ACS VENTURES

BRIDGING THEORY & PRACTICE

Evaluation of Alignment Quality of the Cognia Science Alternate Assessment

Final Report

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Contents

Summary

Cognia sought an independent evaluation of the alignment of the Cognia Science Alternate Assessment (CSAA) to Extended Performance Expectations (EPEs) which were created based on *A Framework for K-12 Science Education* (*Framework*) (NRC, 2011). ACS Ventures, LLC (ACS) was selected to lead this alignment evaluation and manage all activities associated with the facilitation of the workshop and analysis of all data collected. Currently the CSAA is being administered by some of the states/entities (aka, Partners) that are part of the Multi-State Alternate Assessment (MSAA). It is referred to as the MSAA science in those MSAA Science Partners locations.

Evaluation Methodology

The approach to evaluating the alignment of the CSAA to EPEs includes the collection and evaluation of a comprehensive body of evidence that itself aligns with the demands of both the federal peer review criteria for alignment and, even more importantly, *The Standards for Educational and Psychological Testing* which describes industry standards for assessment development and validation (*The Standards*; AERA, APA, & NCME, 2014). The evaluation criteria closely followed the recommendations described in the *Links for Academic Learning (LAL)* (Flowers et. al, 2009). Each component of the LAL is briefly described below:

Links for Academic Learning (LAL) Criteria (Flowers et al., 2009)

- **Criterion 3: Fidelity with Grade Level Content and Performance.** ACS used panelist judgments to evaluate the alignment between the content and performance requirements of the CSAA items/tasks and those specified in the aligned EPEs.
- **Criterion 4: Content Differs in Range, Balance, and Complexity**. ACS used panelist judgments to evaluate the extent to which the content of each grade level CSAA assessment aligns to the domains of the EPEs and represents the expectations outlined in the blueprint.
- **Criterion 5: Differentiation Across Grade Levels**. ACS used selected panelists' judgments to evaluate how the content of the exam (i.e., knowledge and skills measured) is differentiated across grades.
- **Criterion 7: Barriers to Performance**. ACS used panelist judgments to evaluate the accessibility of the CSAA for students with varying levels of communicative competence.

To complete these evaluations, ACS worked with Cognia to recruit and organize three panels of subject matter experts from the Multi-State Alternate Assessment (MSAA) Science Partners that administers the CSAA including content experts and special education teachers. Cognia also recruited subject matter experts from their organization's scoring and accessibility teams. Each panel comprised the collective recruits. Each panel met virtually for 3 days to review a CSAA test form and make judgments relative to each criterion through independent work and panel-level collaboration. ACS consolidated their judgments following the meeting to develop this report.

Evaluation Findings and Recommendations

This report details the specific results by grade level and alignment criteria. Overall, the results show a strong degree of alignment between the CSAA and EPEs.

- Across all grade levels, the CSAA was consistently determined to be well aligned to the EPEs. This included a review of criterion 3 and 4 with results consistent across all grade levels evaluated.
- The CSAA provided clear differentiation across grade levels, with content identified as distinct or more in-depth as students increased in grade level.
- The CSAA was viewed as accessible to students with varying levels of communicative competence. With only a few exceptions, the CSAA as currently constructed was viewed as accessible to all students in the targeted student population.

Background

Evaluation Purpose

The purpose of this document is to summarize the data collection and analysis for evaluating the alignment quality of the Cognia Science Alternate Assessment (CSAA) to the Extended Performance Expectations (EPEs) which were based on *A Framework for K-12 Science Education* (*Framework*) (NRC, 2011). The alignment was completed for the CSAA in grades 5, 8 and 11. This report summarizes the methodology used, the data that was collected, and the resulting analysis and conclusions.

Cognia Science Alternate Assessment (CSAA)

The CSAA assesses the educational performance of students with significant cognitive disabilities through a set of items given in a spring administration. As noted above, currently the CSAA is being administered by some of the states/entities (aka, Partners) that are part of the Multi-State Alternate Assessment (MSAA). It is referred to as the MSAA science in those MSAA Science Partners locations. The CSAA items are aligned to a set of Extended Performance Expectations (EPEs) that are derived from *A Framework for K-12 Science Education* (*Framework*). This *Framework* conceptualizes K-12 science education as being built around three dimensions: Science and Engineering Practices [SEPs], Crosscutting Concepts [CCCs], and Disciplinary Core Ideas [DCIs] where the standards, curriculum, instruction, and assessment are all integrated into each (NRC, 2011).

The CSAA EPEs are also three-dimensional, where possible. The main purpose statement developed for the CSAA is that students are able to use the majority of the DCIs, SEPs, and CCCs to address moderately complex science phenomena and problems, some concrete and some abstract. In working to develop the EPEs, Cognia selected a total of 12 general education standards/Performance Expectations (PEs) from each of the three "traditional" content domains (life science, physical science, Earth and space science) to be the focus for each grade level. In identifying these 12 PEs, the goal was to provide reasonable representation across the DCIs and to focus on the most fundamental, broad principles that would be accessible and meaningful for this student population as a progression from elementary to middle to high school. In support of that, the selected PEs represent content from all grades in the grade band for each test. For the grade 5 test, for example, PEs from grades 3, 4, and 5 are included; the progression of standards in those grades is such that to provide a solid representation of the core ideas and understandings students need to progress from elementary school to middle school, PEs needed to be selected across grade bands. Likewise for the grade 8 and grade 11 test (and even though the standards are presented as grade band in these levels), the selected PEs would typically be taught across multiple years in middle school and high school, respectively. For additional information on the identification of PEs to be designated as EPEs, see Appendix A.

These PEs were reviewed to ensure they provided reasonable representation across the core ideas and focused on the most fundamental principles that would be accessible and meaningful for this student population. Each PE was expanded into a set of three access points with the overarching goal to preserve the intent of the three-dimensional constructs described in the *Framework* and to maintain the commitment that the standards are for "all students."

The highest access point, Level 3, is intended to closely mirror the general education PE and represents the most cognitively demanding target for this student population. The Level 3 EPE is three-dimensional and aligned to the same three dimensions (DCI, SEP, and CCC) as the general education PE. However, the Level 3 EPE typically has a slightly lower cognitive demand than the general education PE. For example, the EPE may limit the number or types of examples that students will be expected to connect to the construct. Depending on the particular EPE and the phenomenon or context chosen for assessing the EPE, some items may not encompass all parts of the

EPE, particularly if it has multiple examples/contexts listed. All Level 3 items will, however, align to all three dimensions and the essence of the EPE.

The other two access points, Level 2 and Level 1, have been written as progression points that students would likely move through as they build proficiency towards the Level 3 EPE. Level 2 and Level 1 EPEs are therefore intended to provide a scaffold for instruction and learning by supporting students in the attainment of the target knowledge and skills expressed in the Level 3 EPE. All Level 2 EPEs are two-dimensional, occasionally three-dimensional. All Level 1 EPEs are one-dimensional (DCI), occasionally two-dimensional. This allows instruction and learning to be appropriately focused and scaffolded in a logical, accessible sequence towards the complex expectation of integrating multiple facets of science (DCI, SEP, and CCC) in the target performance.

Additionally, in evaluating alignment to the DCI in Level 1 items, and some Level 2 items, alignment is achieved using the vocabulary and examples/contexts matching the DCI. For this population of students, simply being able to process the words and context of the DCI to answer the item is evidence of engagement with and use of DCI knowledge. Regarding the SEP and CCC, the Level 2 (and Level 1, if two-dimensional) access point may align to an SEP and/or CCC other than the ones in the general education PE and Level 3 EPE. The rationale for this is two-fold: first, this approach mirrors best practices for classroom instruction on three-dimensional science and supports an emphasis on including all SEPs and CCCs, not just select ones, over the course of instruction; second, this approach allows a scaffolded progression towards proficiency to be developed for each EPE, rather than trying to differentiate nuances of the *degree* to which a student is demonstrating a singular target learning outcome.

Within each administration of the CSAA there are two sessions, with Session 1 having 13 item sets (39 items), and Session 2 having 3 item sets (9 items). Even though there are item sets, the items were designed to be stand-alone in nature and to represent increasing access points to the measurement of the same construct (i.e., first item represents Level 1, second item – Level 2, third item – Level 3). There are also a small number of clusters, which contain 2 item sets (of 3 items each) bundled together with a single shared stimulus, to create a more integrated, performance task-like experience for the students. The clusters are also designed to be stand-alone in nature. Session 1 contains the operational items and Session 2 contains field test items. The alignment methodology included a review of operational items used in the spring of 2022.

Methodology

Alignment Evaluation Questions and Criteria

The LAL methodology was the foundation for this alignment evaluation and the specific questions and criteria were adapted to the CSAA. The criteria are described below along with the related evaluation questions.

LAL Criterion 3: Fidelity with Grade-Level Content and Performance

This criterion focuses on two concepts related to connection between the CSAA and the EPEs with regards to content area content and the type of performance required.

Evaluation Question 1: What degree of content centrality is maintained between the items and the EPEs? *Content centrality* is defined as the degree to which the assessments reflect fidelity with the grade-level content as defined in the aligned EPE. The purpose of this question is to evaluate the similarity of the knowledge and skills being measured to the expectations outlined in the EPEs.

Evaluation Question 2: What degree of performance centrality is maintained between the items and the EPEs?

Performance centrality is defined as the degree to which the assessments reflect fidelity with the grade-level performance as defined in the aligned EPE. The purpose of this question is to evaluate the similarity of the performance expectations to those outlined in the EPEs.

LAL Criterion 4: Content Differs in Range, Balance, and Complexity

This criterion focuses on the degree to which each test form represents the knowledge and skills that are to be measured as outlined in the blueprint.

Evaluation Question 1: Are there an adequate number of items representing each domain on the CSAA test form?
Each domain represents an area of knowledge or skills to be assessed by the CSAA grade-level test form. The purpose of this question is to evaluate the extent to which the domains are represented in each test form as indicated by item alignment judgements.

Evaluation Question 2: Does the collection of the CSAA items represent multiple EPEs within each domain of the blueprints?
Each domain includes a range of EPEs. The purpose of this question is to evaluate how the items aligned to a domain represent the range of subsumed EPEs as indicated by item alignment judgments.

Evaluation Question 3: Does the balance of representation indicate similar emphasis of CSAA items as the blueprint?
The CSAA grade-level assessments include a targeted representation of each domain on each test form. The purpose of this question is to compare these targets with what is included on the test forms as indicated by item alignment judgments.

Evaluation Question 4: Is there a range of complexity levels across the content of the CSAA items?
The levels of complexity are defined by Cognia for each grade level and combine the concepts of item complexity and supports provided for students. The purpose of this question is to determine if the test forms represent the range of complexity levels as defined.

LAL Criterion 5: Differentiation Across Grade Levels

This criterion focuses on identifying how the content of the CSAA is different across grade levels.

Evaluation Question 1: Is there a change in emphasis of age-appropriate content across grade levels?
Flowers (2009) defined five descriptors that can be used when comparing content across grade levels: broader, deeper, prerequisite, new, and identical. The purpose of this question is to evaluate how the content compares for each adjacent grade level.

LAL Criterion 7: Barriers to Performance

This criterion focuses on how the CSAA is designed to be accessible for students with different levels of communicative competence.

Evaluation Question 1: Is the content accessible to students with varying levels of communicative competence?

Data Collection

To analyze the evaluation questions associated with the LAL, ACS collected ratings from a diverse panel of educators and content specialists. ACS worked with educators recruited by Cognia and MSAA Science Partners to conduct an alignment study that included three panels, one for each grade level. These three panels completed the task, with four panelists included in the panels for grade 5 and grade 11, and three panelists included in the panel for grade 8. The meeting was conducted virtually via Zoom on September 20-22, 2022.

All panelists convened virtually for training on the purpose and process of the study. In addition to information about the study, a CSAA overview training was provided to all panelists. The overview topics included testing features, learner characteristics, participation criteria, item types and structure, complexity levels, assessment features and accommodations, information about the EPEs and the three dimensions, and a demonstration of CSAA items in the testing platform. Following the group training, the panelists met in Zoom breakout rooms that were specific to their designated grade level. Facilitators led each panel in additional training to reiterate the expectations, security procedures, and cover process topics specific to the panel. Each facilitator was responsible for leading the group process and discussion, documenting the group discussions, answering panelist questions, and verifying that ratings were being captured accurately. Copies of the training PowerPoints as well as other materials used for each of the panels is included in Appendix C.

Panelists were provided time to review each CSAA item and were asked to independently select the EPE that best represented the knowledge and skills measured by the item. After identifying the EPE, panelists were asked to complete a series of additional ratings that followed the LAL guidelines and were based upon the EPE that was selected. The specific evaluation questions and judgmental criteria are outlined below within the LAL framework.

LAL Criterion 3: Fidelity with Grade Level Content and Performance

To analyze the evaluation questions posed in LAL Criteria 3, ACS evaluated panelist ratings of the connection between the CSAA and the EPEs with regards to content area content and performance requirements.

Evaluation Questions:

1. **What degree of content centrality is maintained between the items and the EPEs?**
2. **What degree of performance centrality is maintained between the items and the EPEs?**

To address these two evaluation questions, ACS considered the following two data collection sources: 1) the content centrality rating and 2) the performance centrality rating. For content centrality, the panelists were asked to provide a rating as to whether the content of the item had a *Near link*, *Far link*, or *No link* to the content of the EPE. The rating options were defined to the panelist as:

- **Near link:** The item clearly measures ALL of the same content as the EPE.
- **Far link:** The item measures SOME of the content in the EPE; the content of the item is present in the EPE even if the EPE contains additional content.
- **No link:** The item measures NONE of the content in the EPE.

If the panelists provided a *No Link* rating, they were then asked to select a reason that best explained their choice. The reasons for *No Link* options and their associated definitions were presented to panelists as:

- **Back mapping:** The EPE has been deconstructed until it is a functional skill.
- **Overstretch:** The link to the EPE has been stretched too far; the item has lost the essence of the EPE.
- **Misconception:** The item does not correctly represent a concept or concepts in the EPE.
- **Standard Specificity:** The EPE itself is too broad to understand what is expected.
- **Other**

For performance centrality, the panelists were asked to provide a rating as to whether the performance required to answer the item had *All*, *Some,* or *None* of the student performance described in the EPE. The rating options were defined to the panelist as:

- **All:** The performance of the item is IDENTICAL to the performance of the EPE.
- **Some:** The performance of the item PARTIALLY MATCHES the performance of the EPE; the performance of the EPE is present in the item.
- **None:** The performance of the item is COMPLETELY DIFFERENT from the performance of the EPE.

If a panelist did not believe the item aligned to any of the EPEs, they were asked to indicate whether the item matched any of the domains, the EPEs, or if there was no EPE.

LAL Criterion 4: Content Differs in Range, Balance, and Complexity

To analyze the evaluation questions posed in LAL Criteria 4, ACS evaluated panelists ratings on the alignment of the CSAA items to the EPEs and representation of the layers of complexity.

