			-
6.INF.C			-
6.INF.C.7		1	-
6.INF.C.8			-
6.INF.C.9		1	-
6.INF.D			-
6.INF.D.10	x		-
6.W			
6.W.A			
6.W.A.1			
6.W.A.1.a			1
6.W.A.1.b			1
6.W.A.1.c			1
6.W.A.1.d			1
6.W.A.1.e			1
6.W.A.2		1	
6.W.A.2.a			1
6.W.A.2.b			1
6.W.A.2.c			1
6.W.A.2.d			1
6.W.A.2.e			1
6.W.A.2.f			1
6.W.A.3		1	
6.W.A.3.a			1
6.W.A.3.b			1
6.W.A.3.c			1
6.W.A.3.d			1
6.W.A.3.e			1
6.W.A.3.f			1
6.W.B			
6.W.B.4			1
6.W.B.5	x		1
6.W.B.6	x		1
6.W.C			
6.W.C.7	x		
6.W.C.8	x		1
6.W.C.9			
6.W.C.9.a	x		1
6.W.C.9.b	x		1
6.W.D			
6.W.D.10	x		1
6.L			
6.L.A			
6.L.A.1			
6.L.A.1.a			1
6.L.A.1.b			1
6.L.A.1.c			1
6.L.A.1.d			1
6.L.A.1.e			1
6.L.A.2			
6.L.A.2.a		1	1
6.L.A.2.b			1
6.L.B			
6.L.B.3			
6.L.B.3.a			1
6.L.B.3.b			1
6.L.C			
6.L.C.4			
6.L.C.4.a		1	
6.L.C.4.b			
6.L.C.4.c			
6.L.C.4.d			
6.L.C.5			
6.L.C.5.a			
6.L.C.5.b			1
6.L.C.5.c			1
6.L.C.6			1

Table D5
Porportion of standards represented in MCAS - ELA Grade 6

	Total Standards	Items	Rubric	Represented	Percent
ALL STANDARDS					
Literature	10	6	0	6	60%
Information	10	7	0	7	70%
Writing	25	0	24	24	96%
Language	17	2	12	13	76%
	62	15	36	51	82%
ASSESSED STANDARDS ONLY					
Literature	9	6	0	6	67%
Information	9	7	0	7	78%
Writing	18	0	18	18	100%
Language	17	2	12	13	76%
	53	15	30	45	85%

Key:

x Standards that MCAS is not designed to assess

1 Standards represented in MCAS by either an item or a criterion in the scoring rubrics

Appendix E - Summary of Panel Decisions ELA Grade 7

Table E1: Evaluation of DOK for each standard

Table E2: Evaluation of DOK for each item

Table E3: Evaluation of Standards Associated with each item

Table E4: Representation of Standards in MCAS

Table E5: Porportion of standards represented in MCAS

Table E1
Evaluation of DOK for each standard _ ELA Grade 7

Standard	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
7.LIT	–	0	–		–	0	–	
7.LIT.A	–	0	–		–	0	–	
7.LIT.A.1	YES	8	2		YES	8	2	
7.LIT.A.2	YES	7	3		YES	7	3	
7.LIT.A.3	YES	7	3		YES	7	3	
7.LIT.B	–	0	–		–	0	–	
7.LIT.B.4	YES	6	2		YES	6	2	
7.LIT.B.5	YES	7	3		YES	7	3	
7.LIT.B.6	YES	7	3		YES	7	3	
7.LIT.C	–	0	–		–	0	–	
7.LIT.C.7	YES	7	3		YES	7	3	
7.LIT.C.8	NO	5	3		YES	7	3	
7.LIT.C.9	YES	7	3		YES	7	3	
7.LIT.D	–	0	–		–	0	–	
7.LIT.D.10	YES	8	2		YES	8	2	
7.INF	–	0	–		–	0	–	
7.INF.A	–	0	–		–	0	–	
7.INF.A.1	YES	7	2		YES	7	2	
7.INF.A.2	YES	6	2		YES	7	2	
7.INF.A.3	NO	5	3		YES	8	3	
7.INF.B	–	0	–		–	0	–	
7.INF.B.4	YES	6	2		YES	6	2	
7.INF.B.5	YES	6	3		YES	6	3	
7.INF.B.6	YES	7	3		YES	7	3	
7.INF.C	–	0	–		–	0	–	
7.INF.C.7	YES	7	3		YES	7	3	
7.INF.C.8	YES	7	3		YES	7	3	
7.INF.C.9	YES	7	3		YES	7	3	
7.INF.D	–	0	–		–	0	–	
7.INF.D.10	YES	8	2		YES	8	2	
7.W	–	0	–		–	0	–	
7.W.A	–	0	–		–	0	–	
7.W.A.1	–	0	–		–	0	–	
7.W.A.1.a	YES	6	3		YES	6	3	
7.W.A.1.b	YES	8	3		YES	8	3	
7.W.A.1.c	YES	7	2		YES	7	2	
7.W.A.1.d	YES	7	2		YES	7	2	
7.W.A.1.e	YES	6	3		YES	6	3	
7.W.A.2	–	0	–		–	0	–	
7.W.A.2.a	YES	6	3		YES	6	3	
7.W.A.2.b	YES	7	3		YES	7	3	
7.W.A.2.c	YES	7	2		YES	7	2	
7.W.A.2.d	YES	6	3		YES	6	3	
7.W.A.2.e	YES	7	2		YES	7	2	
7.W.A.2.f	YES	6	3		YES	6	3	
7.W.A.3	–	0	–		–	0	–	
7.W.A.3.a	YES	7	3		YES	7	3	
7.W.A.3.b	YES	7	3		YES	7	3	
7.W.A.3.c	YES	7	2		YES	7	2	
7.W.A.3.d	YES	8	3		YES	8	3	
7.W.A.3.e	YES	7	3		YES	7	3	
7.W.A.3.f	YES	8	3		YES	8	3	
7.W.B	–	0	–		–	0	–	
7.W.B.4	YES	6	3		YES	6	3	
7.W.B.5	NO	5	3		YES	6	3	
7.W.B.6	NO	5	2		YES	7	2	
7.W.C	–	0	–		–	0	–	
7.W.C.7	YES	7	3		YES	7	3	
7.W.C.8	YES	8	3		YES	8	3	
7.W.C.9	–	0	–		–	0	–	
7.W.C.9.a	YES	6	3		YES	6	3	
7.W.C.9.b	YES	6	3		YES	6	3	
7.W.D	–	0	–		–	0	–	
7.W.D.10	NO	4	2	3	YES	7	2	
7.L	–	0	–		–	0	–	
7.L.A	–	0	–		–	0	–	
7.L.A.1	–	0	–		–	0	–	
7.L.A.1.a	YES	7	2		YES	7	2	
7.L.A.1.b	YES	7	2		YES	7	2	
7.L.A.1.c	YES	8	2		YES	8	2	
7.L.A.2	–	0	–		–	0	–	
7.L.A.2.a	YES	8	2		YES	8	2	
7.L.A.2.b	YES	7	2		YES	7	2	
7.L.B	–	0	–		–	0	–	
7.L.B.3	–	0	–		–	0	–	
7.L.B.3.a	NO	5	3		YES	7	3	
7.L.C	–	0	–		–	0	–	
7.L.C.4	–	0	–		–	0	–	
7.L.C.4.a	YES	8	2		YES	8	2	
7.L.C.4.b	YES	6	2		YES	6	2	
7.L.C.4.c	YES	7	1		YES	7	1	
7.L.C.4.d	YES	6	1		YES	6	1	
7.L.C.5	–	0	–		–	0	–	
7.L.C.5.a	YES	7	2		YES	8	2	
7.L.C.5.b	YES	7	2		YES	7	2	
7.L.C.5.c	YES	8	2		YES	8	2	
7.L.C.6	YES	8	2		YES	8	2	
Total	59				59			
Consensus	53				59			
% Consensus	90%				100%			

Appendix S—Boston College Content Alignment Study

Table E2
Evaluation of DOK for each item - ELA Grade 7

Item	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
1	NO	5	2		YES	8	2	
2	NO	4	2	3	YES	8	3	
3	NO	5	2		YES	8	2	
4	YES	6	2		YES	6	2	
5	YES	8	3		YES	8	3	
6	NO	5	2		YES	7	2	
7	NO	4	2	3	YES	6	3	
8	YES	8	2		YES	8	2	
9	YES	8	2		YES	8	2	
10	YES	6	3		YES	6	3	
11	NO	5	1		YES	8	1	
12	YES	7	2		YES	7	2	
13	NO	5	2		YES	8	2	
14	YES	7	2		YES	8	2	
15	YES	7	3		YES	7	3	
16	YES	7	2		YES	7	2	
17	YES	7	2		YES	7	2	
18	YES	8	2		YES	8	2	
19	YES	7	2		YES	7	2	
20	NO	4	2	3	YES	8	3	
21	YES	7	2		YES	8	2	
22	YES	8	2		YES	8	2	
23	NO	5	3		YES	7	3	
24	YES	6	1		YES	8	1	
25	YES	7	3		YES	7	3	
Total	25				25			
Consensus	16				25			
% Consensus	64%				100%			

Table E3
Evaluation of Standards Associated with each item - ELA Grade 7

Item	Initial Round				Final Round			
	Consensus	Reviewers	Standard	2nd Stdrd	Consensus	Reviewers	Standard	2nd Stdrd
1	YES	6	7.LIT.A.1		YES	7	7.LIT.A.1	
2	YES	8	7.LIT.A.2	7.LIT.A.1	YES	8	7.LIT.A.2	7.LIT.A.1
3	YES	8	7.LIT.A.2	7.LIT.A.1	YES	8	7.LIT.A.2	7.LIT.A.1
4	YES	7	7.LIT.A.1		YES	7	7.LIT.A.1	
5	YES	8	7.W.A.3		YES	8	7.W.A.3	
6	NO	3	7.LIT.B.4	7.LIT.B.5	YES	7	7.LIT.B.4	
7	NO	3	7.LIT.B.4	7.LIT.C.8	YES	7	7.LIT.C.8	
8	YES	6	7.LIT.B.4		YES	8	7.LIT.B.4	
9	YES	6	7.LIT.B.4		YES	6	7.LIT.B.4	
10	YES	7	7.LIT.C.8		YES	8	7.LIT.C.8	
11	NO	5	7.L.A.1.a		YES	6	7.L.A.2	
12	NO	5	7.INF.B.4		NO	5	7.INF.B.4	
13	NO	3	7.INF.A.2		YES	7	7.INF.B.5	
14	NO	5	7.INF.B.4		YES	8	7.L.C.4.a	7.INF.B.4
15	YES	8	7.W.A.2		YES	8	7.W.A.2	
16	NO	5	7.LIT.A.1		YES	8	7.LIT.A.1	
17	NO	4	7.LIT.A.1		YES	7	7.LIT.A.1	7.LIT.B.4
18	NO	5	7.LIT.A.1		YES	6	7.LIT.A.1	7.LIT.A.3
19	NO	5	7.LIT.A.1		YES	7	7.LIT.A.1	
20	NO	4	7.LIT.A.1	7.LIT.A.2	YES	6	7.LIT.A.2	3.INF.B.5
21	YES	6	7.LIT.A.1		YES	6	7.LIT.A.1	
22	NO	5	7.LIT.A.1		YES	8	7.LIT.A.1	
23	NO	5	7.LIT.B.6		YES	8	7.LIT.B.6	
24	NO	2	7.LIT.B.4	7.L.A.1.a	YES	7	7.L.A.2	
25	YES	7	7.W.A.2		YES	7	7.W.A.2	
Total	25				25			
Consensus	11				24			
% Consensus	44%				96%			

Table E4
Representation of Standards in MCAS - ELA Grade 7

Standard	Unassessed Standards	Representation Items	Representation Rubric
7.LIT			-
7.LIT.A			-
7.LIT.A.1		1	-
7.LIT.A.2		1	-
7.LIT.A.3		1	-
7.LIT.B			-
7.LIT.B.4		1	-
7.LIT.B.5			-
7.LIT.B.6		1	-
7.LIT.C			-
7.LIT.C.7			-
7.LIT.C.8		1	-
7.LIT.C.9			-
7.LIT.D			-
7.LIT.D.10	x		-
7.INF			-
7.INF.A			-
7.INF.A.1			-
7.INF.A.2			-
7.INF.A.3			-
7.INF.B			-
7.INF.B.4		1	-
7.INF.B.5		1	-
7.INF.B.6			-
7.INF.C			-
7.INF.C.7			-
7.INF.C.8			-
7.INF.C.9			-
7.INF.D			-
7.INF.D.10	x		-
7.W			
7.W.A			
7.W.A.1			
7.W.A.1.a			1
7.W.A.1.b			1
7.W.A.1.c			1
7.W.A.1.d			1
7.W.A.1.e			1
7.W.A.2		1	
7.W.A.2.a			1
7.W.A.2.b			1
7.W.A.2.c			1
7.W.A.2.d			1
7.W.A.2.e			1
7.W.A.2.f			1
7.W.A.3		1	
7.W.A.3.a			1
7.W.A.3.b			1
7.W.A.3.c			1
7.W.A.3.d			1
7.W.A.3.e			1
7.W.A.3.f			1
7.W.B			
7.W.B.4			1
7.W.B.5	x		1
7.W.B.6	x		1
7.W.C			
7.W.C.7	x		
7.W.C.8	x		1
7.W.C.9			
7.W.C.9.a	x		1
7.W.C.9.b	x		1
7.W.D			
7.W.D.10	x		1
7.L			
7.L.A			
7.L.A.1			
7.L.A.1.a			1
7.L.A.1.b			1
7.L.A.1.c			1
7.L.A.2		1	
7.L.A.2.a			1
7.L.A.2.b			1
7.L.B			
7.L.B.3			
7.L.B.3.a			1
7.L.C			
7.L.C.4			
7.L.C.4.a		1	
7.L.C.4.b			
7.L.C.4.c			
7.L.C.4.d			
7.L.C.5			
7.L.C.5.a			
7.L.C.5.b			1
7.L.C.5.c			1
7.L.C.6			1

Table E5
Porportion of standards represented in MCAS - ELA Grade 7

	Total Standards	Items	Rubric	Represented	Percent
ALL STANDARDS					
Literature	10	6	0	6	60%
Information	10	2	0	2	20%
Writing	25	0	24	24	96%
Language	14	1	9	10	71%
	59	9	33	42	71%
ASSESSED STANDARDS ONLY					
Literature	9	6	0	6	67%
Information	9	2	0	2	22%
Writing	18	0	18	18	100%
Language	14	1	9	10	71%
	50	9	27	36	72%

Key:

x   Standards that MCAS is not designed to assess

1   Standards represented in MCAS by either an item or a criterion in the scoring rubrics

Appendix S—Boston College Content Alignment Study

Appendix F - Summary of Panel Decisions ELA Grade 8

Table F1: Evaluation of DOK for each standard

Table F2: Evaluation of DOK for each item

Table F3: Evaluation of Standards Associated with each item

Table F4: Representation of Standards in MCAS

Table F5: Porportion of standards represented in MCAS

Table F1
Evaluation of DOK for each standard _ ELA Grade 8

Standard	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
8.LIT	-	0	-		-	0	-	
8.LIT.A	-	0	-		-	0	-	
8.LIT.A.1	YES	8	2		YES	8	2	
8.LIT.A.2	YES	7	3		YES	7	3	
8.LIT.A.3	YES	6	3		YES	6	3	
8.LIT.B	-	0	-		-	0	-	
8.LIT.B.4	NO	5	2		YES	8	3	
8.LIT.B.5	YES	8	3		YES	8	3	
8.LIT.B.6	YES	8	3		YES	8	3	
8.LIT.C	-	0	-		-	0	-	
8.LIT.C.7	YES	7	3		YES	7	3	
8.LIT.C.8	YES	6	3		YES	6	3	
8.LIT.C.9	YES	8	3		YES	8	3	
8.LIT.D	-	0	-		-	0	-	
8.LIT.D.10	YES	8	2		YES	8	2	
8.INF	-	0	-		-	0	-	
8.INF.A	-	0	-		-	0	-	
8.INF.A.1	YES	8	2		YES	8	2	
8.INF.A.2	NO	4	2	3	YES	8	3	
8.INF.A.3	YES	7	3		YES	7	3	
8.INF.B	-	0	-		-	0	-	
8.INF.B.4	NO	5	2		YES	8	3	
8.INF.B.5	YES	6	3		YES	6	3	
8.INF.B.6	YES	8	3		YES	8	3	
8.INF.C	-	0	-		-	0	-	
8.INF.C.7	YES	8	3		YES	8	3	
8.INF.C.8	YES	8	3		YES	8	3	
8.INF.C.9	YES	7	3		YES	7	3	
8.INF.D	-	0	-		-	0	-	
8.INF.D.10	YES	8	2		YES	8	2	
8.W	-	0	-		-	0	-	
8.W.A	-	0	-		-	0	-	
8.W.A.1	-	0	-		-	0	-	
8.W.A.1.a	YES	7	3		YES	7	3	
8.W.A.1.b	YES	8	3		YES	8	3	
8.W.A.1.c	YES	6	2		YES	6	2	
8.W.A.1.d	YES	7	2		YES	7	2	
8.W.A.1.e	YES	6	3		YES	6	3	
8.W.A.2	-	0	-		-	0	-	
8.W.A.2.a	YES	6	3		YES	6	3	
8.W.A.2.b	YES	8	3		YES	8	3	
8.W.A.2.c	YES	7	2		YES	7	2	
8.W.A.2.d	YES	6	3		YES	6	3	
8.W.A.2.e	YES	7	2		YES	7	2	
8.W.A.2.f	YES	6	3		YES	6	3	
8.W.A.3	-	0	-		-	0	-	
8.W.A.3.a	YES	7	3		YES	7	3	
8.W.A.3.b	YES	7	3		YES	7	3	
8.W.A.3.c	NO	5	2		YES	8	2	
8.W.A.3.d	YES	7	3		YES	7	3	
8.W.A.3.e	YES	7	3		YES	7	3	
8.W.A.3.f	YES	8	3		YES	8	3	
8.W.B	-	0	-		-	0	-	
8.W.B.4	YES	7	3		YES	7	3	
8.W.B.5	NO	5	3		YES	7	3	
8.W.B.6	NO	5	2		YES	7	2	
8.W.C	-	0	-		-	0	-	
8.W.C.7	YES	7	3		YES	7	3	
8.W.C.8	YES	8	3		YES	8	3	
8.W.C.9	-	0	-		-	0	-	
8.W.C.9.a	YES	8	3		YES	8	3	
8.W.C.9.b	YES	8	3		YES	8	3	
8.W.D	-	0	-		-	0	-	
8.W.D.10	YES	7	2		YES	8	2	
8.L	-	0	-		-	0	-	
8.L.A	-	0	-		-	0	-	
8.L.A.1	-	0	-		-	0	-	
8.L.A.1.a	NO	5	2		YES	8	2	
8.L.A.1.b	YES	6	2		YES	7	2	
8.L.A.1.c	YES	7	2		YES	7	2	
8.L.A.1.d	YES	6	2		YES	6	2	
8.L.A.2	-	0	-		-	0	-	
8.L.A.2.a	YES	6	2		YES	6	2	
8.L.A.2.b	YES	6	2		YES	6	2	
8.L.A.2.c	YES	7	2		YES	7	2	
8.L.B	-	0	-		-	0	-	
8.L.B.3	-	0	-		-	0	-	
8.L.B.3.a	YES	6	3		YES	6	3	
8.L.C	-	0	-		-	0	-	
8.L.C.4	-	0	-		-	0	-	
8.L.C.4.a	YES	8	2		YES	8	2	
8.L.C.4.b	YES	6	2		YES	6	2	
8.L.C.4.c	YES	6	1		YES	8	1	
8.L.C.4.d	NO	4	1	2	YES	8	1	
8.L.C.5	-	0	-		-	0	-	
8.L.C.5.a	YES	6	2		YES	6	2	
8.L.C.5.b	YES	6	2		YES	7	2	
8.L.C.5.c	YES	7	2		YES	8	2	
8.L.C.6	YES	7	2		YES	8	2	
Total	61				61			
Consensus	53				61			
% Consensus	87%				100%			

Table F2
Evaluation of DOK for each item - ELA Grade 8

Item	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
1	YES	7	2		YES	7	2	
2	NO	4	2	3	YES	8	3	
3	YES	7	3		YES	7	3	
4	YES	7	2		YES	7	2	
5	YES	8	3		YES	8	3	
6	YES	7	2		YES	7	2	
7	YES	6	2		YES	6	2	
8	NO	4	3		YES	7	2	
9	NO	4	2	3	YES	8	3	
10	NO	5	2		NO	4	2	3
11	YES	6	2		YES	7	2	
12	NO	4	2		YES	8	2	
13	NO	5	3		YES	8	3	
14	YES	7	2		YES	8	3	
15	YES	7	3		YES	7	3	
16	YES	6	2		YES	6	2	
17	YES	6	2		YES	8	2	
18	YES	6	2		YES	6	2	
19	YES	8	2		YES	8	2	
20	YES	6	3		YES	7	3	
21	NO	3	2	3	YES	8	2	
22	YES	7	2		YES	7	2	
23	YES	7	2		YES	7	2	
24	NO	5	3		YES	8	3	
25	YES	7	3		YES	7	3	
Total	25				25			
Consensus	17				24			
% Consensus	68%				96%			

Table F3
Evaluation of Standards Associated with each item - ELA Grade 8

Item	Initial Round				Final Round			
	Consensus	Reviewers	Standard	2nd Stdrd	Consensus	Reviewers	Standard	2nd Stdrd
1	YES	7	8.LIT.A.1	8.LIT.A.3	YES	7	8.LIT.A.1	8.LIT.A.3
2	YES	8	8.LIT.A.2	8.LIT.A.1	YES	8	8.LIT.A.2	8.LIT.A.1
3	YES	7	8.LIT.A.1	8.LIT.A.2	YES	7	8.LIT.A.1	8.LIT.A.2
4	YES	6	8.LIT.A.1		YES	6	8.LIT.A.1	
5	YES	8	8.W.A.3		YES	8	8.W.A.3	
6	YES	7	8.LIT.A.3		YES	7	8.LIT.A.3	
7	YES	6	8.LIT.A.3		YES	6	8.LIT.A.3	
8	NO	3	8.LIT.B.6	8.LIT.C.8	YES	7	8.LIT.B.6	8.LIT.C.8
9	NO	5	8.LIT.A.3		YES	8	8.LIT.A.3	
10	NO	3	8.INF.B.4		YES	8	8.INF.B.4	
11	NO	3	8.LIT.B.4		YES	7	8.INF.B.5	
12	NO	5	8.LIT.A.2		YES	8	8.LIT.A.2	8.INF.A.2
13	YES	8	8.LIT.A.2		YES	8	8.LIT.A.2	
14	NO	5	8.L.C.4.a		YES	8	8.L.C.4.a	8.LIT.B.4 8.INF.B.4
15	YES	8	8.W.A.2		YES	8	8.W.A.2	
16	YES	8	8.LIT.A.3		YES	7	8.LIT.A.3	
17	NO	5	8.LIT.A.3		YES	8	8.LIT.A.3	
18	YES	6	8.LIT.A.3		YES	8	8.LIT.A.3	
19	NO	4	8.LIT.A.1		YES	8	8.LIT.A.1	
20	YES	8	8.LIT.A.2		YES	8	8.LIT.A.2	
21	NO	4	8.LIT.A.3		YES	8	8.LIT.A.3	
22	YES	7	8.LIT.A.3		YES	8	8.LIT.A.3	
23	YES	6	8.L.C.4.a		YES	6	8.LIT.B.4	8.L.C.4.a
24	NO	5	8.LIT.B.5		YES	8	8.LIT.B.5	
25	YES	7	8.W.A.2		YES	8	8.W.A.2	
Total	25				25			
Consensus	15				25			
% Consensus	60%				100%			

Table F4
Representation of Standards in MCAS - ELA Grade 8

Standard	Unassessed Standards	Items	Rubric
8.LIT			-
8.LIT.A			-
8.LIT.A.1		1	-
8.LIT.A.2		1	-
8.LIT.A.3		1	-
8.LIT.B			-
8.LIT.B.4		1	-
8.LIT.B.5		1	-
8.LIT.B.6		1	-
8.LIT.C			-
8.LIT.C.7			-
8.LIT.C.8		1	-
8.LIT.C.9			-
8.LIT.D			-
8.LIT.D.10	x		-
8.INF			-
8.INF.A			-
8.INF.A.1			-
8.INF.A.2		1	-
8.INF.A.3			-
8.INF.B			-
8.INF.B.4		1	-
8.INF.B.5		1	-
8.INF.B.6			-
8.INF.C			-
8.INF.C.7			-
8.INF.C.8			-
8.INF.C.9			-
8.INF.D			-
8.INF.D.10	x		-
8.W			
8.W.A			
8.W.A.1			
8.W.A.1.a			1
8.W.A.1.b			1
8.W.A.1.c			1
8.W.A.1.d			1
8.W.A.1.e			1
8.W.A.2		1	
8.W.A.2.a			1
8.W.A.2.b			1
8.W.A.2.c			1
8.W.A.2.d			1
8.W.A.2.e			1
8.W.A.2.f			1
8.W.A.3		1	
8.W.A.3.a			1
8.W.A.3.b			1
8.W.A.3.c			1
8.W.A.3.d			1
8.W.A.3.e			1
8.W.A.3.f			1
8.W.B			
8.W.B.4			1
8.W.B.5	x		1
8.W.B.6	x		1
8.W.C			
8.W.C.7	x		
8.W.C.8	x		1
8.W.C.9			
8.W.C.9.a	x		1
8.W.C.9.b	x		1
8.W.D			
8.W.D.10	x		1
8.L			
8.L.A			
8.L.A.1			
8.L.A.1.a			1
8.L.A.1.b			1
8.L.A.1.c			1
8.L.A.1.d			
8.L.A.2			
8.L.A.2.a			1
8.L.A.2.b			1
8.L.A.2.c			
8.L.B			
8.L.B.3			
8.L.B.3.a			1
8.L.C			
8.L.C.4			
8.L.C.4.a		1	
8.L.C.4.b			
8.L.C.4.c			
8.L.C.4.d			
8.L.C.5			
8.L.C.5.a			
8.L.C.5.b			1