Evaluation Questions:

1. **Are there an adequate number of items representing each domain on the CSAA test form?**
2. **Does the collection of the CSAA items represent multiple EPEs within each domain of the blueprints (range of knowledge)?**
3. **Does the balance of representation indicate similar emphasis of CSAA items as the blueprint?**
4. **Is there a range of complexity levels across the content of the CSAA items?**

To address these four evaluation questions, ACS considered the following three data collection sources:

- Panelist item-level ratings of alignment to the EPEs.
  - The panelists were asked to identify the items that had a direct alignment to EPEs. Direct alignment means that if a student were to answer the item correctly it would support the claim that they have achieved the expectation in the EPE.
- Expectations for content representation outlined in the CSAA blueprints.
  - The blueprint for each CSAA test form includes a target percentage of items that will represent each domain.
- Panelist item-level ratings of the levels of complexity.
  - The panelists were asked to consider the content area-specific descriptors of the three entry-levels and to identify the level which best described the level of complexity presented by the item, as well as the support provided based on the presentation of the item and instructions for test administration.

Using these sources of evidence, each of the four validity questions described by Flowers could be reviewed and evaluated.

LAL Criterion 5: Differentiation Across Grade Levels

ACS also collected holistic ratings from two panelists that indicated the degree to which they believed the CSAA demonstrated changing expectations of content across grade levels. These panelists were provided additional training on this process prior to the start of this portion of the study. The facilitators used Flowers (2009) categories of differentiation to rate the CSAA.

Evaluation Question:

1. **Is there a change in emphasis of age-appropriate content across grade levels (i.e., differentiation)?**

To address this evaluation question, ACS considered the following source of evidence:

1. Selected panelists provided holistic ratings to indicate the degree to which they believed the CSAA grade-level assessments demonstrated changing expectations of content across grade levels. The categories of differentiation were defined to panelists as:
    a. **Broader:** Higher-grade items reflect broader application of target skill or knowledge.
    b. **Deeper**: Higher-grade items reflect deeper mastery of the target skill or knowledge.
    c. **Prerequisite**: Lower-grade items reflect a different but prerequisite skill for mastery of the higher-grade test items.
    d. **New:** The higher-grade has a new skill or knowledge unrelated to skills or knowledge covered at prior grades.
    e. **Identical:** Higher-grade items appear identical to one of the lower grade test items.

LAL Criterion 7: Barriers to Performance

To analyze the evaluation question posed in LAL Criteria 7, ACS evaluated ratings from the panelists that focused on the degree to which the CSAA assessments are accessible to students' varying levels of communicative abilities.

Evaluation Question

1. **Is the content accessible to students with varying levels of communicative competence?**

It should be noted that there are several ways in which an assessment can be accessible for students with varying communicative competence: by designing it in a way that allows for flexibility of responses, by identifying allowable accommodations based on the students' needs, or by identifying allowable modifications to the assessment design. The purpose of this question is to evaluate how accessible the CSAA test forms are based on the identified levels of communicative competence which were defined to panelists as:

- Visual impairment / legally blind
- Hearing impaired
- Deaf & blind
- Nonverbal; responds using printed words
- Nonverbal; responds using pictures
- Nonverbal; responds using manual signs
- Nonverbal; responds using eye gaze
- Verbal but no use of hands
- Communicates with objects or by indicating yes/no
- No clear, intentional communication, even at the non-symbolic level

To address this evaluation question, ACS considered the following source of evidence:

- Panelist ratings on the accessibility of the CSAA for students with various levels of communicative competence. Panelists were asked to review the test form and the CSAA *Test Administration Manual* (TAM) and then determine the extent to which students with each level of communicative competence could respond to the assessment. The rating scale was defined to panelists as:
    - Can do alternate assessment as designed, with **flexibility** built into tasks.
    - Can do with **accommodations** available/stated (no change in construct being measured).
    - Can do with **modifications** or supports stated (may alter construct being measured).
    - **No provisions** for students with these characteristics.
- In addition to the question on accessibility, panelists were also asked to review the following two questions and indicate their response with a yes/no ratings:
    - Does the assessment include any way of capturing responses or any responses for students who do not yet have clear, intentional communication even at the non-symbolic level?
    - Are the accommodations, modifications, and supports that can be used clearly defined to the extent that standardized administration of the assessment is possible?

Characteristics of Panelists

A total of 11 panelists across the three panels were recruited to complete the alignment activities. Three of the panelists reviewed the grade 8 assessment, while four reviewed the grade 5 assessment and an additional four reviewed the grade 11 assessment. Consistent with the LAL methodology, Cognia and MSAA Science Partners worked to recruit a committee of panelists with extensive and well-balanced experience with the intended student population. Panelists were recruited based on the following criteria:

- Hold a bachelor's degree or higher
- Hold degrees in special education and/or had direct work experience with the intended student population
- Hold degrees in education for the respective content area
- Have not had any previous or current involvement in developing the CSAA

Each panelist completed a demographic questionnaire and provided information about their gender, ethnicity, teaching, and professional experience. Demographic information for all panelists is summarized below, with specific data provided in Appendix B.

Approximately 64% of the panelists indicated that their area of expertise was Special Education, with the remaining 36% indicating General Education. Approximately 45% of the panelists were teachers active in the classroom at the time of the study; with an additional 18% working either as a coach for students with disabilities or as an Accessibility Specialist for students in the intended student population. Four of the panelists were employed at Cognia in programs unrelated to the CSAA and did not have any prior knowledge regarding the nature and content of the CSAA. Many of the panel members (45%) indicated that they had more than 15 years of experience within their chosen field, with all but one of the panelists indicating that they had 5 or more years of experience in their current position. The panel was close to evenly split, with 6 of the 11 panelists identified as Women (~55%). Approximately 64% of the panelists identified as White, with the remaining panelists identified across multiple categories including Native Hawaiian/Pacific Islander and Asian or Asian American.

Results

This chapter details the results by alignment criteria and grade level. All data was analyzed using the processes described earlier and the results were evaluated using the guidelines from the associated alignment literature (Flowers et al. 2009). A complete set of all results for all items and grade levels can be found in Appendix D.

LAL Criterion 3: Fidelity with Grade-Level Content and Performance

This criterion includes two evaluation questions focused on content and performance centrality.

Evaluation Question 1: What degree of *content centrality* is maintained between the items and the EPEs?
ACS determined the consensus judgments for content centrality for each item on the CSAA. The results were then consolidated by grade level. The overall results were evaluated using the following criteria:

- **Well-aligned**: At least 90% of items were judged as having a *Near Link or Far Link* in terms of content centrality.
- **Somewhat aligned**: At least 75% of items were judged as having *a Near Link* or *Far Link* in terms of content centrality.
- **Not aligned**: Fewer than 75% of items were judged as having a *Near Link* or *Far Link* in terms of content centrality.

Evaluation Question 2: What degree of *performance centrality* is maintained between the items and the EPEs?
ACS determined the consensus judgments for performance centrality for each item on the CSAA. The results were then consolidated by grade level. The overall results were evaluated using the following criteria:

- **Well-aligned**: At least 90% of items were judged as having *Some* or *All* of the same performance expectations as the EPEs.
- **Somewhat aligned**: At least 75% of items were judged as having *Some* or *All* of the same performance expectations as the EPEs.
- **Not aligned**: Fewer than 75% of items were judged as having *Some* or *All* of the same performance expectations as the EPEs.

The results for centrality are summarized in Tables 1 and 2 below. The items were considered to be *Well Aligned* for all three grade levels. For content centrality, 100% of the items in all three grade levels rated as having a *Near Link* or *Far Link* to the EPE. The results were similar for performance centrality, with all three grade levels considered to be *Well Aligned*. In grades 8 and 11, 100% of the items were identified as having either *All* or *Some* link with the EPEs. The percentage was slightly less for grade 5, with approximately 92% of the items identified as having *All* or *Some* alignment with the intended EPEs. Overall, these findings provide support for the content of the CSAA measuring the intended content and performance as outlined in the EPEs.

Table 1. Content Centrality Results for Grades 5, 8, and 11

Test Forms	Content Centrality	
	% Near + Far	Evaluation
Grade 5	100.0%	Well-aligned
Grade 8	100.0%	Well-aligned
Grade 11	100.0%	Well-aligned

Table 2. Performance Centrality Results for Grades 5, 8, and 11

Test Forms	Performance Centrality	
	% All + Some	Evaluation
Grade 5	92.3%	Well-aligned
Grade 8	100.0%	Well-aligned
Grade 11	100.0%	Well-aligned

LAL Criterion 4: Content Differs in Range, Balance, and Complexity

This criterion includes four evaluation questions focused on how the CSAA represents the EPEs.

Evaluation Question 1: Are there an adequate number of items representing each domain on the CSAA test form?

ACS reviewed the alignment of items to the EPEs and used the following levels to characterize the degree to which the CSAA items represent the domains and prioritized Performance Expectations (PEs):

- **Well-aligned**: At least 90% of the items on the test form align to an EPE defined in the blueprint, no item on the test form reflects expectations not defined in the grade level, and each of the domains in the blueprint is represented by items on the form.
- **Somewhat aligned**: All of the items on the test form align to a domain in the blueprint, at least 75% of the items align to an EPE defined in the blueprint, and no items reflect expectations not defined in the grade level.
- **Not aligned**: Fewer than 75% of the items on the test form align to an EPE defined in the blueprint OR any item on the test form reflects expectations not defined in the grade level.

The results for this first evaluation question are shown in Table 3. The CSAA at each grade level was *Well-Aligned* to the EPEs.

Table 3. Domain Concurrence Results for Grades 5, 8, and 11

Test Forms	Domain Concurrence		
	% Aligned to EPE	% Aligned Outside Target	Evaluation
Grade 5	97.4%	0.0%	Well-aligned
Grade 8	100.0%	0.0%	Well-aligned
Grade 11	97.4%	0.0%	Well-aligned

Evaluation Question 2: Does the collection of the CSAA items represent multiple EPEs within each domain of the blueprints (i.e., range of knowledge)?

ACS reviewed the alignment of items within each domain and used the following levels to characterize the degree to which the CSAA items represent multiple EPEs within each domain of the blueprints:

- **Well-aligned**: The blueprint is well-aligned in terms of range AND at least 50% of the EPEs in each domain are associated with score points on the test.
- **Somewhat aligned**: The blueprint is well-aligned in terms of range AND at least 50% of the EPEs in most domains are associated with score points on the test.
- **Not aligned**: The blueprint is not well-aligned in terms of range OR fewer than 50% of the EPEs in most or all of the domains are associated with score points on the test.

The results for this evaluation question are summarized in Table 4. The values show the percent of EPEs within each domain that were represented with aligned items on each test form (by grade level). The results indicate that the CSAA items were *Well-Aligned* with respect to the range of domains for all three grade levels.

Table 4. Range of Knowledge Results for Grades 5, 8, and 11

Test Forms	Range of Knowledge			
	% PS EPEs with Points Aligned	% LS EPEs with Points Aligned	% ESS EPEs with Points Aligned	Evaluation
Grade 5	100.0%	60.0%	80.0%	Well-aligned
Grade 8	100.0%	75.0%	75.0%	Well-aligned
Grade 11	75.0%	100.0%	50.0%	Well-aligned

Evaluation Question 3: Does the balance of representation indicate similar emphasis of CSAA items as the blueprint?

ACS reviewed the item to EPE alignment results against the specifications within the CSAA blueprints to evaluate each form for balance of representation:

- **Well aligned**: The blueprint is well-aligned in terms of balance AND the proportion of points assigned to each domain is within 10% of the proportion indicated in the blueprint.
- **Somewhat aligned**: The blueprint is well-aligned in terms of balance AND the proportion of points assigned to each domain is within 20% of the proportion indicated in the blueprint.
- **Not aligned**: The blueprint is not well-aligned in terms of balance OR the proportion of points assigned to each domain differs by more than 20% of the proportion indicated in the blueprint.

The results for this evaluation question are summarized in Table 5. The CSAA was classified as *Well-Aligned* for all three grade levels. In all domains, the percentage of points assigned to the aligned items was within 10% of the targets designated in the blueprints.

Table 5. Balance of Representation Results for Grades 5, 8, and 11

Test Forms	Balance of Representation				
	BOR Index	% PS Points within Target	% LS Points within Target	% ESS Points within Target	Evaluation
Grade 5	0.91	1.5%	1.8%	0.8%	Well-aligned
Grade 8	0.88	3.5%	4.2%	0.8%	Well-aligned
Grade 11	0.86	6.8%	3.5%	0.8%	Well-aligned

Evaluation Question 4: **Is there a range of complexity levels across the content of the CSAA items?**

ACS reviewed the results of each panel aligning the CSAA items to the three cognitive complexity levels used for the CSAA. ACS compared the aligned cognitive complexity levels of the items to the intended complexity, as defined within the EPEs. The following criteria were used to classify the ratings:

- **Well-aligned**: At least 90% of the items on the test form align to a cognitive complexity defined in the EPEs.
- **Somewhat aligned**: At least 50% of the items on the test form align to a cognitive complexity defined in the EPEs.
- **Not aligned**: Fewer than 50% of the items on the test form align to a cognitive complexity defined in the EPEs.

The results of the cognitive complexity analysis are presented in Table 6. All three grade levels were classified as *Well-Aligned* for the cognitive complexity levels.

Table 6. Cognitive Complexity Results for Grades 5, 8, and 11

Test Forms	Cognitive Complexity	
	% Meeting Target	**Evaluation**
Grade 5	97.4%	Well-aligned
Grade 8	100.0%	Well-aligned
Grade 11	100.0%	Well-aligned

LAL Criterion 5: Differentiation Across Grade Levels

Evaluation Question 1: Is there a change in emphasis of age-appropriate content across grade levels (i.e., differentiation)?

ACS reviewed the panelists' ratings of the degree to which the content differs across grade levels. The panelists compared the content and expectations for each assessment and determined if there is differentiation according to the *Differentiation Rubric*.

The expectation for LAL Criterion 5 is that the content of the CSAA test forms differs across grade levels (different knowledge and skills being measured). As students progress through the grade levels, they should have the opportunity to demonstrate that their content knowledge has grown broader and deeper, and that they have learned new information. A good differentiation of content also should minimize repetition of the same skills and concepts across grade levels. Two panelists were selected and asked to provide a holistic rating of the progression across adjoining grade levels of the CSAA.

The expectation for what is considered *Acceptable* differentiation is that the holistic rating for % Broader, % Deeper, % Prerequisite, and % New should be at least 25% and the holistic rating for % Identical should be no more than 25%. The results for this criterion are shown in Table 7.

Table 7. Differentiation Across Grade Levels Results

Test Forms	Differentiation Across Grade Levels					
	% Broader	% Deeper	% Prerequisite	% New	% Identical	Evaluation
Grade 8 to Grade 5	75.0%	75.0%	75.0%	75.0%	0.0%	Well-aligned
Grade 11 to Grade 8	75.0%	75.0%	50.0%	50.0%	0.0%	Well-aligned

The panelists reported acceptable holistic ratings of differentiation across all grade levels and within all rating categories. The ratings for all grade levels indicated that the CSAA demonstrated increased breadth and depth of the content.

LAL Criterion 7: Barriers to Performance

Evaluation Question 1: Is the content accessible to students with varying levels of communicative competence?

ACS reviewed panelist rating consensus on how accessible the CSAA is for students with a variety of communication competence. The expectation for LAL Criterion 7 is that the assessment is accessible to all students regardless of their level of communicative competence. Panelists indicated the accessibility of the CSAA for each level of communicative competence with one of the following rating options:

1. Can do alternate assessment as designed, with **flexibility** built into the items
2. Can do with **accommodations** available / stated (no change in construct measured)
3. Can do with **modifications** or supports stated (may alter construct being measured)
4. **No provision** for students with this characteristic

The first three options denote that the CSAA is accessible to students, at least to some degree. When panelists selected the first option, they were indicating that students with that specific level of communicative competence can access the CSAA because of the flexible nature of the items. This option is the preferred rating because it means that the assessment is already designed to be accessible to students with that communicative competence. The second option indicates that certain accommodations will need to be utilized by the student and/or test administrator so that the student can access the assessment. The possible accommodations offered to students are described in the *Test Administration Manual* (TAM). The third option indicates that students with this specific level of communicative competence will need modifications to the assessment beyond what is described in the *Test Administration Manual* (TAM). These modifications may even alter the construct that the assessment is intended to measure. The fourth option (no provisions) indicates that the CSAA is not accessible to students with that specific type of communicative competence (not as designed, with accommodations, or modifications).

The final two evaluations asked panelists to respond with either **yes** or **no**. Specifically, panelists first indicated whether the CSAA was or was not accessible to students with no clear method of communication and the second indicated whether the accommodations, modifications, and supports were adequately defined in the test documents. The consensus ratings are summarized in Table 8 below. Overall, the panelists reported that the CSAA was accessible to students with most levels of communicative competence. The only group of students who the panelists indicated that the CSAA were not accessible was for students with no clear, intentional communication even at the non-symbolic level.

Table 8. Minimizing Barriers Consensus Ratings for Grades 5, 8, and 11

Exceptionality	Grade 5		Grade 8		Grade 11	
	Rating	Evaluation	Rating	Evaluation	Rating	Evaluation
Visual Impairment / legally blind	Can do with accommodations	Accessible	Can do with modifications	Somewhat accessible	Can do with accommodations	Accessible
Hearing Impaired	Can do as designed	Accessible	Can do as designed	Accessible	Can do with accommodations	Accessible
Deaf & Blind	Can do with accommodations	Accessible	Can do with modifications	Somewhat accessible	Can do with accommodations	Accessible
Nonverbal; responds using printed words	Can do with accommodations	Accessible	Can do with accommodations	Accessible	Can do as designed	Accessible
Nonverbal; responds using pictures	Can do with modifications	Somewhat accessible	Can do with accommodations	Accessible	Can do as designed	Accessible
Nonverbal; responds using manual signs	Can do with accommodations	Accessible	Can do with accommodations	Accessible	Can do as designed	Accessible
Nonverbal; responds using eye gaze	Can do with accommodations	Accessible	Can do with accommodations	Accessible	Can do as designed	Accessible
Verbal but no use of hands	Can do with accommodations	Accessible	Can do with accommodations	Accessible	Can do as designed	Accessible
Communicates with objects or by indicating yes /no	Can do with modifications	Somewhat accessible	Can do with accommodations	Accessible	Can do as designed	Accessible
Does the assessment include any way of capturing responses for students who do not yet have a clear, intentional communication even at the non-symbolic level?	No	Not accessible	No	Not accessible	No	Not accessible

Are the accommodations, modifications, and supports that can be used clearly defined to the extent that standardized administration of the assessment is possible?	Yes	Accessible	Yes	Accessible	Yes	Accessible

Supplementary Analysis

In addition to the data collected and analyses completed consistent with the LAL alignment framework, additional data was collected and analyzed to provide a more comprehensive understanding of the CSAA. During the development of the CSAA test items, all items were assigned to a given EPE. The EPE was, in turn, aligned to the three dimensions of the *Framework for K-12 Science Education* (NRC, 2011). The three dimensions outlined in the *Framework* are:

- Disciplinary Core Ideas/Core Ideas (DCIs/CIs)
- Science and Engineering Practices (SEPs)
- Cross-Cutting Concepts (CCCs)

As a result of this work, all of the items that were aligned at the workshop had not only an EPE, but each EPE was also directly aligned to each of the three dimensions. In order to evaluate how well the dimensions actually aligned to the designated dimensions, after panelists determined the EPE for each item, panelists were shown the assigned dimensions for the given EPE. They were then asked if the assigned or linked dimensions were 1) Aligned, 2) Somewhat aligned, or 3) Not aligned. The collection of this data and the summaries provided below are designed to provide supplementary information for Cognia and its MSAA Science Partners to consider as they review the results of the alignment workshop.

Three important caveats to this data collection should be noted here. First, this exercise was confirmatory by its process. Panelists were not presented the full list of possible dimensions. Instead, they were presented the linked dimension and asked to confirm whether they felt the designated dimension was assessed by the item. Second, during the development of items, the Level 3 items are three-dimensional and aligned to the same three dimensions (DCI, SEP, and CCC) as the general education PE. The level 2 and Level 1 items have been written as progression points that students would likely move through as they build proficiency towards the Level 3 EPE. All Level 2 items are two-dimensional, occasionally three-dimensional. All Level 1 items are one-dimensional (DCI), occasionally two-dimensional. This allows instruction and learning to be appropriately focused and scaffolded in a logical, accessible sequence towards the complex expectation of integrating multiple facets of science (DCI, SEP, and CCC) in the target performance.

As can be seen in Table 9 below, the items across the CSAA demonstrated strong alignment to the dimensions. For grades 8 and 11, every item on the CSAA had its linked alignment to the EPE/NGSS/*Framework* dimensions confirmed by the workshop panel. In grade 5, the percent of items that had their NGSS linked alignment confirmed ranged from a low of 85% of the test items with a confirmed link to the CCC and 90% of the test items with a confirmed link to the DCI.

Table 9. Dimension Item Alignment

	Grade 5	Grade 8	Grade 11
Disciplinary Core Ideas	90%	100%	100%
Science and Engineering Practices	87%	100%	100%
Cross-Cutting Concepts	85%	100%	100%

Evaluation

To evaluate the alignment study, we applied the validation framework suggested by Davis-Becker and Buckendahl (2013). Within this framework, the authors suggested four sources of evidence that should be considered in the validation process: procedural, internal, external, and utility. At the end of the alignment study, the panelists completed an online evaluation survey. The panelists were asked to rate their agreement (*strongly disagree, disagree somewhat, agree somewhat,* or *strongly agree*) with a series of statements about the alignment study activities and experience. The results are presented in Tables 10, 11, and 12 for each grade level.

Table 10. Panelist Evaluation Results for Grade 5

Panelist Evaluation: Grade 5				
Survey Questions	**Response %**			
	Strongly disagree	**Disagree somewhat**	**Agree somewhat**	**Strongly agree**
The training and resources provided were clear.	0%	0%	0%	100%
The training and resources provided were beneficial to support my participation in the study.	0%	0%	25%	75%
The rating process used was appropriate to accomplish the goals of the study.	0%	0%	25%	75%
I was able to make a contribution to the study.	0%	0%	75%	25%
The process used resulted in sound information regarding the assessment and EPEs.	0%	0%	25%	75%
Participating in the meeting was professionally rewarding.	0%	0%	50%	50%
The work accomplished here will help students.	0%	0%	50%	50%

Table 11. Panelist Evaluation Results for Grade 8

Panelist Evaluation: Grade 8				
Survey Questions	Response %			
	Strongly disagree	Disagree somewhat	Agree somewhat	Strongly agree
The training and resources provided were clear.	0%	0%	0%	100%
The training and resources provided were beneficial to support my participation in the study.	0%	0%	0%	100%
The rating process used was appropriate to accomplish the goals of the study.	0%	0%	0%	100%
I was able to make a contribution to the study.	0%	0%	0%	100%
The process used resulted in sound information regarding the assessment and EPEs.	0%	0%	0%	100%
Participating in the meeting was professionally rewarding.	0%	0%	0%	100%
The work accomplished here will help students.	0%	0%	0%	100%

Table 12. Panelist Evaluation Results for Grade 11

Panelist Evaluation: Grade 11				
Survey Questions	Response %			
	Strongly disagree	Disagree somewhat	Agree somewhat	Strongly agree
The training and resources provided were clear.	0%	0%	0%	100%
The training and resources provided were beneficial to support my participation in the study.	0%	0%	0%	100%
The rating process used was appropriate to accomplish the goals of the study.	0%	0%	0%	100%
I was able to make a contribution to the study.	0%	0%	0%	100%
The process used resulted in sound information regarding the assessment and EPEs.	0%	0%	0%	100%
Participating in the meeting was professionally rewarding.	0%	0%	0%	100%
The work accomplished here will help students.	0%	0%	0%	100%

The results of the evaluation survey reflect high levels of satisfaction with the process and the outcomes of the activity. This indicates that the panelists found the alignment training to be effective and the process to be worthwhile. Overall, the evaluation results support the validity of the overall process and methodology followed and provide strong evidence that panelists were comfortable with the process and results of the alignment.

References

Davis-Becker, S. L., & Buckendahl, C. W. (2013). A proposed framework for evaluating alignment studies. *Educational Measurement Issues and Practice, 32*(1), 23-33.

Flowers, C., Wakeman, S., Browder, D., & Karvonen, M. (2009). Links for academic learning (LAL): A conceptual model for investigating alignment of alternate assessments based on alternate achievement standards. *Educational Measurement: Issues and Practice, 28(1),* 25-37.

National Research Council (NRC) (2011). *A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas.*

Appendix A: History of EPEs

The MSAA Science is aligned to and assesses academic standards for three-dimensional science standards that is appropriate for the student population. Three-dimensional science standards, such as the Next Generation Science Standards (NGSS), are based on *A Framework for K-12 Science Education* (National Research Council, 2012). Standards based on the *Framework* are complex science standards (often termed Performance Expectations, or PEs) that integrate three dimensions in each standard: Disciplinary Core Ideas (DCIs), Science and Engineering Practices (SEPs), and Crosscutting Concepts (CCCs).

The DCIs included in the *Framework* represent the science content ideas from Physical Sciences, Life Sciences, Earth and Space Sciences, and Engineering Design that are considered to be most central to science education. The writers of the *Framework* chose the DCIs for being major organizing principles of the disciplines, providing key tools for understanding or investigating more complex ideas and solving problems, and relating to the interests, personal and/or societal concerns, and life experiences of students (*Framework*, p. 31). While the *Framework* focuses on a more limited set of core ideas than past science standards did, resulting standards developed from the *Framework* still have a very large number of PEs in each grade span. To develop an appropriate science assessment for students with the most significant cognitive disabilities (SCD), the number of standards being assessed had to be further limited.

A total of 12 PEs (based on the *Framework* and the NGSS) were chosen as the focus for each grade test. In identifying these PEs, the goal was to provide reasonable representation across the DCIs and to focus on the most fundamental, broad principles that would be accessible and meaningful for this student population as a progression from elementary to middle to high school. In support of that, the selected PEs represent content from all grades in the grade band for each test. For the grade 5 test, for example, PEs from grades 3, 4, and 5 are included; the progression of standards in those grades is such that to provide a solid representation of the core ideas and understandings that students need to progress from elementary school to middle school, the PEs needed to be selected across grade bands. Likewise for the grade 8 and high school test (and even though the standards are presented as grade band in these levels), the selected PEs would typically be taught across multiple years in middle school and high school, respectively. Information regarding the history of the MSAA Science test design including stakeholder reviews is available in Chapter 2. The following Table 3-1 shows the collection of PEs chosen to be assessed on the grade 5 test.

Table 3-1. Selected Performance Expectations for Grade 5 Test

Performance Expectation (PE)	DCI	SEP	CCC
5-PS1-2. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.	PS1.A–Structure and Properties of Matter PS1.B–Chemical Reactions	Using Mathematics and Computational Thinking	Scale, Proportion, and Quantity
3-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.	PS2.A–Forces and Motion	Planning and Carrying Out Investigations	Patterns
5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.	PS2.B–Types of Interactions	Engaging in Argument from Evidence	Cause and Effect
4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another. *	PS3.B–Conservation of Energy and Energy Transfer PS3.D–Energy in Chemical Processes and Everyday Life ETS1.A–Defining and Delimiting an Engineering Problem	Designing Solutions	Energy and Matter
5-PS3-1. Use models to describe that energy in animals' food (used for body repair, growth, and motion, and to maintain body warmth) was once energy from the sun.[1]	PS3.D–Energy in Chemical Processes and Everyday Life	Developing and Using Models	Energy and Matter
4-LS1-1. Construct an argument that plants, and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.	LS1.A–Structure and Function	Engaging in Argument from Evidence	Systems and System Models
3-LS3-1. Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.	LS3.A–Inheritance of Traits LS3.B–Variation of Traits	Analyzing and Interpreting Data	Patterns
3-LS4-1. Analyze and interpret data from fossils to provide evidence of the organisms and environments in which they lived long ago.	LS4.A–Evidence of Common Ancestry and Diversity	Analyzing and Interpreting Data	Scale, Proportion, and Quantity
5-ESS1-2. Represent data in graphical displays to reveal patterns of daily changes in the length and direction of shadows, day and night, and the seasonal appearance of some stars in the night sky.	ESS1.B–Earth and the Solar System	Analyzing and Interpreting Data	Patterns
3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.	ESS2.D–Weather and Climate	Analyzing and Interpreting Data	Patterns
5-ESS2-1. Develop a model using an example to describe ways in which the geosphere, biosphere, hydrosphere, and/or atmosphere interact.	ESS2.A–Earth Materials and Systems	Developing and Using Models	Systems and System Models
5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.	ESS3.C–Human Impacts on Earth Systems	Obtaining, Evaluating, and Communicating Information	Systems and System Models

**PEs marked with an asterisk incorporate Engineering constructs.*
[1]This PE crosses Physical Sciences and Life Sciences. It will be classified in Life Sciences in fulfilling the blueprint distribution.

For the grade 5 test, PEs were chosen from grades 3–5 to generate the best representation of broad, fundamental principles for the elementary grade assessment. Because the NGSS spread science topics out across grades in the 3–5 grade band, there are some key content ideas for forces and motion, as well as for heredity, biological

evolution, and weather, that only appear in standards at grade 3. Although the test is targeted for administration to students in grade 5, the following four grade 3 PEs were included to ensure focus on all foundational areas that students would need exposure to, to prepare for middle school expectations:

- 3-PS2-2 focuses on basic patterns of motion, as a foundation of the cause-and-effect exploration of forces and motion. This PE also provides an opportunity to expose students to the various types of forces, from physical contact forces to gravity and magnetism, linking to another motion/forces PE within elementary and to other motion/forces PEs in later grades.
- 3-LS3-1 introduces the fundamental principle of inheritance of traits (traits passed from parents to offspring) as well as the idea of variation, which are both cornerstones of the study of genetics and biological evolution.
- 3-LS4-1 provides an accessible foundation for thinking about evidence of organisms' fit to the environment, and changes in organisms and environments over time.
- 3-ESS2-1 focuses on the most foundational understandings of weather, which are then extended in other elementary PEs and in later grades in studying interactions of Earth's systems, geoscience processes changing Earth's surface, water cycling through Earth's systems, and the larger concept of climate.

It should also be noted that while the chosen PEs may seem to lean more toward Physical Sciences than Life Sciences (5 PEs coded to Physical Sciences and only 3 PEs coded to Life Sciences), PE 5-PS3-1 is a "crossover" PE that connects the physical science concept of energy in everyday life with the life science concept of matter and energy flow. Although 5-PS3-1 has a physical science coding, it would typically be taught within an ecology unit (and is therefore classified as a Life Science PE in the test blueprint).