Table F5
Porportion of standards represented in MCAS - ELA Grade 8

	Total Standards	Items	Rubric	Represented	Percent
ALL STANDARDS					
Literature	10	7	0	7	70%
Information	10	3	0	3	30%
Writing	25	0	24	24	96%
Language	14	1	7	8	57%
	59	11	31	42	71%
ASSESSED STANDARDS ONLY					
Literature	9	7	0	7	78%
Information	9	3	0	3	33%
Writing	18	0	18	18	100%
Language	14	1	7	8	57%
	50	11	25	36	72%

Key:

x   Standards that MCAS is not designed to assess

1   Standards represented in MCAS by either an item or a criterion in the scoring rubrics

Appendix S—Boston College Content Alignment Study   **65**

Appendix G - Summary of Panel Decisions Math Grade 3

Table G1: Evaluation of DOK for each standard

Table G2: Evaluation of DOK for each item

Table G3: Evaluation of Standards Associated with each item

Table G4: Representation of Standards in MCAS

Table G5: Porportion of standards represented in MCAS

Table G1
Evaluation of DOK for each standard - Math Grade 3

Standard	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2n DOK
3.OA	-	0	-		-	0	-	
3.OA.A	-	0	-		-	0	-	
3.OA.A.1	YES	7	2		YES	7	2	
3.OA.A.2	YES	7	2		YES	7	2	
3.OA.A.3	YES	6	2		YES	6	2	
3.OA.A.4	YES	6	1		YES	8	1	
3.OA.B	-	0	-		-	0	-	
3.OA.B.5	NO	5	2		YES	8	2	
3.OA.B.6	YES	6	1		YES	8	1	
3.OA.C	-	0	-		-	0	-	
3.OA.C.7	YES	8	1		YES	8	1	
3.OA.D	-	0	-		-	0	-	
3.OA.D.8	YES	6	3		YES	6	3	
3.OA.D.9	NO	5	3		YES	8	3	
3.NBT	-	0	-		-	0	-	
3.NBT.A	-	0	-		-	0	-	
3.NBT.A.1	YES	8	1		YES	8	1	
3.NBT.A.2	YES	7	1		YES	7	1	
3.NBT.A.3	NO	5	1		YES	8	2	
3.NF	-	0	-		-	0	-	
3.NF.A	-	0	-		-	0	-	
3.NF.A.1	YES	7	1		YES	7	1	
3.NF.A.2	-	0	-		-	0	-	
3.NF.A.2.a	NO	4	1		YES	8	2	
3.NF.A.2.b	NO	5	2		YES	8	2	
3.NF.A.3	-	0	-		-	0	-	
3.NF.A.3.a	NO	5	1		YES	8	1	
3.NF.A.3.b	YES	6	2		YES	8	3	
3.NF.A.3.c	YES	6	1		YES	8	1	
3.NF.A.3.d	NO	4	2		YES	7	3	
3.MD	-	0	-		-	0	-	
3.MD.A	-	0	-		-	0	-	
3.MD.A.1	YES	8	2		YES	8	2	
3.MD.A.2	YES	8	2		YES	8	2	
3.MD.B	-	0	-		-	0	-	
3.MD.B.3	NO	5	2		YES	7	3	
3.MD.B.4	NO	4	2		YES	8	3	
3.MD.C	-	0	-		-	0	-	
3.MD.C.5	-	0	-		-	0	-	
3.MD.C.5.a	YES	8	1		YES	8	1	
3.MD.C.5.b	YES	7	1		YES	7	1	
3.MD.C.6	YES	8	1		YES	8	1	
3.MD.C.7	-	0	-		-	0	-	
3.MD.C.7.a	YES	8	2		YES	8	2	
3.MD.C.7.b	NO	4	2		YES	8	2	
3.MD.C.7.c	YES	6	2		YES	8	2	
3.MD.C.7.d	YES	6	2		YES	8	2	
3.MD.D	-	0	-		-	0	-	
3.MD.D.8	NO	5	2		YES	8	2	
3.G	-	0	-		-	0	-	
3.G.A	-	0	-		-	0	-	
3.G.A.1	YES	6	2		YES	8	2	
3.G.A.2	NO	4	1		YES	7	1	
Total	33				33			
Consensus	21				33			
% Consensus	64%				100%			

Table G2
Evaluation of DOK for each item - Math Grade 3

Item	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
1	YES	8	1		YES	8	1	
2	YES	6	1		YES	6	1	
3	NO	5	1		YES	8	1	
4	YES	7	1		YES	7	1	
5	YES	6	1		YES	6	1	
6	YES	7	1		YES	7	1	
7	YES	6	3		YES	6	3	
8	YES	8	1		YES	7	1	
9	NO	4	1	2	YES	8	2	
10	NO	5	3		YES	8	3	
11	NO	5	2		YES	8	2	
12	NO	4	2		YES	7	2	
13	NO	5	1		YES	8	1	
14	YES	6	2		YES	6	2	
15	YES	8	1		YES	8	1	
16	YES	6	3		YES	6	3	
17	YES	7	2		YES	7	2	
18	NO	4	1	2	YES	7	2	
19	NO	5	1		YES	8	1	
20	NO	4	1	2	YES	8	2	
21	YES	8	1		YES	8	1	
22	YES	7	1		YES	7	1	
23	YES	8	1		YES	8	1	
24	YES	8	1		YES	8	1	
25	YES	8	1		YES	8	1	
26	NO	5	2		NO	4	1	2
27	YES	6	3		NO	5	3	
28	YES	6	1		YES	7	1	
29	YES	6	2		YES	6	2	
30	NO	5	2		YES	8	2	
31	YES	8	1		YES	8	1	
32	YES	7	1		YES	7	1	
33	NO	5	1		YES	8	1	
34	YES	6	2		NO	5	2	
Total	34				34			
Consensus	22				31			
% Consensus	65%				91%			

Table G3
Evaluation of Standards Associated with each item - Math Grade 3

Item	Initial Round				Final Round			
	Consensus	Reviewers	Standard	2nd Stdrd	Consensus	Reviewers	Standard	2nd Stdrd
1	NO	5	3.MD.C.6		YES	8	3.MD.C.6	
2	YES	6	3.NF.A.3.a		YES	6	3.NF.A.3.a	
3	YES	8	3.G.A.1		YES	8	3.G.A.1	
4	YES	7	3.MD.B.4		YES	7	3.MD.B.4	
5	YES	7	3.OA.A.3		YES	7	3.OA.A.3	
6	YES	7	3.NF.A.1		YES	7	3.NF.A.1	
7	YES	7	3.NBT.A.1		YES	7	3.NBT.A.1	
8	NO	4	3.OA.A.4		YES	8	3.OA.A.4	
9	YES	8	3.MD.A.1		YES	7	3.MD.A.1	
10	NO	4	3.OA.A.3		YES	6	3.OA.A.3	
11	YES	8	3.NBT.A.2		YES	8	3.NBT.A.2	
12	YES	8	3.MD.A.2		YES	8	3.MD.A.2	
13	NO	5	3.OA.C.7		YES	8	3.OA.C.7	
14	YES	7	3.MD.D.8		YES	7	3.MD.D.8	
15	YES	8	3.NBT.A.1		YES	8	3.NBT.A.1	
16	YES	7	3.NF.A.3.d		YES	7	3.NF.A.3.d	
17	NO	5	3.OA.A.1		YES	8	3.OA.A.1	
18	YES	8	3.MD.D.8		YES	8	3.MD.D.8	
19	NO	5	3.NF.A.3.b		YES	8	3.NF.A.3.b	
20	YES	8	3.MD.B.3		YES	8	3.MD.B.3	
21	YES	6	3.NF.A.2.b		YES	6	3.NF.A.2.b	
22	YES	8	3.G.A.1		YES	8	3.G.A.1	
23	NO	5	3.OA.A.4		YES	8	3.OA.A.4	
24	YES	8	3.NF.A.1		YES	8	3.NF.A.1	
25	YES	8	3.NBT.A.2		YES	8	3.NBT.A.2	
26	YES	8	3.OA.B.5		YES	8	3.OA.B.5	
27	NO	5	3.MD.C.7.b		YES	7	3.MD.C.7.b	
28	NO	5	3.OA.C.7		YES	8	3.OA.C.7	
29	YES	8	3.OA.D.8		YES	8	3.OA.D.8	
30	YES	6	3.OA.A.1		YES	6	3.OA.A.1	
31	NO	4	3.NF.A.1	3.G.A.2	YES	7	3.G.A.2	
32	YES	8	3.OA.C.7		YES	8	3.OA.C.7	
33	NO	4	3.OA.A.3		YES	8	3.NBT.A.3	
34	YES	8	3.OA.D.9		YES	8	3.OA.D.9	
Total	34				34			
Consensus	23				34			
% Consensus	68%				100%			

Table G4
Representation of Standards in MCAS - Math Grade 3

Standard	Represented
3.OA	
3.OA.A	
3.OA.A.1	1
3.OA.A.2	
3.OA.A.3	1
3.OA.A.4	1
3.OA.B	
3.OA.B.5	
3.OA.B.6	
3.OA.C	
3.OA.C.7	1
3.OA.D	
3.OA.D.8	
3.OA.D.9	
3.NBT	
3.NBT.A	
3.NBT.A.1	1
3.NBT.A.2	1
3.NBT.A.3	
3.NF	
3.NF.A	
3.NF.A.1	1
3.NF.A.2	
3.NF.A.2.a	
3.NF.A.2.b	1
3.NF.A.3	
3.NF.A.3.a	1
3.NF.A.3.b	1
3.NF.A.3.c	
3.NF.A.3.d	1
3.MD	
3.MD.A	
3.MD.A.1	1
3.MD.A.2	1
3.MD.B	
3.MD.B.3	1
3.MD.B.4	1
3.MD.C	
3.MD.C.5	
3.MD.C.5.a	
3.MD.C.5.b	
3.MD.C.6	1
3.MD.C.7	
3.MD.C.7.a	
3.MD.C.7.b	
3.MD.C.7.c	
3.MD.C.7.d	
3.MD.D	
3.MD.D.8	1
3.G	
3.G.A	
3.G.A.1	1
3.G.A.2	

Table G5
Porportion of standards represented in MCAS - Math Grade 3

Strand	Code	Total Standards	Represented	Percent
Operations and Algebraic Thinking	OA	9	4	44%
Numbers and Operations in Base Ten	NBT	3	2	67%
Numbers and Operations Fractions	NF	7	5	71%
Measurement and Data	MD	12	6	50%
Geometry	G	2	1	50%
		33	18	55%

Appendix H - Summary of Panel Decisions Math Grade 4

Table H1: Evaluation of DOK for each standard

Table H2: Evaluation of DOK for each item

Table H3: Evaluation of Standards Associated with each item

Table H4: Representation of Standards in MCAS

Table H5: Porportion of standards represented in MCAS

Table H1
Evaluation of DOK for each standard - Math Grade 4

Standard	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
4.OA	-	0	-		-	0	-	
4.OA.A	-	0	-		-	0	-	
4.OA.A.1	NO	4	1	2	NO	4	1	2
4.OA.A.2	NO	5	2		YES	8	2	
4.OA.A.3	YES	6	3		NO	4	2	3
4.OA.B	-	0	-		-	0	-	
4.OA.B.4	NO	4	1	2	YES	8	2	
4.OA.C	-	0	-		-	0	-	
4.OA.C.5	YES	6	2		YES	6	2	
4.NBT	-	0	-		-	0	-	
4.NBT.A	-	0	-		-	0	-	
4.NBT.A.1	NO	5	1		YES	8	1	
4.NBT.A.2	YES	7	1		YES	7	1	
4.NBT.A.3	YES	8	1		YES	8	1	
4.NBT.B	-	0	-		-	0	-	
4.NBT.B.4	YES	8	1		YES	8	1	
4.NBT.B.5	YES	7	2		YES	7	2	
4.NBT.B.6	YES	8	1		YES	8	1	
4.NBT.B.7	YES	7	2		YES	7	2	
4.NF	-	0	-		-	0	-	
4.NF.A	-	0	-		-	0	-	
4.NF.A.1	NO	4	3		YES	7	3	
4.NF.A.2	NO	4	2	3	YES	8	3	
4.NF.B	-	0	-		-	0	-	
4.NF.B.3	-	0	-		-	0	-	
4.NF.B.3.a	NO	5	1		YES	8	1	
4.NF.B.3.b	NO	5	2		YES	6	2	
4.NF.B.3.c	NO	5	2		YES	6	2	
4.NF.B.3.d	YES	6	2		YES	6	2	
4.NF.B.4	-	0	-		-	0	-	
4.NF.B.4.a	YES	8	1		YES	8	1	
4.NF.B.4.b	NO	5	2		NO	5	2	
4.NF.B.4.c	YES	6	2		YES	6	2	
4.NF.C	-	0	-		-	0	-	
4.NF.C.5	NO	5	1		YES	6	2	
4.NF.C.6	YES	8	1		YES	8	1	
4.NF.C.7	NO	5	3		YES	8	3	
4.MD	-	0	-		-	0	-	
4.MD.A	-	0	-		-	0	-	
4.MD.A.1	NO	4	1	2	YES	8	2	
4.MD.A.2	YES	8	2		YES	8	2	
4.MD.A.3	NO	4	1	2	YES	8	2	
4.MD.B	-	0	-		-	0	-	
4.MD.B.4	YES	7	2		YES	7	2	
4.MD.C	-	0	-		-	0	-	
4.MD.C.5	-	0	-		-	0	-	
4.MD.C.5.a	YES	6	1		YES	8	1	
4.MD.C.5.b	YES	8	1		YES	8	1	
4.MD.C.6	NO	4	1	2	YES	8	2	
4.MD.C.7	YES	7	2		YES	7	2	
4.G	-	0	-		-	0	-	
4.G.A	-	0	-		-	0	-	
4.G.A.1	YES	6	1		YES	6	1	
4.G.A.2	YES	7	2		YES	7	2	
4.G.A.3	YES	6	1		YES	7	2	
Total	35				35			
Consensus	20				32			
% Consensus	57%				91%			

Table H2
Evaluation of DOK for each item - Math Grade 4

Item	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
1	YES	8	1		YES	8	1	
2	YES	6	1		YES	7	1	
3	YES	7	1		YES	7	1	
4	YES	8	1		YES	8	1	
5	YES	6	2		YES	6	2	
6	NO	5	2		NO	5	2	
7	YES	8	1		YES	8	1	
8	YES	8	1		YES	8	1	
9	YES	8	1		YES	8	1	
10	YES	7	3		YES	7	3	
11	YES	7	1		YES	7	1	
12	NO	5	2		YES	7	2	
13	NO	4	1	2	YES	8	1	
14	YES	8	1		YES	8	1	
15	NO	5	2		YES	8	2	
16	YES	8	1		YES	8	1	
17	YES	6	3		YES	6	3	
18	NO	5	1		NO	5	2	
19	YES	6	2		YES	6	2	
20	NO	5	1		YES	7	2	
21	YES	7	1		YES	7	1	
22	YES	7	1		YES	7	1	
23	YES	6	1		YES	6	1	
24	YES	8	2		YES	8	2	
25	NO	5	2		YES	8	2	
26	YES	6	1		YES	6	1	
27	NO	5	1		YES	7	1	
28	YES	7	3		YES	7	3	
29	YES	6	1		YES	6	1	
30	YES	6	1		YES	6	1	
31	YES	8	1		YES	8	1	
32	NO	4	1	2	YES	7	2	
33	YES	8	1		YES	8	1	
34	YES	6	2		YES	6	2	
Total	34				34			
Consensus	25				32			
% Consensus	74%				94%			

Table H3
Evaluation of Standards Associated with each item - Math Grade 4

Item		Initial Round				Final Round		
	Consensus	Reviewers	Standard	2nd Stdrd	Consensus	Reviewers	Standard	2nd Stdrd
1	YES	6	4.G.A.1		YES	6	4.G.A.1	
2	NO	4	4.OA.A.2		NO	5	4.OA.A.2	
3	NO	3	4.NF.B.3.b		YES	8	4.NF.B.3.b	
4	YES	7	4.NBT.B.5		YES	7	4.NBT.B.5	
5	YES	8	4.G.A.3		YES	8	4.G.A.3	
6	YES	8	4.OA.A.3		YES	8	4.OA.A.3	
7	YES	8	4.NBT.A.2		YES	8	4.NBT.A.2	
8	YES	8	4.MD.A.1		YES	8	4.MD.A.1	
9	YES	8	4.NBT.B.5		YES	8	4.NBT.B.5	
10	YES	8	4.OA.A.3		YES	8	4.OA.A.3	
11	NO	4	4.G.A.1		YES	8	4.G.A.1	
12	YES	6	4.NF.B.4.b		YES	6	4.NF.B.4.b	
13	YES	8	4.MD.A.3		YES	7	4.MD.A.3	
14	YES	8	4.NBT.B.4		YES	8	4.NBT.B.4	
15	YES	7	4.MD.C.7		YES	7	4.MD.C.7	
16	YES	7	4.NBT.B.7		YES	7	4.NBT.B.7	
17	NO	5	4.OA.A.3		YES	8	4.MD.A.2	
18	YES	8	4.NF.A.2		YES	8	4.NF.A.2	
19	YES	6	4.NF.B.3.d		YES	6	4.NF.B.3.d	
20	YES	8	4.NF.C.7		YES	8	4.NF.C.7	
21	YES	8	4.G.A.3		YES	8	4.G.A.3	
22	NO	4	4.NBT.B.5		YES	8	4.NBT.B.5	
23	YES	6	4.NF.B.4.c		YES	6	4.NF.B.4.c	
24	YES	8	4.OA.A.3		YES	8	4.OA.A.3	
25	NO	5	4.OA.A.3		YES	7	4.MD.A.2	
26	YES	7	4.G.A.1		YES	7	4.G.A.1	
27	NO	4	4.NF.A.1		YES	8	4.NF.A.1	
28	YES	7	4.OA.B.4		YES	7	4.OA.B.4	
29	YES	7	4.MD.C.6		YES	7	4.MD.C.6	
30	YES	8	4.NF.B.4.b		YES	8	4.NF.B.4.b	
31	YES	8	4.NBT.B.4		YES	8	4.NBT.B.4	
32	YES	8	4.G.A.2		YES	8	4.G.A.2	
33	YES	8	4.NBT.B.7		YES	8	4.NBT.B.7	
34	YES	7	4.MD.C.7		YES	7	4.MD.C.7	
Total	34				34			
Consensus	27				33			
% Consensus	79%				97%			

Table H4
Representation of Standards in MCAS - Math Grade 4

Standard	Represented
4.OA	
4.OA.A	
4.OA.A.1	
4.OA.A.2	1
4.OA.A.3	1
4.OA.B	
4.OA.B.4	
4.OA.C	
4.OA.C.5	
4.NBT	
4.NBT.A	
4.NBT.A.1	
4.NBT.A.2	1
4.NBT.A.3	
4.NBT.B	
4.NBT.B.4	1
4.NBT.B.5	1
4.NBT.B.6	
4.NBT.B.7	1
4.NF	
4.NF.A	
4.NF.A.1	
4.NF.A.2	1
4.NF.B	
4.NF.B.3	
4.NF.B.3.a	
4.NF.B.3.b	1
4.NF.B.3.c	
4.NF.B.3.d	1
4.NF.B.4	
4.NF.B.4.a	
4.NF.B.4.b	1
4.NF.B.4.c	1
4.NF.C	
4.NF.C.5	
4.NF.C.6	
4.NF.C.7	1
4.MD	
4.MD.A	
4.MD.A.1	1
4.MD.A.2	1
4.MD.A.3	1
4.MD.B	
4.MD.B.4	
4.MD.C	
4.MD.C.5	
4.MD.C.5.a	
4.MD.C.5.b	
4.MD.C.6	
4.MD.C.7	1
4.G	
4.G.A	
4.G.A.1	1

Table H5
Porportion of standards represented in MCAS - Math Grade 4

Strand	Code	Total Standards	Represented	Percent
Operations and Algebraic Thinking	OA	5	2	40%
Numbers and Operations in Base Ten	NBT	7	4	57%
Numbers and Operations Fractions	NF	12	6	50%
Measurement and Data	MD	8	4	50%
Geometry	G	1	1	100%
		33	17	52%

Appendix I - Summary of Panel Decisions Math Grade 5

Table I1
Evaluation of DOK for each standard - Math Grade 5

Standard	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
5.OA	-	0	-		-	0	-	
5.OA.A	-	0	-		-	0	-	
5.OA.A.1	NO	5	1		YES	8	1	
5.OA.A.2	YES	8	2		YES	8	2	
5.OA.B	-	0	-		-	0	-	
5.OA.B.3	YES	6	2		YES	8	2	
5.NBT	-	0	-		-	0	-	
5.NBT.A	-	0	-		-	0	-	
5.NBT.A.1	YES	6	1		YES	8	1	
5.NBT.A.2	NO	4	2		YES	8	3	
5.NBT.A.3	-	0	-		-	0	-	
5.NBT.A.3.a	YES	8	1		YES	8	1	
5.NBT.A.3.b	YES	6	1		YES	8	1	
5.NBT.A.4	YES	8	1		YES	8	1	
5.NBT.B	-	0	-		-	0	-	
5.NBT.B.5	YES	8	1		YES	8	1	
5.NBT.B.6	YES	6	3		YES	8	3	
5.NBT.B.7	NO	5	3		YES	8	3	
5.NF	-	0	-		-	0	-	
5.NF.A	-	0	-		-	0	-	
5.NF.A.1	NO	4	1	2	NO	4	1	2
5.NF.A.2	YES	6	2		NO	5	2	
5.NF.B	-	0	-		-	0	-	
5.NF.B.3	YES	8	2		YES	7	2	
5.NF.B.4	-	0	-		-	0	-	
5.NF.B.4.a	NO	5	2		YES	6	2	
5.NF.B.4.b	NO	5	2		YES	6	2	
5.NF.B.5	-	0	-		-	0	-	
5.NF.B.5.a	YES	6	2		YES	8	2	
5.NF.B.5.b	YES	7	3		YES	7	3	
5.NF.B.6	YES	8	2		YES	8	2	
5.NF.B.7	-	0	-		-	0	-	
5.NF.B.7.a	YES	7	2		YES	7	2	
5.NF.B.7.b	YES	6	2		YES	7	2	
5.NF.B.7.c	YES	8	2		YES	8	2	
5.NS	-	0	-		-	0	-	
5.NS.A	-	0	-		-	0	-	
5.NS.A.1	NO	5	1		YES	8	1	
5.MD	-	0	-		-	0	-	
5.MD.A	-	0	-		-	0	-	
5.MD.A.1	YES	8	2		YES	8	2	
5.MD.B	-	0	-		-	0	-	
5.MD.B.2	YES	8	2		YES	8	2	
5.MD.C	-	0	-		-	0	-	
5.MD.C.3	-	0	-		-	0	-	
5.MD.C.3.a	YES	8	1		YES	8	1	
5.MD.C.3.b	YES	8	1		YES	8	1	
5.MD.C.4	YES	7	1		YES	7	1	
5.MD.C.5	-	0	-		-	0	-	
5.MD.C.5.a	YES	7	2		YES	7	2	
5.MD.C.5.b	YES	7	2		YES	7	2	
5.MD.C.5.c	YES	8	2		YES	8	2	
5.G	-	0	-		-	0	-	
5.G.A	-	0	-		-	0	-	
5.G.A.1	YES	6	1		YES	8	1	
5.G.A.2	YES	8	2		YES	8	2	
5.G.B	-	0	-		-	0	-	
5.G.B.3	YES	7	1		YES	7	1	
5.G.B.4	YES	8	2		YES	8	2	
Total	35				35			
Consensus	28				33			
% Consensus	80%				94%			

Table 12
Evaluation of DOK for each item - Math Grade 5

Item	Initial Round				Final Round			
	Consensus	How many	What DOK	2d DOK	Consensus	How many	What DOK	2nd DOK
1	YES	6	2		YES	6	2	
2	YES	7	2		YES	7	2	
3	YES	8	1		YES	8	1	
4	YES	8	1		YES	8	1	
5	YES	8	1		YES	8	1	
6	YES	6	2		YES	6	2	
7	YES	8	1		YES	8	1	
8	YES	7	2		YES	7	2	
9	NO	5	1		YES	6	2	
10	NO	5	3		YES	8	3	
11	YES	8	1		YES	8	1	
12	NO	4	2	3	YES	7	3	
13	YES	8	1		YES	8	1	
14	YES	8	2		YES	8	2	
15	YES	8	1		YES	8	1	
16	YES	6	1		YES	6	1	
17	YES	7	3		YES	7	3	
18	YES	8	1		YES	8	1	
19	NO	4	1	2	YES	7	2	
20	YES	6	1		YES	6	1	
21	NO	4	1	2	YES	6	2	
22	NO	5	1		YES	8	1	
23	YES	8	2		YES	8	2	
24	NO	5	1		YES	8	1	
25	YES	7	2		YES	7	2	
26	YES	8	1		YES	8	1	
27	YES	8	1		YES	8	1	
28	YES	8	3		YES	8	3	
29	YES	8	1		YES	8	1	
30	NO	4	1	2	YES	8	1	
31	YES	7	1		YES	7	1	
32	YES	8	1		YES	8	1	
33	YES	6	2		YES	6	2	
34	YES	7	2		YES	7	2	
Total	34				34			
Consensus	26				34			
% Consensus	76%				100%			