Additionally, it may be noted that there are no PEs in the elementary grade test for Physical Sciences DCI PS4, Waves and Their Application in Technologies for Information Transfer. The concept of waves is abstract and is therefore viewed as more appropriate to address in the grade 8 test than in this grade band for students with significant cognitive disabilities. Likewise in Life Sciences, although no performance expectation is explicitly aligned to DCI LS2 (Ecosystems: Interactions, Energy, and Dynamics), PE 5-PS3-1 overlaps heavily with these concepts. All other DCIs are represented in the elementary grade test. Additional detailed information regarding the rationale of PE selections for all grades is provided in Appendix D.

As PEs were selected and finalized for each grade band, the progression of DCIs was checked to help validate the appropriateness of the collection of PEs chosen for assessment on each grade's test. The following tables show an example of the final prioritized PEs and associated DCIs for the Physical Sciences across grades 5, 8, and HS.

Table 3-2. Selected Performance Expectations for Physical Sciences Across Grades 5, 8, and HS

Grade	Performance Expectation (PE)	DCI
5	5-PS1-2. Measure and graph quantities to provide evidence that regardless of the type of change that occurs when heating, cooling, or mixing substances, the total weight of matter is conserved.	PS1.A PS1.B
	3-PS2-2. Make observations and/or measurements of an object's motion to provide evidence that a pattern can be used to predict future motion.	PS2.A
	5-PS2-1. Support an argument that the gravitational force exerted by Earth on objects is directed down.	PS2.B
	4-PS3-4. Apply scientific ideas to design, test, and refine a device that converts energy from one form to another.*	PS3.B PS3.D ETS1.A
8	MS-PS1-2. Analyze and interpret data on the properties of substances before and after the substances interact to determine if a chemical reaction has occurred.	PS1.A PS1.B
	MS-PS2-2. Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.	PS2.A
	MS-PS3-5. Construct, use, and present arguments to support the claim that when the kinetic energy of an object changes, energy is transferred to or from the object.	PS3.B
	MS-PS4-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.	PS4.A PS4.B
HS	HS-PS1-2. Construct and revise an explanation for the outcome of a simple chemical reaction based on the outermost electron states of atoms, trends in the periodic table, and knowledge of the patterns of chemical properties.	PS1.A PS1.B
	HS-PS2-3. Apply scientific and engineering ideas to design, evaluate, and refine a device that minimizes the force on a macroscopic object during a collision.*	PS2.A ETS1.A ETS1.C
	HS-PS2-5. Plan and conduct an investigation to provide evidence that an electrical current can produce a magnetic field and that a changing magnetic field can produce an electrical current.	PS2.B PS3.A
	HS-PS3-2. Develop and use models to illustrate that energy at the macroscopic scale can be accounted for as a combination of energy associated with the motions of particles (objects) and energy associated with the relative positions of particles (objects).	PS3.A

**PEs marked with an asterisk incorporate Engineering constructs.*

Table 3-3. DCI Coverage for Physical Sciences Across Grades 5, 8, and HS

	Physical Sciences Disciplinary Core Idea (DCI) Coverage Across Grades												
	PS1.A	PS1.B	PS1.C	PS2.A	PS2.B	PS2.C	PS3.A	PS3.B	PS3.C	PS3.D	PS4.A	PS4.B	PS4.C
Grade 5	X	X		X	X			X		X			
Grade 8	X	X		X				X			X	X	
Grade HS	X	X		X	X		X						

Ultimately, the selected PEs within and across grades represent a content progression supporting essential learning and understandings in the Physical Sciences. The constructs of structure and properties of matter, chemical reactions, forces and motion, types of interactions, and conservation and transfer of energy are all well-represented across the grade bands. Additionally, basic understanding of waves and their behavior is included in grade 8.

The representation of SEPs and CCCs across the selected PEs was also reviewed to ensure most, if not all, SEPs and CCCs were included for each grade test. Likewise, one or two engineering-aligned PEs were included in the selected PEs for each grade test, as engineering constructs are included in the *Framework* as both SEPs and DCIs. As can be seen in Table 3-1 for the grade 5 test, the selected PEs incorporate seven of the eight SEPs and five of the seven CCCs (with the other two CCCs not actually included in the elementary grade band in NGSS standards). There is also one engineering-aligned PE included, 4-PS3-4. Additional detailed information regarding the final prioritized PEs and associated DCIs for the Physical Sciences, Life Sciences, and Earth and Space Sciences across all three grades is provided in Appendix D.

Prior to the start of item development, the Extended Performance Expectations (EPEs) were created. The EPEs are the standards developed to define academic grade-level content that is clearly linked to *Framework*-defined grade-level content, but at reduced complexity, breadth, and depth appropriate for students with significant cognitive disabilities. These EPEs represent the assessable grade-level content for the MSAA Science.

3.1.1 Extended Performance Expectations (EPEs)

Each selected general education PE has been extended into three access points to create the EPEs. The operational items vary in complexity following those three access levels of the EPEs. The highest access point, Level 3, is intended to closely mirror the general education PE and represents the most cognitively demanding target for this student population. The Level 3 EPE is three-dimensional and aligned to the same three dimensions (DCI, SEP, and CCC) as the general education PE. However, the Level 3 EPE typically has a slightly lower cognitive demand than the general education PE. For example, the EPE may limit the number or types of examples that students will be expected to connect to the construct. Depending on the particular EPE and the phenomenon or context chosen for assessing the EPE, some items may not encompass all parts of the EPE, particularly if it has multiple examples/contexts listed. All Level 3 items will, however, align to all three dimensions and the essence of the EPE.

The other two access points, Level 2 and Level 1, have been written as progression points that students would likely move through as they build proficiency towards the Level 3 EPE. Level 2 and Level 1 EPEs are therefore intended to provide a scaffold for instruction and learning by supporting students in the attainment of the target knowledge and skills expressed in the Level 3 EPE. All Level 2 EPEs are two-dimensional, occasionally three-dimensional. All Level 1 EPEs are one-dimensional (DCI), occasionally two-dimensional. This allows instruction and learning to be appropriately focused and scaffolded in a logical, accessible sequence towards the complex expectation of integrating multiple facets of science (DCI, SEP, and CCC) in the target performance. Additionally, in evaluating alignment to the DCI in Level 1 items, and some Level 2 items, alignment is achieved through the use of the vocabulary and examples/contexts matching the DCI. For this population of students, simply being able to process the words and context of the DCI to answer the item is evidence of engagement with and use of DCI knowledge. Regarding the SEP and CCC, the Level 2 (and Level 1, if two-dimensional) access point may align to an SEP and/or CCC other than the ones in the general education PE and Level 3 EPE. The rationale for this is two-fold: first, this approach mirrors best practices for classroom instruction on three-dimensional science and supports an emphasis on including all SEPs and CCCs, not just select ones, over the course of instruction; and second, this approach allows a scaffolded progression towards proficiency to be developed for each EPE, rather than trying to differentiate nuances of the *degree* to which a student is demonstrating a singular target learning outcome.

Appendix B: Summary of demographic data and experience for panelists

Grade	State/ Entity	Location	Current Position	Years of Experience	Area of Expertise	Gender	Race / Ethnicity
5	Arizona	Suburban	ESS Coach	More than 15	Special Education	Woman	White or Caucasian
5	Arizona	Urban	5th Grade Teacher	5-10	Special Education	Man	Asian or Asian American
5	Cognia	Suburban	Temp	0-5	Special Education	Man	White or Caucasian
5	Cognia	Suburban	Content Specialist II - Math	More than 15	Special Education	Woman	White or Caucasian
8	Arizona	Rural	Teacher	5-10	Special Education	Man	Native Hawaiian / Pacific Islander
8	Cognia	Suburban	Scoring Leadership	5-10	Special Education	Man	White or Caucasian
8	Cognia	Suburban	Scoring Site Manager	5-10	General Education	Man	White or Caucasian
11	Arizona	Rural	Special Education Teacher	More than 15	General Education	Woman	Asian or Asian American
11	Arizona	Urban	Teacher	More than 15	General Education	Woman	Multi
11	Cognia	Rural	Accessibility Specialist	10-15	Special Education	Woman	White or Caucasian
11	Maine	Rural	Teacher	More than 15	General Education	Woman	White or Caucasian

Appendix C: Training materials

(Provided under separate cover)

Appendix D: Data collection by grade level and items

Table C1: Centrality ratings for Grade 5

Set #	Item #	Consensus EPE	Content Centrality	Performance Centrality
Grade 5				
1	1	5-PS3-1.1	Near Link	No Consensus
1	2	5-PS3-1.2	Near Link	All
1	3	5-PS3-1.3	Near Link	All
2	4	3-LS4-1.1	Near Link	All
2	5	3-LS4-1.2	Near Link	All
2	6	No Consensus	Near Link	No Consensus
3	7	5-ESS3-1.1	Near Link	All
3	8	5-ESS3-1.2	Near Link	All
3	9	5-ESS3-1.3	Near Link	All
4	10	3-LS4-1.1	Near Link	All
4	11	3-LS4-1.2	Near Link	All
4	12	3-LS4-1.3	Near Link	No Consensus
5	13	3-ESS2-1.1	Near Link	All
5	14	3-ESS2-1.2	Near Link	All
5	15	3-ESS2-1.3	Near Link	All
6	16	3-PS2-2.1	Near Link	All
6	17	3-PS2-2.2	Near Link	All
6	18	3-PS2-2.3	Near Link	All
7	19	5-ESS1-2.1	Near Link	All
7	20	5-ESS1-2.2	Near Link	All
7	21	5-ESS1-2.3	Near Link	All
8	22	5-PS1-2.1	Near Link	All
8	23	5-PS1-2.2	Near Link	All
8	24	5-PS1-2.3	Near Link	All
9	25	4-LS1-1.1	Near Link	All
9	26	4-LS1-1.2	Near Link	All
9	27	4-LS1-1.3	Near Link	All
10	28	3-LS3-1.1	Near Link	All
10	29	3-LS3-1.2	Near Link	All
10	30	3-LS3-1.3	Near Link	All
11	31	5-PS2-1.1	Near Link	All
11	32	5-PS2-1.2	Near Link	All
11	33	3-PS2-2.3	Near Link	All
12	34	5-ESS2-1.1	Near Link	All
12	35	5-ESS2-1.2	Near Link	All
12	36	5-ESS2-1.3	Near Link	All
13	37	4-PS3-4.1	Near Link	All
13	38	4-PS3-4.2	Near Link	All
13	39	4-PS3-4.3	Near Link	All

Table C2: Dimensions and Complexity Level Rating for Grade 5

Set #	Item#	DCI Alignment	SEP Alignment	CCC Alignment	Complexity Level
Grade 5					
1	1	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Somewhat Aligned	Level 1
1	2	Linked DCI Aligned	Linked SEP Aligned	No Consensus	Level 2
1	3	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	No Consensus
2	4	Linked DCI Aligned	No Consensus	Linked CCC Aligned	Level 1
2	5	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
2	6	Linked DCI Aligned	No Consensus	Linked CCC Aligned	Level 3
3	7	Linked DCI Aligned	Linked SEP Aligned	No Consensus	Level 1
3	8	Linked DCI Aligned	Linked SEP Aligned	No Consensus	Level 2
3	9	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
4	10	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
4	11	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
4	12	Linked DCI Aligned	No Consensus	Linked CCC Aligned	Level 3
5	13	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
5	14	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
5	15	Linked DCI Aligned	No Consensus	Linked CCC Aligned	Level 3
6	16	Linked DCI Aligned	No Consensus	Linked CCC Aligned	Level 1
6	17	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
6	18	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
7	19	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
7	20	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
7	21	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
8	22	No Consensus	Linked SEP Aligned	Linked CCC Aligned	Level 1
8	23	No Consensus	Linked SEP Aligned	Linked CCC Aligned	Level 2
8	24	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
9	25	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
9	26	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
9	27	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
10	28	No Consensus	Linked SEP Aligned	Linked CCC Aligned	Level 1
10	29	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
10	30	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
11	31	Linked DCI Aligned	Linked SEP Aligned	No Consensus	Level 1
11	32	Linked DCI Aligned	Linked SEP Aligned	No Consensus	Level 2
11	33	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
12	34	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
12	35	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
12	36	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
13	37	No Consensus	Linked SEP Aligned	Linked CCC Aligned	Level 1
13	38	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
13	39	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3

Table C3: Centrality ratings for Grade 8

Set #	Item #	Consensus EPE	Content Centrality	Performance Centrality
Grade 8				
1	1	MS-LS1-3.1	Near Link	All
1	2	MS-LS1-3.2	Near Link	All
1	3	MS-LS1-3.3	Near Link	All
2	4	MS-ESS1-1.1	Near Link	All
2	5	MS-ESS1-1.2	Near Link	All
2	6	MS-ESS1-1.3	Near Link	All
3	7	MS-LS1-5.1	Near Link	All
3	8	MS-LS1-5.2	Near Link	All
3	9	MS-LS1-5.3	Near Link	All
4	10	MS-PS2-2.1	Near Link	All
4	11	MS-PS2-2.2	Near Link	All
4	12	MS-PS2-2.3	Near Link	All
5	13	MS-PS3-5.1	Near Link	All
5	14	MS-PS3-5.2	Near Link	All
5	15	MS-PS3-5.3	Near Link	All
6	16	MS-ESS2-2.1	Near Link	All
6	17	MS-ESS2-2.2	Near Link	All
6	18	MS-ESS2-2.3	Near Link	All
7	19	MS-PS1-2.1	Near Link	All
7	20	MS-PS1-2.2	Near Link	All
7	21	MS-PS1-2.3	Near Link	All
8	22	MS-PS2-2.1	Near Link	All
8	23	MS-PS2-2.2	Near Link	All
8	24	MS-PS2-2.3	Near Link	All
9	25	MS-ESS3-3.1	Near Link	All
9	26	MS-ESS3-3.2	Near Link	All
9	27	MS-ESS3-3.3	Near Link	All
10	28	MS-LS1-3.1	Near Link	All
10	29	MS-LS1-3.2	Near Link	All
10	30	MS-LS1-3.3	Near Link	All
11	31	MS-ESS3-3.1	Near Link	All
11	32	MS-ESS3-3.2	Near Link	All
11	33	MS-ESS3-3.3	Near Link	All
12	34	MS-PS4-2.1	Near Link	All
12	35	MS-PS4-2.2	Near Link	All
12	36	MS-PS4-2.3	Near Link	All
13	37	MS-LS1-5.1	Near Link	All
13	38	MS-LS2-1.2	Near Link	All
13	39	MS-LS1-5.3	Near Link	All

Table C4: Dimensions and Complexity Level Rating for Grade 8

Set #	Item #	DCI Alignment	SEP Alignment	CCC Alignment	Complexity Level
Grade 8					
1	1	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
1	2	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
1	3	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
2	4	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
2	5	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
2	6	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
3	7	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
3	8	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
3	9	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
4	10	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
4	11	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
4	12	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
5	13	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
5	14	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
5	15	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
6	16	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
6	17	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
6	18	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
7	19	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
7	20	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
7	21	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
8	22	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
8	23	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
8	24	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
9	25	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
9	26	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
9	27	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
10	28	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
10	29	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
10	30	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
11	31	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
11	32	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
11	33	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
12	34	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
12	35	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
12	36	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
13	37	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
13	38	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2