Table 13
Evaluation of Standards Associated with each item - Math Grade 5

Item	Initial Round				Final Round			
	Consensus	Reviewers	Standard	2nd Stdrd	Consensus	Reviewers	Standard	2nd Stdrd
1	NO	5	5.G.A.2		YES	8	5.G.A.2	
2	YES	8	5.OA.B.3		YES	8	5.OA.B.3	
3	YES	8	5.OA.A.1		YES	8	5.OA.A.1	
4	YES	8	5.NBT.B.5		YES	8	5.NBT.B.5	
5	YES	8	5.NBT.A.3.a		YES	8	5.NBT.A.3.a	
6	YES	7	5.MD.C.5.c		YES	7	5.MD.C.5.c	
7	YES	8	5.OA.A.1		YES	8	5.OA.A.1	
8	NO	4	5.NBT.A.3.b		YES	6	5.NBT.A.3.b	
9	YES	7	5.NF.B.4.b		YES	7	5.NF.B.4.b	
10	YES	6	5.NBT.B.6		YES	6	5.NBT.B.6	
11	YES	8	5.NF.A.1		YES	8	5.NF.A.1	
12	YES	7	5.NF.A.2		YES	7	5.NF.A.2	
13	YES	7	5.NF.B.4.a		YES	7	5.NF.B.4.a	
14	YES	8	5.OA.B.3		YES	8	5.OA.B.3	
15	NO	5	5.G.A.1		NO	5	5.G.A.1	
16	NO	3	5.NF.B.5.a		YES	7	5.NF.B.5.a	
17	YES	6	5.MD.C.5.c		YES	6	5.MD.C.5.c	
18	YES	8	5.NBT.A.4		YES	8	5.NBT.A.4	
19	NO	5	5.OA.A.2		YES	8	5.OA.A.2	
20	NO	4	5.NBT.B.6		YES	8	5.NF.B.3	
21	NO	5	5.NF.B.7.c		YES	8	5.NF.B.7.c	
22	NO	5	5.NF.B.7.c		YES	8	5.NF.B.7.c	
23	YES	6	5.OA.A.2		YES	6	5.OA.A.2	
24	YES	6	5.G.B.3		YES	6	5.G.B.3	
25	YES	6	5.NF.A.2		YES	6	5.NF.A.2	
26	YES	8	5.OA.A.1		YES	8	5.OA.A.1	
27	YES	6	5.NBT.A.2		YES	6	5.NBT.A.2	
28	NO	3	5.MD.C.5.b		YES	8	5.MD.C.5.b	5.MD.C.4
29	YES	8	5.OA.A.1		YES	8	5.OA.A.1	
30	YES	7	5.OA.B.3		YES	7	5.OA.B.3	
31	YES	8	5.NBT.B.7		YES	8	5.NBT.B.7	
32	YES	7	5.G.A.1		YES	7	5.G.A.1	
33	YES	6	5.NF.B.6		YES	6	5.NF.B.6	
34	YES	6	5.NF.B.3		YES	6	5.NF.B.3	
Total	34				34			
Consensus	25				33			
% Consensus	74%				97%			

Table I4
Representation of Standards in MCAS - Math Grade 5

Standard	Represented
5.OA	
5.OA.A	
5.OA.A.1	1
5.OA.A.2	1
5.OA.B	
5.OA.B.3	1
5.NBT	
5.NBT.A	
5.NBT.A.1	
5.NBT.A.2	
5.NBT.A.3	
5.NBT.A.3.a	1
5.NBT.A.3.b	1
5.NBT.A.4	1
5.NBT.B	
5.NBT.B.5	1
5.NBT.B.6	1
5.NBT.B.7	
5.NF	
5.NF.A	
5.NF.A.1	1
5.NF.A.2	1
5.NF.B	
5.NF.B.3	1
5.NF.B.4	
5.NF.B.4.a	1
5.NF.B.4.b	1
5.NF.B.5	
5.NF.B.5.a	1
5.NF.B.5.b	
5.NF.B.6	
5.NF.B.7	
5.NF.B.7.a	
5.NF.B.7.b	
5.NF.B.7.c	1
5.NS	
5.NS.A	
5.NS.A.1	
5.MD	
5.MD.A	
5.MD.A.1	
5.MD.B	
5.MD.B.2	
5.MD.C	
5.MD.C.3	
5.MD.C.3.a	
5.MD.C.3.b	
5.MD.C.4	
5.MD.C.5	
5.MD.C.5.a	
5.MD.C.5.b	
5.MD.C.5.c	1
5.G	
5.G.A	
5.G.A.1	1
5.G.A.2	
5.G.B	
5.G.B.3	1
5.G.B.4	

Table I5
Porportion of standards represented in MCAS - Math Grade 5

Strand	Code	Total Standards	Represented	Percent
Operations and Algebraic Thinking	OA	3	3	100%
Numbers and Operations in Base Ten	NBT	8	5	63%
Numbers and Operations Fractions	NF	11	7	64%
The Number System	NS	1	0	0%
Measurement and Data	MD	8	1	13%
Geometry	G	4	2	50%
		35	18	51%

Appendix J - Summary of Panel Decisions Math Grade 6

Table J1: Evaluation of DOK for each standard

Table J2: Evaluation of DOK for each item

Table J3: Evaluation of Standards Associated with each item

Table J4: Representation of Standards in MCAS

Table J5: Porportion of standards represented in MCAS

Table J1
Evaluation of DOK for each standard - Math Grade 6

Standard	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
6.RP	-	0	-		-	0	-	
6.RP.A	-	0	-		-	0	-	
6.RP.A.1	NO	5	1		YES	7	1	
6.RP.A.2	NO	5	2		YES	8	1	
6.RP.A.3	-	0	-		-	0	-	
6.RP.A.3.a	YES	7	2		YES	7	2	
6.RP.A.3.b	YES	6	2		YES	8	2	
6.RP.A.3.c	NO	5	2		YES	9	2	
6.RP.A.3.d	NO	5	2		YES	7	2	
6.RP.A.3.e	YES	7	2		YES	8	2	
6.NS	-	0	-		-	0	-	
6.NS.A	-	0	-		-	0	-	
6.NS.A.1	NO	5	2		YES	8	3	
6.NS.B	-	0	-		-	0	-	
6.NS.B.2	YES	9	1		YES	9	1	
6.NS.B.3	YES	8	1		YES	8	1	
6.NS.B.4	-	0	-		-	0	-	
6.NS.B.4.a	YES	7	2		YES	8	2	
6.NS.C	-	0	-		-	0	-	
6.NS.C.5	YES	6	2		YES	8	2	
6.NS.C.6	-	0	-		-	0	-	
6.NS.C.6.a	YES	9	1		YES	9	1	
6.NS.C.6.b	YES	6	2		YES	7	2	
6.NS.C.6.c	YES	7	1		YES	9	1	
6.NS.C.7	-	0	-		-	0	-	
6.NS.C.7.a	NO	5	2		YES	9	1	
6.NS.C.7.b	YES	7	2		YES	8	2	
6.NS.C.7.c	NO	5	2		YES	8	2	
6.NS.C.7.d	YES	6	2		YES	9	2	
6.NS.C.8	YES	7	2		YES	9	2	
6.EE	-	0	-		-	0	-	
6.EE.A	-	0	-		-	0	-	
6.EE.A.1	YES	8	1		YES	8	1	
6.EE.A.2	-	0	-		-	0	-	
6.EE.A.2.a	NO	5	1		NO	5	2	
6.EE.A.2.b	YES	7	1		YES	7	1	
6.EE.A.2.c	NO	5	1		YES	7	1	
6.EE.A.3	NO	4	1	2	YES	7	1	
6.EE.A.4	YES	6	1		YES	9	1	
6.EE.B	-	0	-		-	0	-	
6.EE.B.5	NO	4	2		NO	5	2	
6.EE.B.6	YES	7	2		YES	7	2	
6.EE.B.7	YES	7	2		YES	7	2	
6.EE.B.8	NO	5	2		YES	8	2	
6.EE.C	-	0	-		-	0	-	
6.EE.C.9	YES	9	3		YES	9	3	
6.G	-	0	-		-	0	-	
6.G.A	-	0	-		-	0	-	
6.G.A.1	YES	8	2		YES	8	2	
6.G.A.2	YES	6	2		YES	8	2	
6.G.A.3	YES	6	2		YES	8	2	
6.G.A.4	YES	6	2		YES	9	2	
6.G.A.5	NO	5	1		YES	8	1	
6.G.A.6	YES	7	2		YES	7	2	
6.SP	-	0	-		-	0	-	
6.SP.A	-	0	-		-	0	-	
6.SP.A.1	YES	6	1		YES	8	1	
6.SP.A.2	YES	7	2		YES	7	2	
6.SP.A.3	YES	7	2		YES	7	2	
6.SP.B	-	0	-		-	0	-	
6.SP.B.4	NO	5	1		YES	9	1	
6.SP.B.5	YES	7	2		YES	7	2	
6.SP.B.6	-	0	-		-	0	-	
6.SP.B.6.a	YES	9	1		YES	9	1	
6.SP.B.6.b	NO	5	2		NO	5	2	
6.SP.B.6.c	YES	6	3		YES	8	3	
6.SP.B.6.d	NO	5	3		YES	9	3	
Total	46				46			
Consensus	30				43			
% Consensus	65%				93%			

Table J2
Evaluation of DOK for each item - Math Grade 6

Item	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
1	NO	4	2		NO	5	1	
2	YES	5	2		YES	7	2	
3	YES	5	1		YES	7	1	
4	YES	7	1		YES	9	1	
5	YES	5	1		YES	7	1	
6	YES	7	1		YES	9	1	
7	NO	4	2		YES	9	2	
8	NO	4	2		YES	7	2	
9	NO	3	2	3	YES	7	2	
10	NO	4	1		NO	5	1	
11	YES	6	1		YES	7	1	
12	NO	4	3		NO	5	3	
13	NO	4	2		YES	8	1	
14	NO	4	2		YES	7	2	
15	NO	4	1		YES	7	1	
16	YES	7	1		YES	8	1	
17	YES	5	1		YES	6	1	
18	NO	4	1		NO	5	2	
19	YES	5	1		NO	5	1	
20	YES	5	1		NO	4	1	
21	NO	4	3		YES	6	2	
22	YES	7	2		YES	9	2	
23	YES	6	1		YES	7	1	
24	YES	6	3		YES	6	3	
25	NO	4	1		YES	6	1	
26	NO	4	1		YES	7	1	
27	YES	7	2		YES	9	2	
28	YES	7	1		YES	9	1	
29	NO	4	1		YES	6	2	
30	YES	6	1		YES	6	1	
31	YES	5	2		YES	7	2	
32	YES	5	2		YES	7	2	
33	NO	4	1		YES	7	1	
34	YES	5	3		NO	5	3	
Total	34				34			
Consensus	19				27			
% Consensus	56%				79%			

Table J3
Evaluation of Standards Associated with each item - Math Grade 6

Item	Initial Round				Final Round			
	Consensus	Reviewers	Standard	2nd Stdrd	Consensus	Reviewers	Standard	2nd Stdrd
1	YES	6	6.SP.B.5		YES	9	6.SP.B.5	
2	NO	2	6.EE.B.5		NO	2	6.EE.C.9	
3	NO	3	6.G.A.3		YES	9	6.G.A.3	
4	NO	4	6.EE.A.3		YES	7	6.EE.A.3	
5	YES	6	6.SP.B.4		YES	9	6.SP.B.4	
6	YES	6	6.NS.B.2		YES	8	6.NS.B.2	
7	YES	5	6.RP.A.3.b		YES	6	6.RP.A.3.b	6.NS.B.3
8	NO	3	6.EE.A.2.a	6.EE.B.6	YES	7	6.EE.B.6	
9	NO	4	6.G.A.5		YES	8	6.G.A.5	
10	YES	6	6.G.A.4		YES	9	6.G.A.4	
11	YES	6	6.NS.B.3		YES	7	6.NS.B.3	
12	YES	6	6.NS.A.1		YES	7	6.NS.A.1	
13	NO	3	6.EE.B.7		YES	9	6.EE.B.5	
14	NO	4	6.SP.B.6.c		YES	8	6.SP.B.6.c	
15	NO	2	6.EE.A.2.c		YES	8	6.EE.A.2.c	
16	YES	5	6.EE.B.5		YES	6	6.EE.B.5	
17	YES	6	6.SP.B.6.c		YES	8	6.SP.B.6.c	
18	YES	6	6.RP.A.1		YES	8	6.RP.A.1	
19	YES	5	6.NS.C.5		YES	7	6.NS.C.5	
20	YES	5	6.EE.B.5		NO	4	6.EE.B.5	
21	NO	4	6.RP.A.3.b	6.EE.B.7	YES	7	6.RP.A.3.b	
22	NO	3	6.SP.A.2		YES	7	6.SP.A.2	
23	NO	3	6.EE.B.8		YES	9	6.EE.B.8	
24	NO	4	6.RP.A.3.b		YES	6	6.RP.A.3.b	
25	NO	3	6.EE.B.5		NO	3	6.EE.B.5	
26	YES	6	6.SP.B.5		YES	8	6.SP.B.5	
27	NO	4	6.RP.A.3.b		NO	4	6.RP.A.3.b	6.EE.B.7
28	YES	5	6.EE.A.1		YES	7	6.EE.A.1	
29	NO	2	6.SP.B.6.c		NO	2	6.RP.A.3.b	
30	NO	3	6.SP.B.6.a		NO	4	6.SP.B.4	
31	YES	6	6.RP.A.3.c		YES	7	6.RP.A.3.c	
32	YES	6	6.G.A.2		YES	9	6.G.A.2	
33	NO	3	6.EE.B.6		NO	4	6.EE.A.2.a	6.EE.B.6
34	YES	6	6.NS.A.1		YES	6	6.NS.A.1	
Total	34				34			
Consensus	17				27			
% Consensus	50%				79%			

Table J4
Representation of Standards in MCAS - Math Grade 6

Standard	Represented
6.RP	
6.RP.A	
6.RP.A.1	1
6.RP.A.2	
6.RP.A.3	
6.RP.A.3.a	
6.RP.A.3.b	1
6.RP.A.3.c	
6.RP.A.3.d	
6.RP.A.3.e	
6.NS	
6.NS.A	
6.NS.A.1	1
6.NS.B	
6.NS.B.2	1
6.NS.B.3	1
6.NS.B.4	
6.NS.B.4.a	
6.NS.C	
6.NS.C.5	1
6.NS.C.6	
6.NS.C.6.a	
6.NS.C.6.b	
6.NS.C.6.c	
6.NS.C.7	
6.NS.C.7.a	
6.NS.C.7.b	
6.NS.C.7.c	
6.NS.C.7.d	
6.NS.C.8	
6.EE	
6.EE.A	
6.EE.A.1	
6.EE.A.2	
6.EE.A.2.a	
6.EE.A.2.b	
6.EE.A.2.c	1
6.EE.A.3	1
6.EE.A.4	
6.EE.B	
6.EE.B.5	1
6.EE.B.6	1
6.EE.B.7	
6.EE.B.8	1
6.EE.C	
6.EE.C.9	1
6.G	
6.G.A	
6.G.A.1	
6.G.A.2	
6.G.A.3	1
6.G.A.4	1
6.G.A.5	1
6.G.A.6	
6.SP	
6.SP.A	
6.SP.A.1	
6.SP.A.2	1
6.SP.A.3	

Table J5
Porportion of standards represented in MCAS - Math Grade 6

Strand	Code	Total Standards	Represented	Percent
Rations and Proportional Relationships	RP	7	2	29%
The Number System	NS	13	4	31%
Expressions and Equations	EE	11	6	55%
Geometry	G	6	3	50%
Statistics and Probability	SP	3	1	33%
		40	16	40%

Appendix K - Summary of Panel Decisions Math Grade 7

Table K1: Evaluation of DOK for each standard

Table K2: Evaluation of DOK for each item

Table K3: Evaluation of Standards Associated with each item

Table K4: Representation of Standards in MCAS

Table K5: Porportion of standards represented in MCAS

Table K1
Evaluation of DOK for each standard - Math Grade 7

Standard	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
7.RP	-	0	-		-	0	-	
7.RP.A	-	0	-		-	0	-	
7.RP.A.1	YES	8	1		YES	8	1	
7.RP.A.2	-	0	-		-	0	-	
7.RP.A.2.a	YES	6	2		YES	6	2	
7.RP.A.2.b	NO	5	2		YES	7	1	
7.RP.A.2.c	NO	5	1		YES	7	2	
7.RP.A.2.d	NO	5	2		YES	7	2	
7.RP.A.3	NO	4	1		YES	9	2	
7.NS	-	0	-		-	0	-	
7.NS.A	-	0	-		-	0	-	
7.NS.A.1	-	0	-		-	0	-	
7.NS.A.1.a	YES	6	1		YES	6	1	
7.NS.A.1.b	YES	8	2		YES	8	2	
7.NS.A.1.c	YES	7	2		YES	7	2	
7.NS.A.1.d	YES	7	1		YES	7	1	
7.NS.A.2	-	0	-		-	0	-	
7.NS.A.2.a	NO	4	1		YES	8	2	
7.NS.A.2.b	NO	5	2		YES	8	2	
7.NS.A.2.c	YES	8	1		YES	8	1	
7.NS.A.2.d	YES	9	1		YES	9	1	
7.NS.A.3	NO	4	2		NO	5	3	
7.EE	-	0	-		-	0	-	
7.EE.A	-	0	-		-	0	-	
7.EE.A.1	YES	6	1		YES	6	1	
7.EE.A.2	NO	5	2		YES	7	3	
7.EE.B	-	0	-		-	0	-	
7.EE.B.3	YES	9	3		YES	9	3	
7.EE.B.4	-	0	-		-	0	-	
7.EE.B.4.a	NO	5	2		YES	7	2	
7.EE.B.4.b	YES	8	2		YES	8	2	
7.EE.B.4.c	NO	5	2		YES	8	3	
7.G	-	0	-		-	0	-	
7.G.A	-	0	-		-	0	-	
7.G.A.1	NO	5	2		YES	8	2	
7.G.A.2	YES	7	2		YES	7	2	
7.G.A.3	NO	5	2		YES	7	2	
7.G.B	-	0	-		-	0	-	
7.G.B.4	YES	6	1		YES	6	1	
7.G.B.5	YES	7	2		YES	7	2	
7.G.B.6	NO	4	2		YES	7	2	
7.G.B.7	YES	6	2		YES	6	2	
7.SP	-	0	-		-	0	-	
7.SP.A	-	0	-		-	0	-	
7.SP.A.1	NO	3	1	2 & 3	NO	5	2	
7.SP.A.2	YES	6	2		YES	6	2	
7.SP.B	-	0	-		-	0	-	
7.SP.B.3	NO	5	2		NO	5	3	
7.SP.B.4	NO	5	2		YES	6	3	
7.SP.C	-	0	-		-	0	-	
7.SP.C.5	YES	6	1		YES	6	1	
7.SP.C.6	NO	5	2		YES	9	2	
7.SP.C.7	-	0	-		-	0	-	
7.SP.C.7.a	YES	8	2		YES	8	2	
7.SP.C.7.b	YES	7	2		YES	7	2	
7.SP.C.8	-	0	-		-	0	-	
7.SP.C.8.a	NO	5	1		YES	6	2	
7.SP.C.8.b	NO	5	2		YES	9	2	
7.SP.C.8.c	YES	8	3		YES	8	3	
Total	39				39			
Consensus	20				36			
% Consensus	51%				92%			

Table K2
Evaluation of DOK for each item - Math Grade 7

Item	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
1	YES	6	1		YES	6	1	
2	YES	7	1		YES	7	1	
3	YES	6	2		YES	7	2	
4	YES	8	1		YES	8	1	
5	NO	5	2		NO	4	2	
6	YES	7	1		YES	8	1	
7	NO	5	2		YES	8	2	
8	YES	6	1		YES	6	1	
9	YES	6	1		YES	6	1	
10	YES	8	1		YES	9	1	
11	NO	5	1		YES	9	1	
12	YES	7	3		YES	6	3	
13	YES	7	1		YES	8	1	
14	YES	7	2		YES	8	2	
15	YES	8	1		YES	9	1	
16	YES	8	2		YES	9	2	
17	NO	5	1		YES	7	1	
18	YES	7	2		YES	8	2	
19	NO	4	2		YES	8	2	
20	YES	6	2		YES	7	2	
21	YES	7	1		YES	8	1	
22	NO	5	2		YES	9	2	
23	NO	5	3		NO	5	2	
24	NO	4	1	2	YES	7	2	
25	YES	6	2		YES	7	2	
26	YES	6	3		YES	6	3	
27	NO	4	1	2	YES	7	1	
28	YES	7	2		YES	7	2	
29	NO	4	1	2	YES	6	1	
30	YES	7	1		YES	6	1	
31	NO	4	1	2	YES	7	1	
32	YES	8	1		YES	8	1	
33	YES	6	2		YES	7	2	
34	YES	7	3		YES	7	3	
Total	34				34			
Consensus	23				32			
% Consensus	68%				94%			

Table K3
Evaluation of Standards Associated with each item - Math Grade 7

Item	Initial Round				Final Round			
	Consensus	Reviewers	Standard	2nd Stdrd	Consensus	Reviewers	Standard	2nd Stdrd
1	YES	6	7.NS.A.1.a		YES	7	7.NS.A.1.a	
2	YES	6	7.RP.A.1		YES	6	7.RP.A.1	
3	NO	3	7.RP.A.2.a	7.G.A.2	NO	5	7.G.A.2	
4	YES	6	7.EE.A.1		YES	6	7.EE.A.1	
5	NO	3	7.EE.B.3		YES	7	7.NS.A.3	7.EE.B.3
6	NO	5	7.NS.A.2.c		NO	5	7.NS.A.2.c	
7	YES	7	7.RP.A.3		YES	8	7.RP.A.3	
8	NO	5	7.SP.C.5		YES	7	7.SP.C.5	
9	NO	4	7.NS.A.1.d		YES	8	7.NS.A.1.d	7.NS.A.1.c
10	NO	3	7.NS.A.2.a		YES	8	7.NS.A.2.a	
11	NO	5	7.RP.A.1		YES	9	7.RP.A.1	
12	YES	8	7.NS.A.2.d		YES	8	7.NS.A.2.d	
13	YES	6	7.EE.A.1		YES	7	7.EE.A.1	
14	NO	2	7.SP.C.6	7.SP.C.8.a	YES	8	7.SP.C.8.a	
15	NO	3	7.NS.A.1.b		NO	4	7.NS.A.1.b	7.NS.A.1.d
16	YES	6	7.EE.B.4.b		YES	7	7.EE.B.4.b	
17	NO	3	7.NS.A.1.c	7.EE.A.1	NO	4	7.NS.A.1.c	
18	NO	4	7.SP.A.2		YES	7	7.SP.B.4	
19	YES	8	7.G.A.3		YES	9	7.G.A.3	
20	YES	6	7.RP.A.3		YES	6	7.RP.A.3	
21	YES	6	7.RP.A.2.d		YES	6	7.RP.A.2.d	
22	NO	4	7.EE.B.4.c		YES	8	7.EE.B.4.c	
23	YES	7	7.RP.A.3		YES	8	7.RP.A.3	
24	YES	7	7.SP.C.5		YES	8	7.SP.C.5	
25	YES	6	7.SP.A.2		YES	6	7.SP.A.2	
26	YES	8	7.G.B.6		YES	8	7.G.B.6	
27	NO	2	7.EE.B.3		YES	9	7.EE.B.3	
28	YES	8	7.G.B.5		YES	8	7.G.B.5	
29	YES	7	7.SP.B.4		YES	8	7.SP.B.4	
30	YES	7	7.G.B.7		YES	6	7.G.B.7	
31	YES	7	7.SP.A.1		YES	7	7.SP.A.1	
32	YES	7	7.G.B.4		YES	7	7.G.B.4	
33	NO	4	7.SP.A.2		YES	7	7.SP.A.2	
34	NO	5	7.EE.B.4.c		NO	1	7.EE.B.3	
Total	34				34			
Consensus	19				29			
% Consensus	56%				85%			