13	**39**	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3

Table C5: Centrality ratings for Grade 11

Set #	Item #	Consensus EPE	Content Centrality	Performance Centrality
Grade 11				
1	1	HS-PS1-2.1	Near Link	All
1	2	HS-PS1-2.2	Near Link	All
1	3	HS-PS1-2.3	Near Link	All
2	4	HS-ESS1-6.1	Near Link	All
2	5	HS-ESS1-6.2	Near Link	All
2	6	HS-ESS1-6.3	Near Link	All
3	7	HS-LS3-1.1	Near Link	All
3	8	HS-LS3-1.2	Near Link	All
3	9	HS-LS3-1.3	Near Link	All
4	10	HS-PS3-2.1	Near Link	All
4	11	HS-PS3-2.2	Near Link	All
4	12	No Consensus	Near Link	All
5	13	HS-LS2-2.1	Near Link	All
5	14	HS-LS2-2.2	Near Link	All
5	15	HS-LS2-2.3	Near Link	All
6	16	HS-PS1-2.1	Near Link	All
6	17	HS-PS1-2.2	Near Link	All
6	18	HS-PS1-2.3	Near Link	All
7	19	HS-LS4-3.1	Near Link	All
7	20	HS-LS4-3.2	Near Link	All
7	21	HS-LS4-3.3	Near Link	All
8	22	HS-PS2-5.1	Near Link	All
8	23	HS-PS2-5.2	Near Link	All
8	24	HS-PS2-5.3	Near Link	All
9	25	HS-ESS2-5.1	Near Link	All
9	26	HS-ESS2-5.2	Near Link	All
9	27	HS-ESS2-5.3	Near Link	All
10	28	HS-LS4-1.1	Near Link	All
10	29	HS-LS4-1.2	Near Link	All
10	30	HS-LS4-1.3	Near Link	All
11	31	HS-ESS2-5.1	Near Link	All
11	32	HS-ESS2-5.2	Near Link	All
11	33	HS-ESS2-5.3	Near Link	All
12	34	HS-ESS2-5.2	Near Link	All
12	35	HS-ESS2-5.2	Near Link	All
12	36	HS-ESS2-5.3	Near Link	All
13	37	HS-LS4-3.1	Near Link	All
13	38	HS-LS4-3.2	Near Link	All
13	39	HS-LS4-3.3	Near Link	All

Table C2: Dimensions and Complexity Level Rating for Grade 11

Set #	Item #	DCI Alignment	SEP Alignment	CCC Alignment	Complexity Level
Grade 11					
1	1	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
1	2	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
1	3	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
2	4	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
2	5	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
2	6	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
3	7	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
3	8	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
3	9	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
4	10	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
4	11	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
4	12	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
5	13	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
5	14	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
5	15	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
6	16	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
6	17	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
6	18	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
7	19	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
7	20	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
7	21	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
8	22	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
8	23	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
8	24	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
9	25	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
9	26	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
9	27	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
10	28	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
10	29	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
10	30	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
11	31	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
11	32	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
11	33	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
12	34	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
12	35	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
12	36	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3
13	37	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 1
13	38	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 2
13	39	Linked DCI Aligned	Linked SEP Aligned	Linked CCC Aligned	Level 3

Alignment Study Training Materials – Separate Cover

Cognia Science Alternate Assessment (CSAA): Overview

Alignment Study

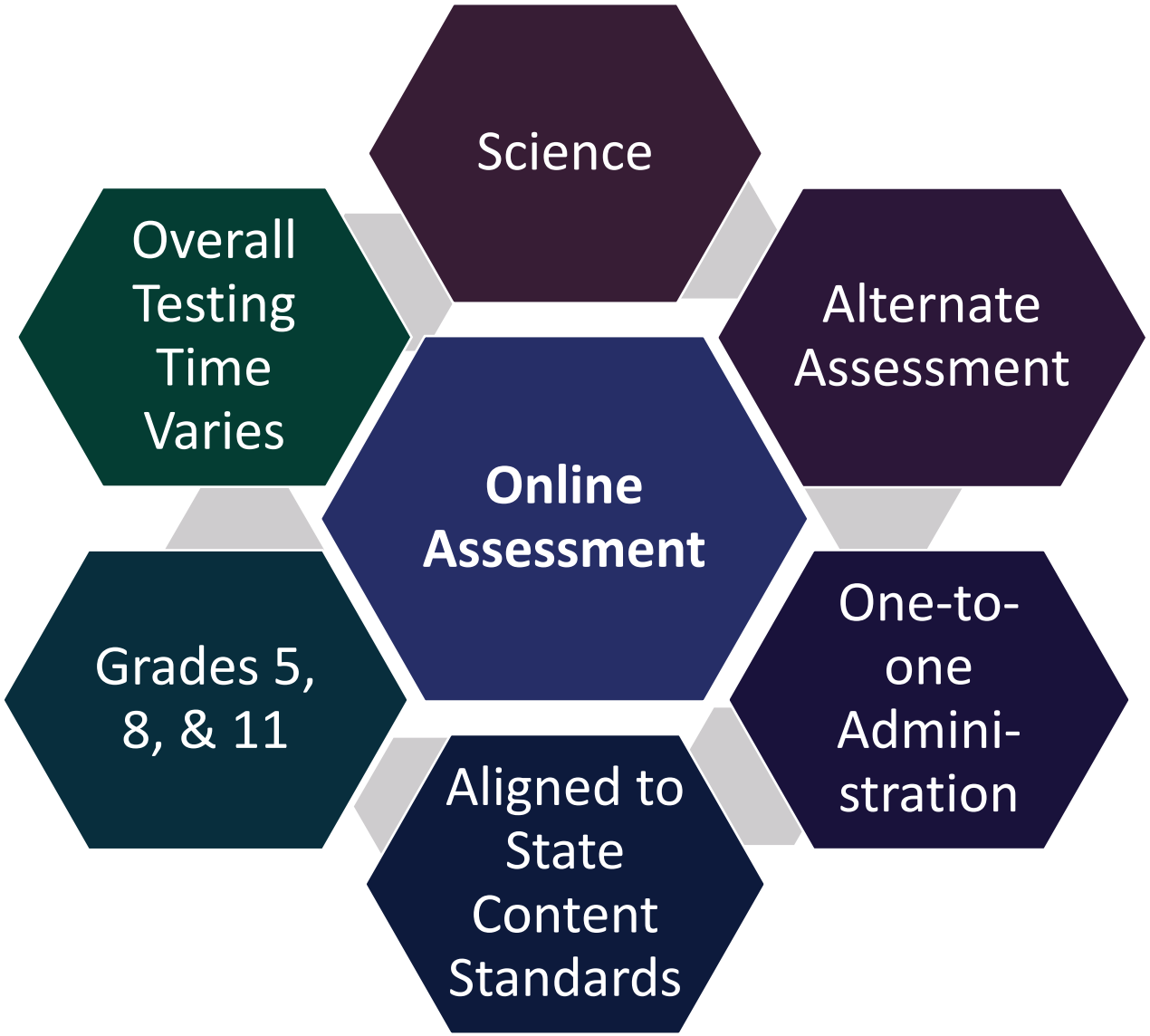
September 2022

Agenda

- Assessing students on an alternate assessment
- CSAA overview
- Assessment features and accommodations
- Demo of the MSAA System
- The three dimensions of science learning

Assessing Students on an Alternate Assessment

What is CSAA?


Science
Overall Testing Time Varies
Alternate Assessment
Online Assessment
Grades 5, 8, & 11
One-to-one Admini-stration
Aligned to State Content Standards

CSAA learner characteristics

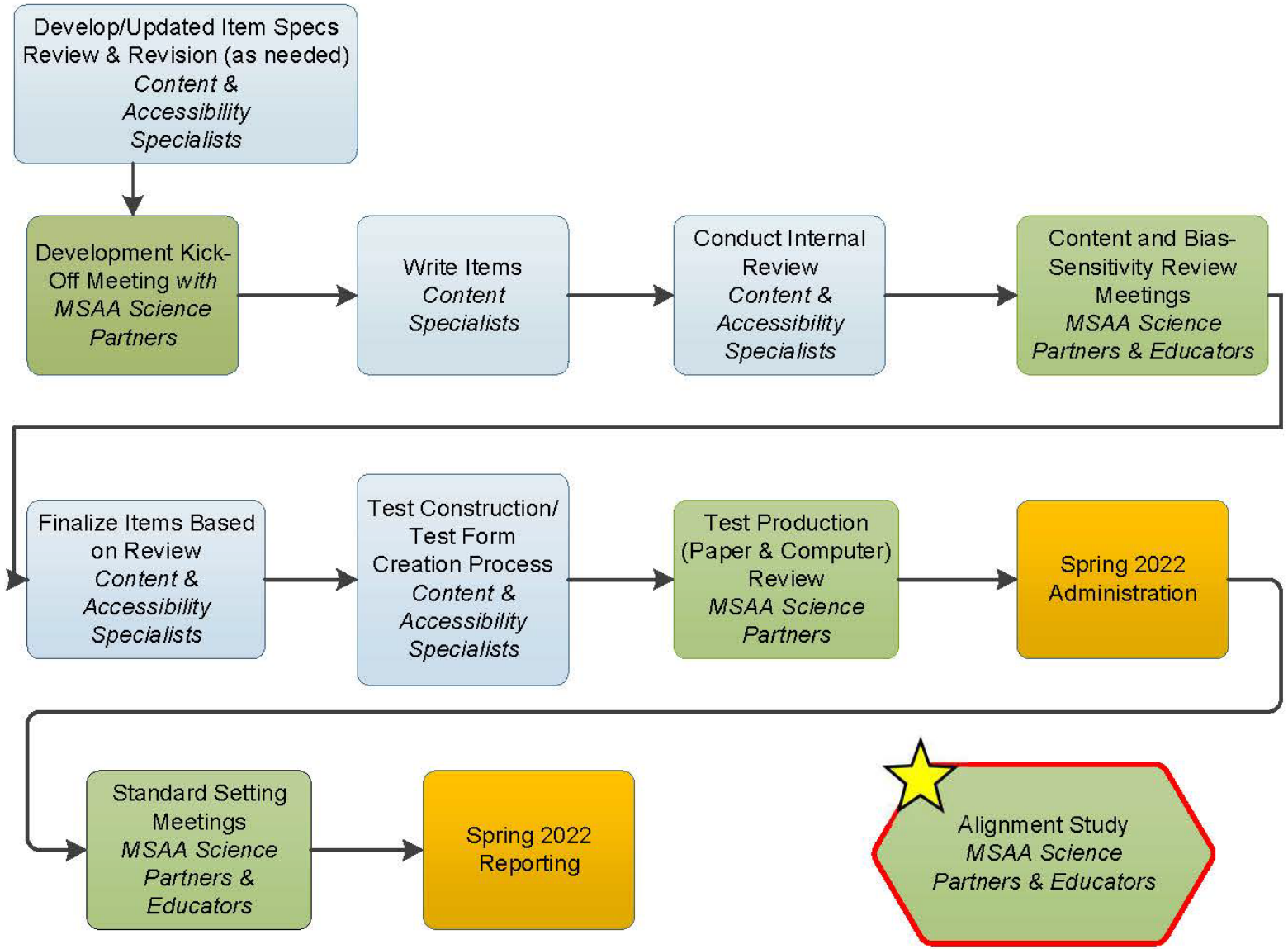
Participation criteria

Learning characteristics

CSAA purpose

Participation	Grade-level content aligned to State Content Standards
	Assesses students in grades 5, 8, and 11 (3rd yr. high school)
Achievement	Higher academic outcomes
	Prepared for post-secondary options
Accountability	Every Student Succeeds Act (ESSA)
	Individuals with Disabilities Education Act (IDEA)

MSAA Development & Administration Process



CSAA Overview

CSAA overview - item types

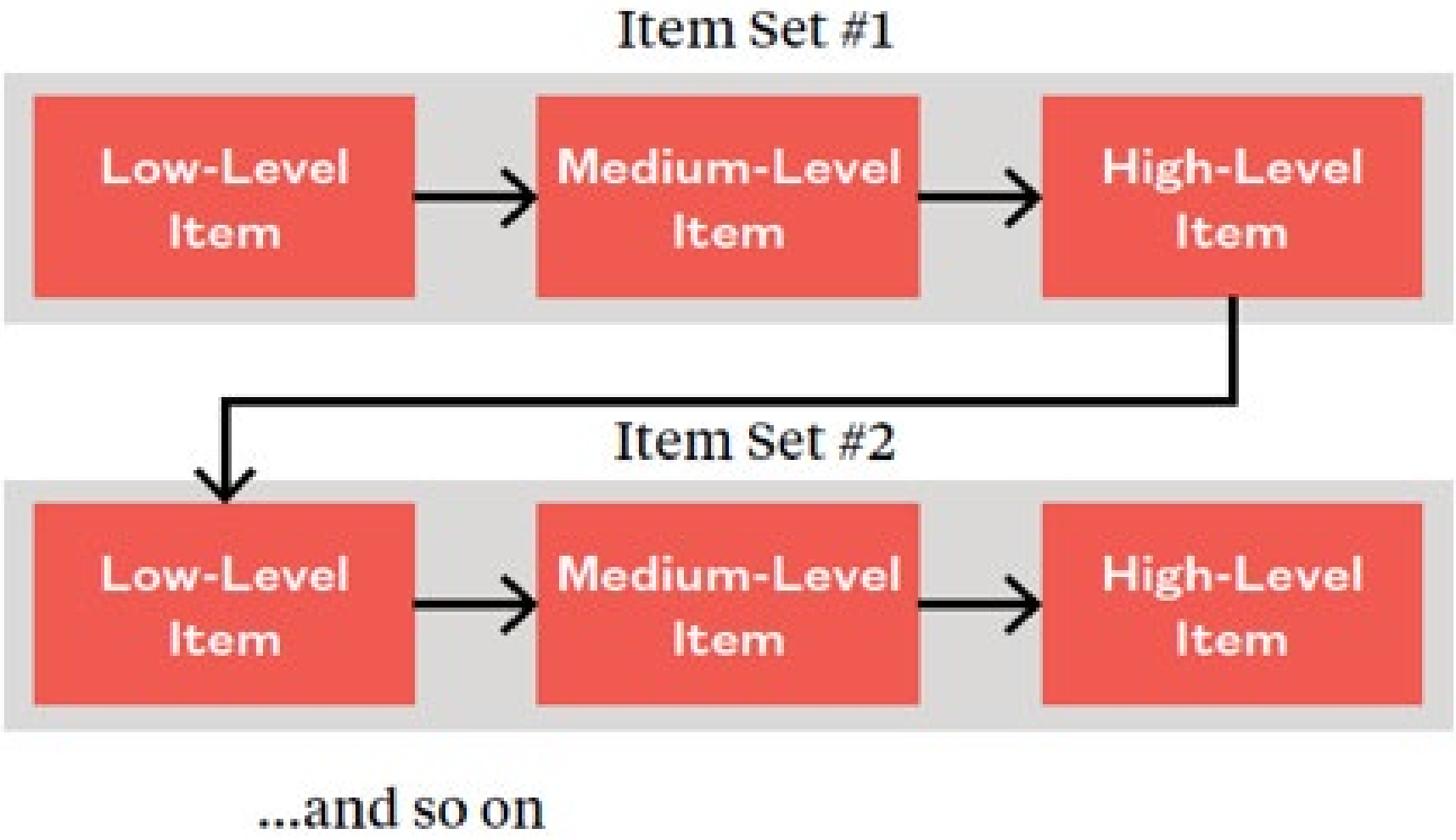
- Selected-response (multiple choice) items written at three levels with increasing cognitive demand
- Presented in a standardized format
  - Item stimulus
    - Phenomenon or context presented as the SAY section within the Test Administrator Booklet
  - Item prompt or question
    - Presented as the ASK section within the Test Administrator Booklet
  - Response options

CSAA overview - item set structure

- Items administered in sets of three
  - Thirteen operational item sets (thirty-nine items total)
- Each item set has three levels of difficulty.
  - Aligned to the three levels of the EPE

- Items in a set are independent of each other.
  - Do not share a stimulus
  - Exception: specialized bundle of item sets referred to as clusters

CSAA overview - item set structure



CSAA overview - clusters

- Combination of two item sets (six items total)
  - Written to two related state science standards
    - First set aligns to the EPEs derived from the first science standard listed
    - Second set aligns to the EPEs derived from the second science standard listed
- Begin with stimulus containing text and graphics sufficient to support the six items
  - Items within the cluster are independent.