Table K4
Representation of Standards in MCAS - Math Grade 7

Standard	Represented
7.RP	
7.RP.A	
7.RP.A.1	1
7.RP.A.2	
7.RP.A.2.a	
7.RP.A.2.b	
7.RP.A.2.c	
7.RP.A.2.d	1
7.RP.A.3	1
7.NS	
7.NS.A	
7.NS.A.1	
7.NS.A.1.a	
7.NS.A.1.b	1
7.NS.A.1.c	1
7.NS.A.1.d	1
7.NS.A.2	
7.NS.A.2.a	1
7.NS.A.2.b	
7.NS.A.2.c	1
7.NS.A.2.d	1
7.NS.A.3	1
7.EE	
7.EE.A	
7.EE.A.1	1
7.EE.A.2	
7.EE.B	
7.EE.B.3	1
7.EE.B.4	
7.EE.B.4.a	
7.EE.B.4.b	1
7.EE.B.4.c	1
7.G	
7.G.A	
7.G.A.1	
7.G.A.2	1
7.G.A.3	1
7.G.B	
7.G.B.4	
7.G.B.5	
7.G.B.6	1
7.G.B.7	
7.SP	
7.SP.A	
7.SP.A.1	
7.SP.A.2	1
7.SP.B	
7.SP.B.3	
7.SP.B.4	1
7.SP.C	
7.SP.C.5	1
7.SP.C.6	
7.SP.C.7	
7.SP.C.7.a	
7.SP.C.7.b	
7.SP.C.8	
7.SP.C.8.a	1
7.SP.C.8.b	
7.SP.C.8.c	

Table K5
Porportion of standards represented in MCAS - Math Grade 7

Strand	Code	Total Standards	Represented	Percent
Rations and Proportional Relationships	RP	6	3	50%
The Number System	NS	9	7	78%
Expressions and Equations	EE	6	4	67%
Geometry	G	7	3	43%
Statistics and Probability	SP	11	4	36%
		39	21	54%

Appendix L - Summary of Panel Decisions   Math Grade 8

Table L1: Evaluation of DOK for each standard

Table L2: Evaluation of DOK for each item

Table L3: Evaluation of Standards Associated with each item

Table L4: Representation of Standards in MCAS

Table L5: Porportion of standards represented in MCAS

Table L1
Evaluation of DOK for each standard - Math Grade 8

Standard	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
8.NS	-	0	-		-	0	-	
8.NS.A	-	0	-		-	0	-	
8.NS.A.1	YES	6	1		YES	7	1	
8.NS.A.2	YES	6	2		YES	6	2	
8.EE	-	0	-		-	0	-	
8.EE.A	-	0	-		-	0	-	
8.EE.A.1	NO	5	1		YES	9	2	
8.EE.A.2	YES	7	1		YES	7	1	
8.EE.A.3	NO	5	1		YES	8	2	
8.EE.A.4	YES	6	2		YES	6	2	
8.EE.B	-	0	-		-	0	-	
8.EE.B.5	YES	6	2		YES	6	2	
8.EE.B.6	YES	6	2		YES	6	2	
8.EE.C	-	0	-		-	0	-	
8.EE.C.7	-	0	-		-	0	-	
8.EE.C.7.a	YES	6	2		YES	6	2	
8.EE.C.7.b	YES	6	1		YES	6	1	
8.EE.C.8	-	0	-		-	0	-	
8.EE.C.8.a	YES	6	2		YES	6	2	
8.EE.C.8.b	NO	5	2		YES	9	2	
8.EE.C.8.c	NO	4	2	3	YES	6	3	
8.F	-	0	-		-	0	-	
8.F.A	-	0	-		-	0	-	
8.F.A.1	YES	9	1		YES	9	1	
8.F.A.2	YES	9	2		YES	9	2	
8.F.A.3	NO	5	2		YES	8	2	
8.F.B	-	0	-		-	0	-	
8.F.B.4	NO	4	2	3	NO	4	2	3
8.F.B.5	YES	6	3		YES	6	3	
8.G	-	0	-		-	0	-	
8.G.A	-	0	-		-	0	-	
8.G.A.1	-	0	-		-	0	-	
8.G.A.1.a	YES	8	1		YES	8	1	
8.G.A.1.b	YES	8	1		YES	8	1	
8.G.A.1.c	YES	8	1		YES	8	1	
8.G.A.2	YES	7	2		YES	7	2	
8.G.A.3	YES	6	2		YES	7	2	
8.G.A.4	NO	5	2		YES	8	2	
8.G.A.5	NO	5	3		NO	5	3	
8.G.B	-	0	-		-	0	-	
8.G.B.6	NO	5	3		NO	5	3	
8.G.B.7	YES	8	2		YES	8	2	
8.G.B.8	NO	5	1		YES	7	1	
8.G.C	-	0	-		-	0	-	
8.G.C.9	NO	5	1		YES	8	2	
8.SP	-	0	-		-	0	-	
8.SP.A	-	0	-		-	0	-	
8.SP.A.1	YES	8	2		YES	8	2	
8.SP.A.2	NO	5	2		YES	6	2	
8.SP.A.3	YES	6	2		YES	7	2	
8.SP.A.4	YES	7	2		YES	7	2	
Total	33				33			
Consensus	21				30			
% Consensus	64%				91%			

Table L2
Evaluation of DOK for each item - Math Grade 8

Item	Initial Round				Final Round			
	Consensus	How many	What DOK	2nd DOK	Consensus	How many	What DOK	2nd DOK
1	YES	8	1		YES	8	1	
2	YES	8	1		YES	8	1	
3	NO	5	2		NO	5	2	
4	NO	5	1		YES	8	1	
5	NO	5	2		NO	5	2	
6	YES	6	1		NO	5	1	
7	YES	7	2		YES	7	2	
8	YES	9	1		YES	9	1	
9	YES	8	1		YES	8	1	
10	YES	7	1		YES	7	1	
11	YES	6	1		YES	6	1	
12	NO	4	1	2	YES	9	2	
13	YES	9	1		YES	9	1	
14	YES	8	2		YES	8	2	
15	YES	8	1		YES	8	1	
16	YES	7	1		YES	7	1	
17	YES	6	2		YES	6	2	
18	NO	5	1		YES	6	2	
19	YES	8	1		YES	8	1	
20	NO	5	2		YES	6	2	
21	YES	6	2		YES	6	2	
22	YES	8	1		YES	8	1	
23	NO	4	2	3	YES	8	2	
24	YES	7	1		YES	7	1	
25	YES	8	1		YES	8	1	
26	YES	6	3		YES	6	3	
27	YES	8	1		YES	8	1	
28	YES	6	2		YES	6	2	
29	YES	9	1		YES	9	1	
30	YES	7	1		YES	7	1	
31	NO	5	1		NO	5	1	
32	NO	5	1		YES	8	1	
33	YES	9	1		YES	9	1	
34	YES	7	2		YES	7	2	
Total	34				34			
Consensus	25				30			
% Consensus	74%				88%			

Table L3
Evaluation of Standards Associated with each item - Math Grade 8

Item	Consensus	Reviewers	Standard	2nd Stdrd	Consensus	Reviewers	Standard	2nd Stdrd
		Initial Round				**Final Round**		
1	YES	6	8.EE.A.2		YES	7	8.EE.A.2	
2	NO	5	8.SP.A.4		YES	6	8.SP.A.4	
3	NO	4	8.G.A.3		YES	8	8.G.A.3	
4	YES	7	8.F.A.1		YES	7	8.F.A.1	
5	YES	8	8.EE.A.3		YES	8	8.EE.A.3	
6	YES	7	8.NS.A.2		YES	6	8.NS.A.2	
7	YES	8	8.F.B.4		YES	8	8.F.B.4	
8	YES	6	8.NS.A.2		YES	6	8.NS.A.2	
9	YES	7	8.EE.C.7.b		YES	7	8.EE.C.7.b	
10	YES	6	8.F.B.5		YES	6	8.F.B.5	
11	YES	6	8.EE.A.4		YES	6	8.EE.A.4	
12	NO	3	8.EE.B.6	8.F.A.3	YES	7	8.F.B.4	
13	YES	6	8.F.A.3		YES	6	8.F.A.3	
14	YES	6	8.G.A.4		YES	6	8.G.A.4	
15	YES	8	8.SP.A.2		YES	8	8.SP.A.2	
16	YES	6	8.F.B.5		YES	6	8.F.B.5	
17	NO	4	8.EE.B.5	8.F.A.2	YES	8	8.F.A.2	
18	YES	8	8.SP.A.4		YES	9	8.SP.A.4	
19	YES	7	8.F.A.1		YES	7	8.F.A.1	
20	YES	6	8.G.A.2		YES	6	8.G.A.2	
21	NO	5	8.F.B.4		YES	7	8.F.B.4	8.F.A.2
22	YES	8	8.EE.B.5		YES	8	8.EE.B.5	
23	YES	9	8.G.C.9		YES	9	8.G.C.9	
24	NO	5	8.F.B.4		YES	7	8.F.B.4	
25	YES	8	8.G.A.5		YES	9	8.G.A.5	
26	YES	6	8.EE.C.8.a		YES	6	8.EE.C.8.a	
27	YES	7	8.G.B.7		YES	7	8.G.B.7	
28	NO	5	8.G.A.4		YES	9	8.G.A.4	
29	YES	6	8.G.A.1.b		NO	5	8.G.A.1.b	
30	NO	5	8.EE.B.6		YES	8	8.EE.B.6	
31	YES	8	8.SP.A.4		YES	8	8.SP.A.4	
32	YES	8	8.G.B.8		YES	8	8.G.B.8	
33	YES	9	8.NS.A.1		YES	9	8.NS.A.1	
34	YES	6	8.F.B.4		YES	6	8.F.B.4	
Total	34				34			
Consensus	26				33			
% Consensus	76%				97%			

Table L4
Representation of Standards in MCAS - Math Grade 8

Standard	Represented
8.NS	
8.NS.A	
8.NS.A.1	
8.NS.A.2	1
8.EE	
8.EE.A	
8.EE.A.1	
8.EE.A.2	
8.EE.A.3	1
8.EE.A.4	1
8.EE.B	
8.EE.B.5	1
8.EE.B.6	
8.EE.C	
8.EE.C.7	
8.EE.C.7.a	
8.EE.C.7.b	1
8.EE.C.8	
8.EE.C.8.a	1
8.EE.C.8.b	
8.EE.C.8.c	
8.F	
8.F.A	
8.F.A.1	1
8.F.A.2	1
8.F.A.3	1
8.F.B	
8.F.B.4	1
8.F.B.5	1
8.G	
8.G.A	
8.G.A.1	
8.G.A.1.a	
8.G.A.1.b	
8.G.A.1.c	
8.G.A.2	1
8.G.A.3	1
8.G.A.4	1
8.G.A.5	1
8.G.B	
8.G.B.6	
8.G.B.7	
8.G.B.8	
8.G.C	
8.G.C.9	1
8.SP	
8.SP.A	
8.SP.A.1	
8.SP.A.2	1
8.SP.A.3	
8.SP.A.4	1

Table L5
Porportion of standards represented in MCAS - Math Grade 8

Strand	Code	Total Standards	Represented	Percent
The Number System	NS	2	1	50%
Expressions and Equations	EE	11	5	45%
Functions	F	5	5	100%
Geometry	G	11	5	45%
Statistics and Probability	SP	4	2	50%
		33	18	55%

Appendix M – Additional Information about the Webb Methodology

This section contains additional details on the formulas used to calculate statistics for each of the four Webb content alignment categories examined in this study. The text in this section is adapted from the WAT system documentation and tailored for the study reported here.

Categorical Concurrence

An important aspect of alignment between standards and assessments is whether both address the same content categories. The categorical-concurrence criterion provides a very general indication of alignment, if both documents incorporate the same content. *The criterion of categorical concurrence between standards and assessment is met if the same or consistent categories of content appear in both documents.* This criterion was judged by determining whether the assessment included items measuring content from each standard. The analysis assumed that the assessment had to have at least six items measuring content from a standard in order an acceptable level of categorical concurrence to exist between the standard and the assessment. The number of items, six, is based on estimating the number of items that could produce a reasonably reliable subscale for estimating students' mastery of content on that subscale. Of course, many factors have to be considered in determining what a reasonable number is, including the reliability of the subscale, the mean score, and cutoff score for determining mastery. Using a procedure developed by Subkoviak (1988) and assuming that the cutoff score is the mean and that the reliability of one item is .1, it was estimated that six items would produce an agreement coefficient of at least .63. This indicates that about 63% of the group would be consistently classified as masters or nonmasters if two equivalent test administrations were employed. The agreement coefficient would increase if the cutoff score were increased to one standard deviation from the mean to .77 and, with a cutoff score of 1.5 standard deviations from the mean, to .88. Usually states do not report student results by standards or require students to achieve a specified cutoff score on subscales related to a standard. If a state did do this, then the state would seek a higher agreement coefficient than .63. Six items were assumed as a minimum for an assessment measuring content knowledge related to a standard, and as a basis for making some decisions about students' knowledge of that standard. If the mean for six items is 3 and one standard deviation is one item, then a cutoff score set at 4 would produce an agreement coefficient of .77. Any fewer items with a mean of one-half of the items would require a cutoff that would only allow a student to miss one item. This would be a very stringent requirement, considering a reasonable standard error of measurement on the subscale.

Depth-of-Knowledge Consistency

Standards and assessments can be aligned not only on the category of content covered by each, but also on the basis of the complexity of knowledge required by each. *Depth-of-knowledge consistency between standards and assessment indicates alignment if what is elicited from students on the assessment is as demanding cognitively as what students are expected to know and do as stated in the standards.* For consistency to exist between the assessment and the standard, as judged in this analysis, at least 50% of targeted objectives are hit by items of the appropriate complexity. Fifty percent, a conservative cutoff point, is based on the assumption

that a minimal passing score for any one standard of 50% or higher would require the student to successfully answer at least some items at or above the depth-of-knowledge level of the corresponding objectives. For example, assume an assessment included six items related to one standard and students were required to answer correctly four of those items to be judged proficient—i.e., 67% of the items. If three, 50%, of the six items were at or above the depth-of-knowledge level of the corresponding objectives, then for a student to achieve a proficient score would require the student to answer correctly at least one item at or above the depth-of-knowledge level of one objective. Some leeway was used in this analysis on this criterion. If a standard had between 40% to 50% of items at or above the depth-of-knowledge levels of the objectives, then it was reported that the criterion was "weakly" met.

The justification above for the 50% cutoff point is based on the assumption that the standard is balanced. If the standard is not balanced, this reasoning does not apply. You could have a situation where a student passes the assessment that meets the DOK Consistency criterion without actually answering a single question at an appropriate DOK Level. Here is an example of why the DOK Consistency calculation must be considered in conjunction with Balance:

Assume an assessment included 6 items related to a given standard, and that these items specifically targeted 3 of the 5 objectives that fell under the standard. Consider two different cases.

The first case is that this standard is balanced—each of the 3 targeted objectives was hit by exactly 2 items. If 4 of the 6 items had DOK values lower than the objectives they targeted, then the depth-of-knowledge consistency score for this standard would be 33%—not high enough to be considered aligned.

The second case is that this standard is not balanced—1 of the 3 targeted objectives was hit by 4 items and the other 2 targeted objectives were only hit by 1 item each. Here, you could still have 4 of the 6 items with DOK values lower than the objective they targeted, just as in the first case. But if these 4 items all targeted the same objective, then the depth-of-knowledge consistency score would be 66%—indicating good alignment!

Range-of-Knowledge Correspondence

For standards and assessments to be aligned, the breadth of knowledge required on both should be comparable. *The range-of-knowledge criterion is used to judge whether a comparable span of knowledge expected of students by a standard is the same as, or corresponds to, the span of knowledge that students need in order to correctly answer the assessment items/activities.* The criterion for correspondence between span of knowledge for a standard and an assessment considers the number of objectives within the standard with one related assessment item/activity. Fifty percent of the objectives for a standard had to have at least one related assessment item in order for the alignment on this criterion to be judged acceptable. This level is based on the assumption that students' knowledge should be tested on content from over half of the domain of knowledge for a standard. This assumes that each objective for a standard should be given equal weight. Depending on the balance in the distribution of items and the need to have a low number of items related to any one objective, the requirement that assessment items need to be related to more than 50% of the objectives for a standard increases the likelihood that students will have to demonstrate knowledge on more than one objective per standard to achieve a minimal passing score. As with the other criteria, a state may choose to make the acceptable level on this criterion more rigorous by requiring an assessment to include items related to a greater number of the objectives. However, any restriction on the number of items included on the test will place an

upper limit on the number of objectives that can be assessed. Range-of-knowledge correspondence is more difficult to attain if the content expectations are partitioned among a greater number of standards and a large number of objectives. If 50% or more of the objectives for a standard had a corresponding assessment item, then the range-of-knowledge correspondence criterion was met. If 41% to 49% of the objectives for a standard had a corresponding assessment item, the criterion was "weakly" met.

Balance of Representation

In addition to comparable depth and breadth of knowledge, aligned standards and assessments require that knowledge be distributed equally in both. The range-of-knowledge criterion only considers the number of objectives within a standard hit (a standard with a corresponding item); it does not take into consideration how the hits (or assessment items/activities) are distributed among these objectives. *The balance-of-representation criterion is used to indicate the degree to which one objective is given more emphasis on the assessment than another.* An index is used to judge the distribution of assessment items. This index only considers the objectives for a standard that have at least one hit—i.e., one related assessment item per objective. The index is computed by considering the difference in the proportion of objectives and the proportion of hits assigned to the objective. An index value of 1 signifies perfect balance and is obtained if the hits (corresponding items) related to a standard are equally distributed among the objectives for the given standard. Index values that approach 0 signify that a large proportion of the hits are on only one or two of all of the objectives hit. Depending on the number of objectives and the number of hits, a unimodal distribution (most items related to one objective and only one item related to each of the remaining objectives) has an index value of less than .5. A bimodal distribution has an index value of around .55 or .6. Index values of .7 or higher indicate that items/activities are distributed among all of the objectives at least to some degree (e.g., every objective has at least two items) and is used as the acceptable level on this criterion. Index values between .6 and .7 indicate the balance-of-representation criterion has only been "weakly" met.

> *Note on the balance index*: The index formula for the balance criterion is $1 - (\sum |1/(O) - I_k/(H)|) / 2$, where I_k is the number of items hit corresponding to objective k, O is the total number of objectives hit within the standard, and H is the total number of items hit within the standard. The balance index does not reflect how many objectives were hit within the given standard, but only how the hits were distributed across the objectives that *were* hit within the standard. For example, a standard where only one of its 20 objectives was hit would have a balance index of 1, although it would have a range of only 0.05 (1/20). This is why Range and Balance need to be considered together in order to obtain a well-rounded indication of how well distributed the items are within a given standard. For instance, if every objective in this same standard was hit once, except one objective which was hit twenty times, this would give a range of 1 but a balance of 0.53.

Two more examples to help illustrate the balance index: Suppose we have a standard with five objectives. Objectives A and C are not hit by items (so they are irrelevant for this calculation), Objectives B and D are each hit by one assessment item, and Objective E is hit by four items. Then this standard would have a balance index of 0.67, which would give a Balance of Representation alignment value of WEAK. (See Table N-1). On the other hand, if the same

objective was hit by items in exactly same way, except that Objective E was only hit by three items, then the standard would have a balance index of 0.73, which would give a Balance of Representation alignment value of YES. (See Table N-2).

Table N-1: *An Example of a Weakly Balanced Standard*

Standard N:	# of hits
Objective A	0
Objective B	0
Objective C	1
Objective D	1
Objective E	4

Balance Index:	0.67
Alignment:	WEAK

Table N-2: *An Example of a Balanced Standard*

Standard N:	# of hits
Objective A	0
Objective B	0
Objective C	1
Objective D	1
Objective E	3

Balance Index:	0.73
Alignment:	YES

Appendix N – Massachusetts Cognitive Levels

This section presents the cognitive levels as described to panel members and which were employed to classify the DOK of standards and items.

ELA Cognitive Levels

- **Level 1 (Identify/Recall)** – Level 1 items require that the test-taker recognize basic information presented in the text. Items require only a shallow understanding of the text presented and often consist of verbatim recall from text, slight paraphrasing of specific details from the text, or simple understanding of a single word or phrase.
    - Key words that are often signify Level 1 include "identify," "list," "match," "recognize," "describe," and "distinguish."
    - Some examples of skills that typically are classified as Level 1 include:
        - Identify main ideas/facts/details
        - Recall and locate details
        - Identify genre
        - Identify setting
        - Identify definitions
        - Identify parts of speech
        - Identify functions of punctuation

- **Level 2 (Infer/Analyze)** – Level 2 items require that the test-taker understand a given text by making inferences and drawing conclusions related to the text; it requires both comprehension and subsequent processing of text or portions of text. Inter-sentence analysis of inference is required. Some important concepts are covered, but not in a complex way. Literal main ideas are stressed. A Level 2 assessment item may require students to apply skills and concepts that are covered in Level 1. However, items require closer understanding of text, possibly through the item's paraphrasing of both the question and the answer.
    - Standards and items at this level may include words such as "infer," "analyze," "describe," "interpret," "determine," "conclude," "explain," "summarize," "classify," and "compare,"
    - Some examples that represent, but do not constitute all of, Level 2 performance are:
        - Understand whole text/generalize (Big Picture)
        - Determine main idea
        - Interpret, make connections, visualize, form questions
        - Explain character's role/motives
        - Determine fact or opinion
        - Filter important information and key concepts
        - Determine word meaning in context

- **Level 3 (Evaluate/Apply)** – Level 3 items require that the test-taker understand multiple points of view and be able to project his or her own judgments or perspectives on the text. Deep knowledge becomes a greater focus at Level 3. Students are encouraged to go beyond the text; however, they are still required to show understanding of the ideas in the text. Students may be encouraged to explain, generalize, or connect ideas. Standards and items at Level 3 involve reasoning and planning. Students must be able to support their thinking. Items may involve abstract theme identification, inference across an entire passage, or students' application of prior knowledge. Items may also involve more superficial connections between texts.
  - Key words include "critique," "evaluate," "analyze," "predict," "agree/disagree," "argue/defend," "apply," "synthesize," "judge," "compare," and "contrast."
  - Some examples that represent, but do not constitute all of, Level 3 performance are:
    - Understand another point of view
    - Analyze/evaluate author's purpose, style, message
    - Argue/defend a point of view with evidence from the text
    - Use reasoning to determine an outcome/prediction
    - Apply information from the text
    - Synthesize elements of text(s) in order to create a whole

Math Cognitive Level Coding Guide

- **Level 1 (Recall and Recognition)** – Level 1 items require students to recall mental definitions, notations, simple concepts, and procedures, as well as to apply common, routine procedures or algorithms (that may involve multiple steps) to solve a well-defined problem. Problems requiring a one-step, well defined, and straight algorithmic are typically classified at Level 1.
  - o Other key words that signify Level 1 include "identify," "recall," "recognize," "use," and "measure." Verbs such as "describe" and "explain" could be classified at different levels, depending on what is to be described and explained.

- **Level 2 (Analysis and Interpretation)** – Level 2 items require students to engage in mathematical reasoning beyond simple recall, in a more flexible thought process, and in enhanced organization of thinking skills. These items require a student to make a decision about the approach needed, to represent or model a situation, or to use one or more nonroutine procedures to solve a well-defined problem. Level 2 activities are not limited only to number skills, but may involve visualization skills and probability skills. Other Level 2 activities include noticing or describing non-trivial patterns, classifying, organizing, and comparing data; and organizing and displaying data in tables, graphs, and charts.
  - o Keywords that generally distinguish a Level 2 item include "classify," "organize," "estimate," "make observations," "collect and display data," and "compare data." These actions imply more than one step. For example, to compare data requires first identifying characteristics of objects or phenomena and then grouping or ordering the objects.
  - o Some action verbs, such as "explain," "describe," or "interpret," could be classified at different levels depending on the object of the action. For example, interpreting information from a simple graph, or reading information from the graph, also are at Level 2. Interpreting information from a complex graph that requires some decisions on what features of the graph need to be considered and how information from the graph can be aggregated is at Level 3.

- **Level 3 (Judgment and Synthesis)** – Level 3 items require students to perform more abstract reasoning, planning, and evidence-gathering. In order to answer these types of questions, a student must engage in reasoning about an open-ended situation with multiple decision points to represent or model unfamiliar mathematical situations and solve more complex, nonroutine, or less well-defined problems. In most instances, requiring students to explain their thinking is at Level 3. Activities that require students to make conjectures are also at this level. Other Level 3 activities include drawing conclusions from observations; citing evidence and developing a logical argument for concepts; explaining phenomena in terms of concepts; and deciding which concepts to apply in order to solve a complex problem.

The cognitive demands at Level 3 are complex and abstract. The complexity does not

result from the fact that there are multiple answers, a possibility for both Levels 1 and 2, but because the task requires more demanding reasoning. An activity, however, that has more than one possible answer and requires students to justify the response they give would most likely be at Level 3.

Appendix O - Summary of Panel Member Survey Responses

	I didn't read them	Not Well	Somewhat	Very Well
How well did the pre-training materials help you understand the purpose ad importance of the study?	.03	.06	.63	.28
	Not Well	**Somewhat**	**Adequately**	**Very Well**
How well do you feel the introductory session informed you about the work to be done in the panel sessions?	.00	.06	.41	.53
How well do you feel the training prepared you to understand the depth-of-knowledge levels?	.00	.09	.28	.63
How well do you feel the training prepared you to participate in the consensus process?	.00	.03	.31	.66
How well did the training prepare you for the Alignment process overall?	.00	.03	.41	.56
How well did the group leader facilitate the consensus process?	.00	.03	.44	.53
	Uncomfortable	**Somewhat Comfortable**	**Comfortable**	**Very Comfortable**
How comfortable did you feel about the process for assigning the DOK level?	.00	.06	.47	.47