Assessment Features and Accommodations

Assessment features

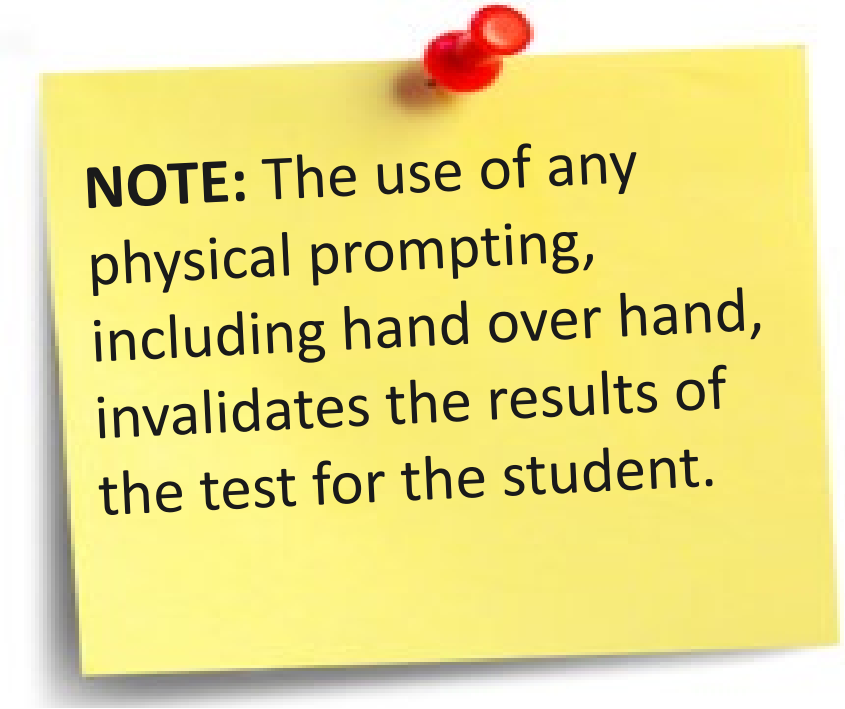
- Computer-Based Assessment Features
  - Answer Masking
  - Audio Player
  - Alternate Color Themes
  - Zoom
  - Increase Volume
  - Line Reader Tool
  - Read Aloud/Reread item directions, response options, passages

Assessment features (cont.)

- Assessment Features Provided by Test Administrator
  - Reading aloud as many times as necessary
  - Alternative text
  - Answer masking
  - Magnification
  - Use of manipulatives
  - Line reader
  - Object replacement
  - Tactile graphics or symbols
  - Transcription

Accommodations

- Assistive Technology (AT) for viewing, responding, or interacting with test items
- Paper version/large print (downloaded from platform)
- Scribe
- Sign language
- Braille



Demo of the online platform

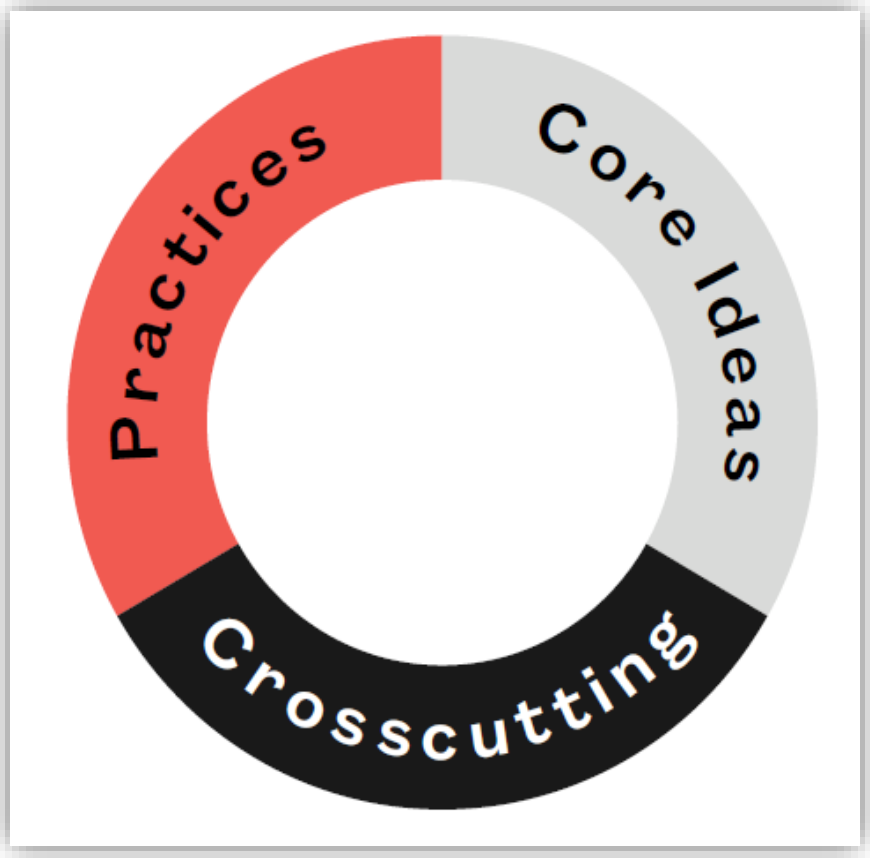
The Three Dimensions of Science Learning

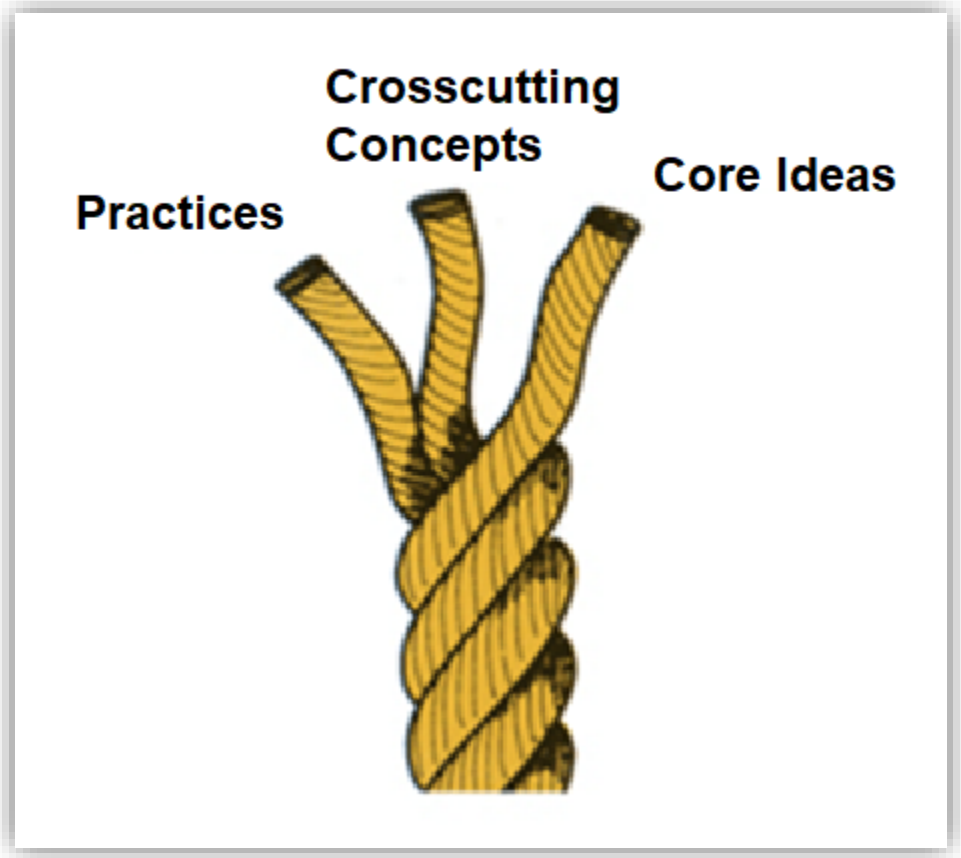
The three dimensions of science learning

- Science and Engineering Practices (SEPs)
  - What students are expected to do
- Disciplinary Core Ideas (DCIs)
  - What students are expected to know
- Crosscutting Concepts (CCCs)
  - How students think and connect ideas

Integrating dimensions

- The standards, called Performance Expectations, integrate all three dimensions in each standard.





Extended Performance Expectation (EPE)

- Aligned with *A Framework for K-12 Science Education*
- Consists of three leveled statements describing three different access points
- Core Ideas represent all content domains.
  - Physical, Life, and Earth and Space, plus at least one Engineering-based PE for each grade band.
- Commitment to maintain multi-dimensional standards expectation
- Each grade band (elementary, middle, high) contains 12 priority EPEs, each with its three leveled access points.

Example: 3-ESS2-1 Item Set

Standards

NGSS Performance Expectation 3-ESS2-1	
3-ESS2-1 Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season. [Clarification Statement: Examples of data could include average temperature, precipitation, and wind direction.] [Assessment Boundary: Assessment of graphical displays is limited to pictographs and bar graphs. Assessment does not include climate change.]	
Science and Engineering Practices (SEP)	**Analyzing and Interpreting Data** • Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships.
Disciplinary Core Ideas (DCI)	**ESS2.D: Weather and Climate** • Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next.
Crosscutting Concepts (CCC)	**Patterns** • Patterns of change can be used to make predictions.

Extended Performance Expectation 3-ESS2-1			
	Level 1	***Level 2***	***Level 3***
	Less Complex ⟵ ⟵ ⟵ ⟵ ⟵ ⟵ ⟶ ⟶ ⟶ ⟶ ⟶ ***More Complex***		
	3-ESS2-1.1 Use observations to describe weather conditions.	**3-ESS2-1.2** Use tables or graphical displays of data to describe patterns of typical weather conditions in a particular season.	**3-ESS2-1.3** Use tables and/or graphical displays of data to predict patterns of typical weather conditions for a particular season.
Science and Engineering Practices (SEP)	**Analyzing and Interpreting Data** • Represent data in tables and various graphical displays (bar graphs and pictographs) to reveal patterns that indicate relationships. **Supporting:** **Planning and Carrying Out Investigations**		
Disciplinary Core Ideas (DCI)	**ESS2.D: Weather and Climate** • Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next.		
Crosscutting Concepts (CCC)	**Patterns** • Patterns of change can be used to make predictions.		

Extended Performance Expectation with the three access points and their codes, increasing in complexity from left to right

SEPs, DCIs, and CCCs that comprise the Extended Performance Expectations (Target and Supporting, as appropriate).

Example: Level 1 item (3-ESS2-1 set)

Sofia observes a tree bending as air blows on it outside.

Level 1	**3-ESS2-1.1**: Use observations to describe weather conditions.

Which word can Sofia use to describe the weather?

○ foggy ○ windy ○ sleepy

Example: Level 2 item (3-ESS2-1 set)

This data table shows winter weather conditions in New York in 2015.

Winter Weather Conditions in New York

Weather Condition	Data
Average snowfall	43 cm
Average temperature	31°F

Level 2	**3-ESS2-1.2**: Use tables or graphical displays of data to describe patterns of typical weather conditions in a particular season.

Based on the data table, which sentence **best** describes winter in New York?

- ○ It has few windy days.
- ○ It is warm with lots of rain.
- ○ It is cold with lots of snow.

Example: Level 3 item (3-ESS2-1 set)

This data table shows the high temperatures for a town in Alaska in the spring and fall. Data for June, July, and August are missing.

High Temperatures for a Town in Alaska

Month	High Temperature (°F)
April	46
May	52
June	?
July	?
August	?
September	50
October	47
November	38
December	35

Level 3	**3-ESS2-1.3**: Use tables and/or graphical displays of data to predict patterns of typical weather conditions for a particular season.

Based on the data table, which range of high temperatures is expected for the summer?

○ between 20° and 29°F ○ between 40° and 49°F ○ between 60° and 69°F

Thank you!

CSAA ALIGNMENT STUDY

September 2022

WELCOME!

- Why are we here?
  - to evaluate the alignment of the Cognia Science Alternate Assessment (CSAA) in Grades 3-8 and High School to the Extended Performance Expectations (EPEs) in science

- Who is here?
  - Panelists – that's you! subject matter experts (SMEs)
  - Multi-state educators – observe the process
  - Study Leaders/Facilitators – provide training and provide support for panelists and facilitators

Expert Panels

Panel	Grade / Subject Area	Length	Facilitator
1	Grade 5	2.5 days	Drew Wiley
2	Grade 8	2.5 days	Russ Keglovits
3	High School	2.5 days	Kelley Wheeler

Meeting Logistics

- We will follow the agenda as planned but some activities may take more or less time than planned.
- We will allow for breaks but ask that you limit distractions/time away from the meeting so that we can move forward with the process as a group
- If you have any questions, please reach out to your facilitator or the project technical support

  - Drew Wiley Awiley@acsventures.com
  - Myrna Bacurin Mbacurin@acsventures.com

Meeting Security

- Materials
  - We have sent you access to several materials in advance via SharePoint. Please do not print, download, or take screen shots of any other materials
  - On breaks and at the end of the day – please close all windows and applications when not at your computer
  - At the end of the study – please delete any files on your computer
- Process and Results
  - Please keep the test material, any discussions, and any results confidential.
- We request no cell phone usage during the meeting

Panelist Expectations

- Participate in panel discussions with professional discourse
- Provide judgments based on alignment criteria
- Ask questions whenever you need clarification
- During discussions, keep your camera on so that we can connect as a group

High level agenda

Day 1

- Orientation to alignment
- Orientation to the CSAA
- Review alignment of initial item sets/group discussion
- Independently complete alignment to remaining items

Day 2

- Review and discuss initial alignment ratings
- Complete final alignment ratings and discuss group consensus

Day 3

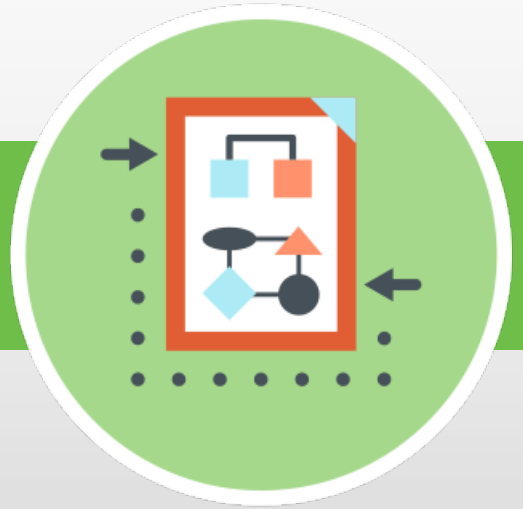
- Discussion of final alignment ratings
- Barrier to Entry review and ratings
- Differentiation across grades

What will we be aligning?

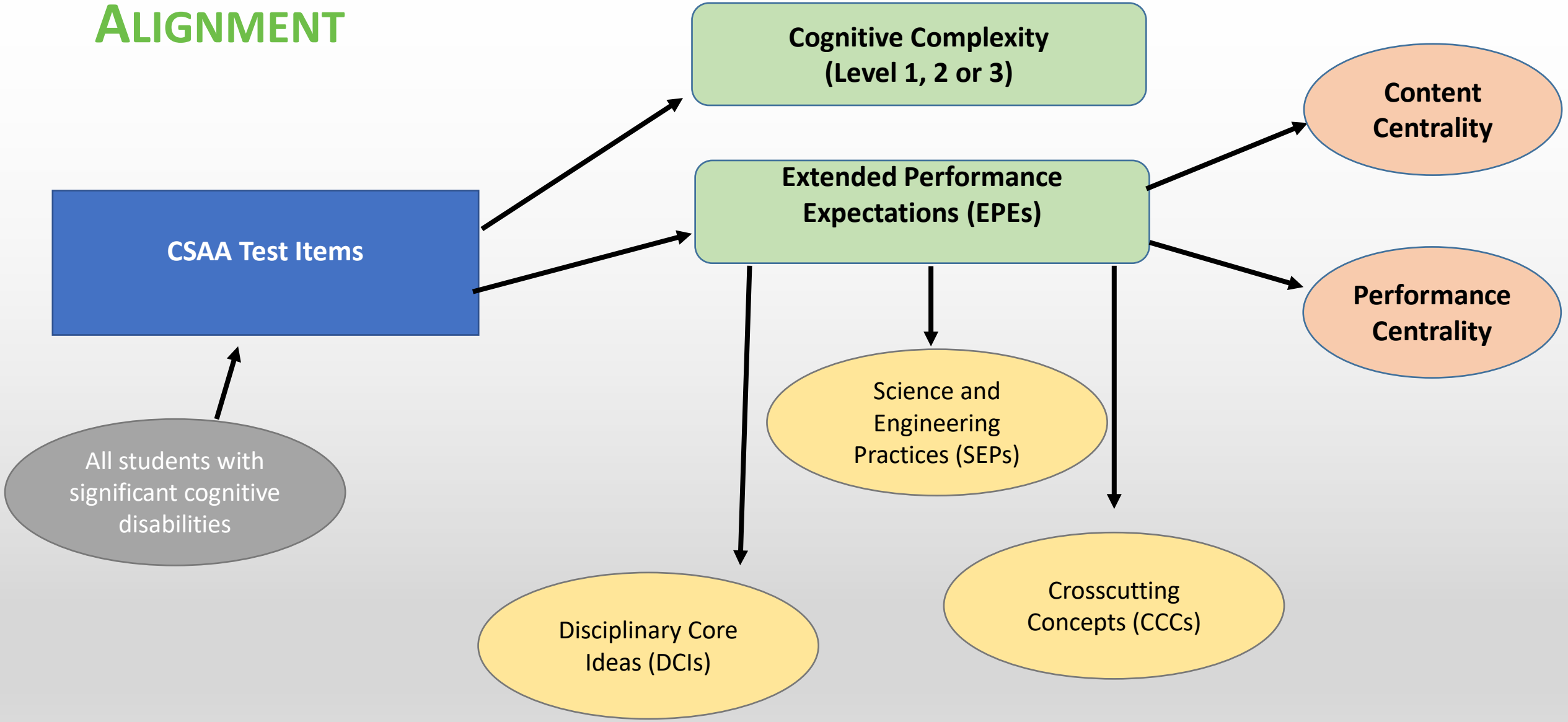
- CSAA
  - Assesses the education performance of students with significant cognitive disabilities
  - Administered in some states/entities as part of the Multi-state Alternative Assessment (MSAA)
  - Designed to be aligned to a set of extended performance expectations (EPEs)
  - EPEs are derived from *A Framework for K-12 Science Education*
  - Three Dimensions of Science Learning
    - Disciplinary Core Ideas (DCI)
    - Science and Engineering Practices (SEP)
    - Crosscutting Concepts (CCC)
  - *Students are assessed in grades 5, 8, and 11*
  - 13 item sets, 3 items per set (Operational items)

TRANSITION TO COGNIA REVIEW OF CSAA

ALIGNMENT



ALIGNMENT


Cognitive Complexity (Level 1, 2 or 3)
Content Centrality
Extended Performance Expectations (EPEs)
CSAA Test Items
Performance Centrality
Science and Engineering Practices (SEPs)
All students with significant cognitive disabilities
Disciplinary Core Ideas (DCIs)
Crosscutting Concepts (CCCs)

ITEM ALIGNMENT PART 1: ITEMS TO EPEs

Alignment question: Which EPE(s) best reflects the knowledge and skills being measured?

- Review each item and think about what knowledge and skills are being measured
- Identify the EPE(s) with direct alignment – direct alignment means if a student answers the item correctly it would support a claim that they have achieved the expectation in the EPE

ITEM ALIGNMENT PART 2:
CONTENT AND PERFORMANCE CENTRALITY

- **Content Centrality** – the degree to which the assessment items reflect fidelity with the content of the primary EPE
  - Near Link – Measures content fully consistent with the EPE
  - Far Link – Measures content somewhat consistent with the EPE
  - No Link

- **Performance Centrality** – the degree to which the assessment items reflect fidelity with the actions (verbs) of the primary EPE
  - All – Activities are fully consistent with the performance described in the EPE
  - Some – Activities are partially consistent with the performance described in the EPE
  - None

Item alignment part 3: alignment to science dimensions

- Science and Engineering Practices (SEP)
  - These are behaviors scientists engage in and engineering practices engineers use, e.g., developing and using models; analyzing and interpreting data; constructing explanations.
- Disciplinary Core Ideas (DCI)/ Core Ideas (CI)
  - These are the content pieces of the standards. They cover the four domains: physical; life; earth and space; and engineering, technology, and applications of science.
- Crosscutting Concepts (CCC)
  - These are the “links” or lenses across the different domains of science: patterns; cause and effect; scale, proportion, and quantity; systems and system models; energy and matter; structure and function; and stability and change.

Item alignment part 3: science dimensions

- During the test and item development process, Cognia mapped each EPE to each of the DCI, SEP, and CCC
- For Level 3, it was intended that items will measure all 3 dimensions
- For Level 1 and 2, it was intended for items to be aligned to the DCI and *may* be aligned to SEP and CCC
- DCI, SEP and CCC will be auto-populated in your rating sheet based upon your primary EPE
- Using these auto-populated columns, your rating will evaluate whether item is aligned to each
  - Ratings will be Fully aligned, Partially aligned, and Not aligned

Item alignment part 4: alignment to complexity level

- Alignment of items to Level 1, 2, and 3
- Each item set is comprised of three items, one designed for each level
- The three levels represent three different access points
- Use the file Content Complexity Resource on SharePoint

TRANSITION: DEMONSTRATE EXCEL FILE

Next steps

- Transition to working in your subject/grade panels
- Additional training for the specific judgments you will make
- Break! Return in 30 minutes to your panel Teams meeting

LET’S GO!

GRADE SPECIFIC

- For grade specific; you can reuse the slides for 12 to 16; and then walk through the Excel file a 2nd time;
- Complete the review until people feel comfortable with the ratings; and then ask people to work through the first item set
- After everyone finishes; facilitate a group discussion
- After the first set discussion, repeat with 2nd set
- After 2nd set (if people are comfortable, panelists can complete their ratings independently and submit to you (copy Drew) on submissions

TRANSITION TO DAY 3 SLIDES

MINIMIZING BARRIERS

Alignment Part 4: Minimizing Barriers

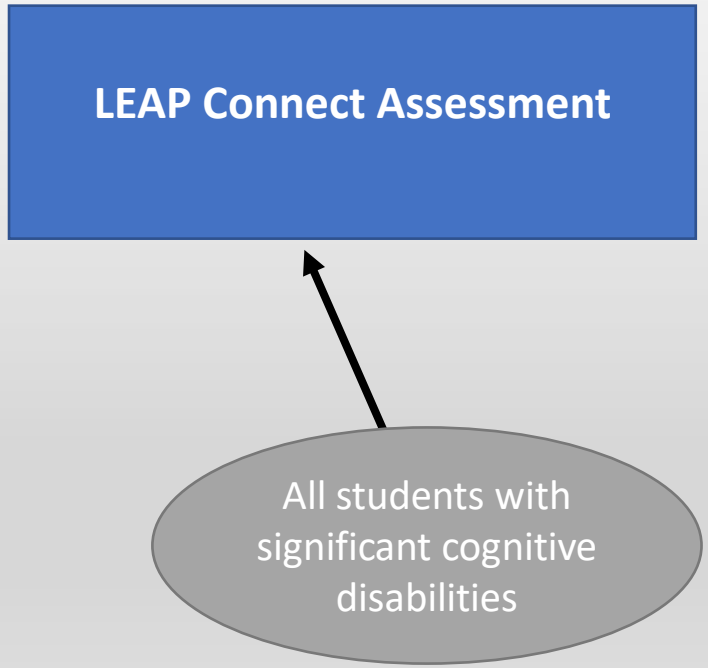
- Flowers, C. 2007 Links for Academic Learning

- LAL examines whether the items/tasks are difficult because of the knowledge and skills they target or for other reasons not related to the item/task content, such as sensory and physical challenges. This criterion considers whether the student performance accurately reflect the intended content standard rather than the disability.

Alignment Part 4: Minimizing Barriers

Is the content accessible to students with varying levels of communicative competence?

- Visual impairment/legally blind
- Hearing impaired
- Deaf/blind
- Nonverbal; responds using printed words
- Nonverbal; response using manual signs
- Nonverbal; responds using eye gaze
- Verbal but no use of hands
- Communicates with objects or by indicating yes/no



Alignment Part 4: Minimizing Barriers

- ○ Can do alternate assessment as designed
- ○ Can do with accommodations available / stated (no change in construct measured)
- ○ Can do with modifications or supports stated (may alter construct being measured)
- ○ No provisions would allow this student to demonstrate their knowledge and skills
- ○ NO CONSENSUS - document split below

MINIMIZING #1: VISUAL IMPAIRMENT/LEGALLY BLIND

3. Visual impairment / legally blind: *

- ◯ Can do alternate assessment as designed
- ◯ Can do with accommodations available / stated (no change in construct measured)
- ◯ Can do with modifications or supports stated (may alter construct being measured)
- ◯ No provisions would allow this student to demonstrate their knowledge and skills
- ◯ NO CONSENSUS - document split below

MINIMIZING #2: HEARING IMPAIRED

5. Hearing impaired: *

- ◯ Can do alternate assessment as designed
- ◯ Can do with accommodations available / stated (no change in construct measured)
- ◯ Can do with modifications or supports stated (may alter construct being measured)
- ◯ No provisions would allow this student to demonstrate their knowledge and skills
- ◯ NO CONSENSUS - document split below

MINIMIZING #3: DEAF&BLIND

7. Deaf & blind: *

- ◯ Can do alternate assessment as designed
- ◯ Can do with accommodations available / stated (no change in construct measured)
- ◯ Can do with modifications or supports stated (may alter construct being measured)
- ◯ No provisions would allow this student to demonstrate their knowledge and skills
- ◯ NO CONSENSUS - document split below

MINIMIZING #4: NONVERBAL; RESPONDS USING PRINTED WORDS

9. Nonverbal; responds using printed words: *

- ◯ Can do alternate assessment as designed
- ◯ Can do with accommodations available / stated (no change in construct measured)
- ◯ Can do with modifications or supports stated (may alter construct being measured)
- ◯ No provisions would allow this student to demonstrate their knowledge and skills
- ◯ NO CONSENSUS - document split below

MINIMIZING #5: NONVERBAL; RESPONDS USING PICTURES

11. Nonverbal; responds using pictures: *

- ◯ Can do alternate assessment as designed
- ◯ Can do with accommodations available / stated (no change in construct measured)
- ◯ Can do with modifications or supports stated (may alter construct being measured)
- ◯ No provisions would allow this student to demonstrate their knowledge and skills
- ◯ NO CONSENSUS - document split below

MINIMIZING #6: NONVERBAL; RESPONDS USING MANUAL SIGNS

13. Nonverbal; responds using manual signs: *

- ◯ Can do alternate assessment as designed
- ◯ Can do with accommodations available / stated (no change in construct measured)
- ◯ Can do with modifications or supports stated (may alter construct being measured)
- ◯ No provisions would allow this student to demonstrate their knowledge and skills
- ◯ NO CONSENSUS - document split below

MINIMIZING #7: NONVERBAL; RESPONDS USING EYE GAZE

15. Nonverbal; responds using eye gaze: *

- ◯ Can do alternate assessment as designed
- ◯ Can do with accommodations available / stated (no change in construct measured)
- ◯ Can do with modifications or supports stated (may alter construct being measured)
- ◯ No provisions would allow this student to demonstrate their knowledge and skills
- ◯ NO CONSENSUS - document split below

MINIMIZING #8: VERBAL BUT NO USE OF HANDS

17. Verbal but no use of hands: *

- ◯ Can do alternate assessment as designed
- ◯ Can do with accommodations available / stated (no change in construct measured)
- ◯ Can do with modifications or supports stated (may alter construct being measured)
- ◯ No provisions would allow this student to demonstrate their knowledge and skills
- ◯ NO CONSENSUS - document split below

MINIMIZING #9: COMMUNICATES WITH OBJECTS OR BY INDICATING YES/NO

19. Communicates with objects or by indicating yes /no: *

- ◯ Can do alternate assessment as designed
- ◯ Can do with accommodations available / stated (no change in construct measured)
- ◯ Can do with modifications or supports stated (may alter construct being measured)
- ◯ No provisions would allow this student to demonstrate their knowledge and skills
- ◯ NO CONSENSUS - document split below

MINIMIZING #10

21. Does the assessment include any way of capturing responses for students who do not yet have a clear, intentional communication even at the non-symbolic level? *

- ◯ Yes
- ◯ No

Item-Rating Guide
CSAA – September 20-22, 2022

The **Item Rating Form** is what you will use to record your individual alignment ratings for each item of the test form you are being asked to review. You may use the following guide to help familiarize yourself with the formatting of the rating form and to answer any questions you have about the rating process.

General Formatting

- You are required to provide a rating to any cell that is shaded **red**.
- In some instances, the ratings you make will cause a previously white cell to highlight **red**. You will be required to provide either an addition rating or a comment to this newly highlighted **red** cell.
- If a cell remains **white** after you have finished making your ratings for the entire row, you are permitted but not required to include any additional text in the cell.

Column Descriptions

A – D: Panelist and Item Information

These columns are hidden columns that include information necessary for item identification and for analysis of the ratings. *No changes necessary within these columns.*

E: Set

This column displays which item set the item belongs to. Each set is composed of three items and each test form will contain 13 total item sets.

F: Item

This column displays the sequence of each item as it appears on the test form.

G: Primary EPE

For each row, you will select which EPE you believe *most* aligns to the item. There is a dropdown menu that lists all of the EPEs for that grade band/level, as well as the options of *Above Grade Match, Below Grade Match, Content Domain Match Only,* or *No EPE Match*.

If you select a EPE from the drop down, the **Content Centrality** and **Performance Centrality** cells for the row will highlight **red**, and you will be required to make a selection for both.

If *Above Grade Match, Below Grade Match,* or *No Connector Match* is selected, the **Connector Comment** cell will highlight **red**, and you will be required to make a comment explaining your choice.

If *Content Domain Match Only* is selected, the **Content Domain Match** cell for that row will highlight **red**, and you will be required to make a selection from the dropdown menu. Additionally, by selecting *Content Domain Match Only* you are indicating that none of the performance dimensions are being represented in the item so the **Performance Centrality** cell for that row will automatically be filled with the *None* drop-down option and the **Performance Comment** cell for that row will highlight **red**, and you will be required to make a comment explaining your choice. You will still be required to address the **Content Centrality** alignment.

H: Secondary EPE

You are **not required** to make a selection from the dropdown menu for this column. This space is provided for you if you wish to include another EPE that aligns to the item.

I: Content Domain Match

This cell will highlight **red** if *Content Domain Match Only* is selected from the **Primary EPE** column. If highlighted, you will be required to select from the drop-down menu which content domain you believe the item aligns with.

J: EPE Comment

This is a space provided for you to record any comments you believe are necessary to explain your **Primary EPE**, **Secondary EPE** selections. You will only be required to provide a comment if this cell is highlighted red.

K: Content Centrality

Content Centrality is defined as the degree to which the assessment items reflect fidelity with the content of the primary EPE.

You will only be required to complete this cell if you selected an EPE from the dropdown menu in the **Primary EPE** cell. For each row, you will consider the *content* of both the item and the EPE you selected, then you will make a selection from the dropdown menu choosing whether you believe the item has a *Near Link*, *Far Link*, or *No Link* to the content described by the EPE you previously selected.

To help guide your selection, *Near Link*, *Far Link*, and *No Link* are defined below:

- **Near link:** The item clearly measures ALL of the same content as the EPE.
- **Far link:** The item measures SOME of the content in the EPE; the content of the item is present in the EPE even if the EPE contains additional content.
- **No link:** The item measures NONE of the content in the EPE.

If you select a rating of *No Link*, the **Reason if No Link** cell will highlight **red**, and then you will be required to make a selection from the **Reason if No Link** dropdown menu.

L: Reason if No Link

If this cell is highlighted **red**, you will be required to select either *Back mapping, Overstretch, Misconception, Standard Specificity,* or *Other* as a reason for why you selected *No Link* in the **Content Centrality** cell.

To help guide your selection, *Mismatch*, *Back mapping, Overstretch,* and *Standard Specificity* are defined below:

- **Mismatch:** an error in identifying the correct standards
- **Back mapping:** The EPE has been deconstructed until it is a functional skill.
- **Overstretch:** The link to the EPE has been stretched too far; the item has lost the essence of the EPE.
- **Standard Specificity:** The EPE itself is too broad to understand what is expected.

If you select *Other*, the **Content Comment** cell will highlight **red**, and then you will be required to provide a comment explaining your selection. You are only required to make a selection from this cell if it is highlighted **red**. If the cell is not, you should otherwise ignore it.

M: Content Comment

If this cell is highlighted red, you will be required to provide a reason for why you selected *No Link* in the **Content Centrality** cell. Even if this cell is not highlighted, you may use this space to further elaborate on your **Content Centrality** selections.

N: Performance Centrality

Performance centrality is defined as the degree to which the assessments reflect fidelity with grade-level/grade-band performance.

You will only be required to complete this cell if you selected an EPE from the dropdown menu in the **Primary EPE** cell. For each row, you will consider the *performance* (with a focus on the action or words in the EPE) of both the item and the EPE you selected as the **Primary EPE**, then you will make a selection from the dropdown menu choosing whether you believe the item has *All, Some,* or *None* of the performance described by the EPE you previously selected.

To help guide your selection *All, Some,* and *None* are defined below:

- All – Activities are fully consistent with the performance described in the EPE
- Some – Activities are partially consistent with the performance described in the EPE
- None

If you select *None*, the **Performance Comment** cell will highlight red, and then you will be required to provide a comment explaining your selection.

O: Performance Comment

If this is highlighted red, you will be required to provide a reason for why you selected *None* in the **Performance Centrality** cell. Even if this cell is not highlighted, you may use this space to further elaborate on you **Performance Centrality** selections.

P: Mapped DCI

Based upon the Cognia mapping of EPEs to the Disciplinary Core Ideas (DCI), and using your primary EPE, the mapped DCI will auto-populate in this column. If your EPE alignment rating was Above Grade, Below Grade, Content Domain Match, and No EPE Match, this column will remain blank.

Q: DCI Alignment:

This cell will be highlighted red and your rating will indicate whether the item is fully aligned, partially aligned or not aligned to the linked DCI(s). If more than one DCI is included, partial alignment would be appropriate if you believe not all of the recommended DCIs are aligned. If only one DCI is included and it is aligned, full alignment should be indicated. If you disagree with the linked DCI, you can select Other and indicate the DCI that you believe is a more appropriate link. If you believe no DCI is properly aligned, you can select None.

R: Mapped SEP
Based upon the Cognia mapping of EPEs to the Science and Engineering Practices (SEPs), and using your primary EPE, the mapped SEP will auto-populate in this column. If your EPE alignment rating was Above Grade, Below Grade, Content Domain Match, and No EPE Match, this column will remain blank.

S: SEP Alignment
This cell will be highlighted red and your rating will indicate whether the item is fully aligned, partially aligned or not aligned to the mapped SEP(s). If more than one SEP is included, partial alignment would be appropriate if you believe not all of the recommended SEPs are aligned. If only one SEP is included and it is aligned, full alignment should be indicated. If you disagree with the linked SEP, you can select Other and indicate the SEP that you believe is a more appropriate link. If you believe no DCI is properly aligned, you can select None.

T: Mapped CCC
Based upon the Cognia mapping of EPEs to the Crosscutting Concepts (CCCs), and using your primary EPE, the mapped CCC will auto-populate in this column. If your EPE alignment rating was Above Grade, Below Grade, Content Domain Match, and No EPE Match, this column will remain blank.

U: CCC Alignment
This cell will be highlighted red and your rating will indicate whether the item is fully aligned, partially aligned or not aligned to the mapped CCC(s). If more than one CCC is included, partial alignment would be appropriate if you believe not all of the recommended CCCs are aligned. If only one CCC is included and it is aligned, full alignment should be indicated. If you disagree with the linked CCC, you can select Other and indicate the CCC that you believe is a more appropriate link. If you believe no DCI is properly aligned, you can select None.

P: Complexity Level
Complexity Level is defined as the degree to which the items on the test form reflect the complexity defined in the levels of the EPEs and in the blueprint. The file *Content Complexity Resource – Item Level Item Level Slopping Guidelines Summary* provides further details on how the three levels are defined.

For each row, you will consider the complexity of the item, and then make a selection from the dropdown menu choosing whether you believe the item is best categorized as *L1, L2, or L3* as defined by the *Content Complexity Resource* document.

Q: Complexity Comment
This is a space provided for you to record any comments you believe are necessary to explain your **Complexity Level** selections. You are not required to provide any comments in this cell.

DCI **1 Pager**

DCI	Description
ESS1.A	The Universe and Its Stars
ESS1.B	Earth and the Solar System
ESS1.C	The History of Planet Earth
ESS2.A	Earth Materials and Systems
ESS2.B	Plate Tectonics and Large-Scale System Interactions
ESS2.C	The Roles of Water in Earth;s Surface Processes
ESS2.D	Weather and Climate
ESS2.E	Biogeology
ESS3.A	Natural Resources
ESS3.B	Natural Hazards
ESS3.C	Human Impacts on Earth Systems
ESS3.D	Global Climate Change
LS1.A	Structure and Function
LS1.B	Growth and Development of Organisms
LS1.C	Organization for Matter and Energy Flow in Organisms
LS1.D	Information Processing
LS2.A	Interdependent Relationships in Ecosystems
LS2.B	Cycles of Matter and Energy Transfer in Ecosystems
LS2.C	Ecosystem Dynamics, Functioning, and Resilience
LS2.D	Social Interactions and Group Behavior
LS3.A	Inheritance of Traits
LS3.B	Variation of Traits
LS4.A	Evidence of Common Ancestry and Diversity
LS4.B	Natural Selection
LS4.C	Adaptation
LS4.D	Biodiversity and Humans
PS1.A	Structure and Properties of Matter
PS1.B	Chemical Reactions
PS1.C	Nuclear Processes
PS2.A	Forces and Motion
PS2.B	Types of Interactions
PS2.C	Stability and Instability in Physical Systems
PS3.A	Definitions of Energy
PS3.B	Conservation of Energy and Energy Transfer
PS3.C	Relationships Between Energy and Forces
PS3.D	Energy in Chemical Processes and Everyday Life
PS4.A	Wave Properties
PS4.B	Electromagnetic Radiation
PS4.C	Information Technologies and Instrumentation
ETS1.A	Defining and Delimiting an Engineering Problem
ETS1.B	Developing Possible Solutions
ETS1.C	Optimizing the Design Solution
ETS2.A	Interdependence of Science, Engineering, and Technology
ETS2.B	Influence of Engineering, Technology, and Science on Society and the Natural World

Science and Engineering Practices **1 pager**

1. Asking Questions and Defining Problems	Science begins with a question about a phenomenon, such as “Why is the sky blue?” or “What causes cancer?,” and seeks to develop theories that can provide explanatory answers to such questions. A basic practice of the scientist is formulating empirically answerable questions about phenomena, establishing what is already known, and determining what questions have yet to be satisfactorily answered.
2. Developing and Using Models	Science often involves the construction and use of a wide variety of models and simulations to help develop explanations about natural phenomena. Models make it possible to go beyond observables and imagine a world not yet seen. Models enable predictions of the form “if . . . then . . . therefore” to be made in order to test hypothetical explanations.
3. Planning and Carrying Out Investigations	Scientific investigation may be conducted in the field or the laboratory. A major practice of scientists is planning and carrying out a systematic investigation, which requires the identification of what is to be recorded and, if applicable, what are to be treated as the dependent and independent variables (control of variables). Observations and data collected from such work are used to test existing theories and explanations or to revise and develop new ones.
4. Analyzing and Interpreting Data	Scientific investigations produce data that must be analyzed in order to derive meaning. Because data usually do not speak for themselves, scientists use a range of tools—including tabulation, graphical interpretation, visualization, and statistical analysis—to identify the significant features and patterns in the data. Sources of error are identified and the degree of certainty calculated. Modern technology makes the collection of large data sets much easier, thus providing many secondary sources for analysis.
5. Using Mathematics and Computational Thinking	In science, mathematics and computation are fundamental tools for representing physical variables and their relationships. They are used for a range of tasks, such as constructing simulations, statistically analyzing data, and recognizing, expressing, and applying quantitative relationships. Mathematical and computational approaches enable predictions of the behavior of physical systems, along with the testing of such predictions. Moreover, statistical techniques are invaluable for assessing the significance of patterns or correlations.
6. Constructing Explanations and Designing Solutions	The goal of science is the construction of theories that can provide explanatory accounts of features of the world. A theory becomes accepted when it has been shown to be superior to other explanations in the breadth of phenomena it accounts for and in its explanatory coherence and parsimony. Scientific explanations are explicit applications of theory to a specific situation or phenomenon, perhaps with the intermediary of a theory-based model for the system under study. The goal for students is to construct logically coherent explanations of phenomena that incorporate their current understanding of science, or a model that represents it, and are consistent with the available evidence.
7. Engaging in Argument from Evidence	In science, reasoning and argument are essential for identifying the strengths and weaknesses of a line of reasoning and for finding the best explanation for a natural phenomenon. Scientists must defend their explanations, formulate evidence based on a solid foundation of data, examine their own understanding in light of the evidence and comments offered by others, and collaborate with peers in searching for the best explanation for the phenomenon being investigated.
8. Obtaining, Evaluating, and Communicating Information	Science cannot advance if scientists are unable to communicate their findings clearly and persuasively or to learn about the findings of others. A major practice of science is thus the communication of ideas and the results of inquiry—orally, in writing, with the use of tables, diagrams, graphs, and equations, and by engag- ing in extended discussions with scientific peers. Science requires the ability to derive meaning from scientific texts (such as papers, the Internet, symposia, and lectures), to evaluate the scientific validity of the information thus acquired, and to integrate that information.

in science, students' facility with addressing these concepts and related topics at any particular grade level depends on their prior experience and instruction. The research base on learning and teaching the crosscutting concepts is limited. For this reason, the progressions we describe should be treated as hypotheses that require further empirical investigation.

SEVEN CROSSCUTTING CONCEPTS OF THE FRAMEWORK

The committee identified seven crosscutting scientific and engineering concepts:

1. *Patterns*. Observed patterns of forms and events guide organization and classification, and they prompt questions about relationships and the factors that influence them.
2. *Cause and effect: Mechanism and explanation*. Events have causes, sometimes simple, sometimes multifaceted. A major activity of science is investigating and explaining causal relationships and the mechanisms by which they are mediated. Such mechanisms can then be tested across given contexts and used to predict and explain events in new contexts.
3. *Scale, proportion, and quantity.* In considering phenomena, it is critical to recognize what is relevant at different measures of size, time, and energy and to recognize how changes in scale, proportion, or quantity affect a system's structure or performance.
4. *Systems and system models*. Defining the system under study—specifying its boundaries and making explicit a model of that system—provides tools for understanding and testing ideas that are applicable throughout science and engineering.
5. *Energy and matter: Flows, cycles, and conservation.* Tracking fluxes of energy and matter into, out of, and within systems helps one understand the systems' possibilities and limitations.
6. *Structure and function.* The way in which an object or living thing is shaped and its substructure determine many of its properties and functions.
7. *Stability and change*. For natural and built systems alike, conditions of stability and determinants of rates of change or evolution of a system are critical elements of study.

This set of crosscutting concepts begins with two concepts that are fundamental to the nature of science: that observed patterns can be explained and that

CSAA Alignment: Differentiation Task

Purpose: The purpose of this activity is to evaluate how the CSAA assessments are different across the grade levels included in this study (Science: 5, 8, 11).

Task: We are asking one panelist from each subject area to review the assessment items for two grade levels and evaluate the differentiation between each pair of adjacent grades.

- For Science: Evaluate
    - grade 5 (in comparison to grade 8)
    - High school (in comparison to grade 8)

After you have reviewed the materials for two adjacent grades, please complete the rating form indicating you are evaluating the **higher** grade level.

Rating form: https://forms.office.com/r/L9a6tvXhKh

We are evaluating **Differentiation** based on the following five dimensions:

- **Broader**: higher-grade items reflect broader applications of target skills or knowledge
- **Deeper**: higher-grade items reflect deeper mastery of the target skill or knowledge
- **Prerequisites**: lower-grade items reflects a different by prerequisite skill for mastery of the higher grade standard
- **New**: the higher-grade has a new skill or knowledge unrelated to skills or knowledge covered at prior grades
- **Identical**: higher-grade items appear identical to one of the lower-grade standards

Each dimension is rated on the following scale:

- 0% (no)
- 25% (limited)
- 50% (partial)
- 75% (clear)

For **Broader**, **Deeper**, **Prerequisites**, and **New**: If your ratings indicate a lack of differentiation ("No" or "Limited" rating) please use the text box that follows to explain your finings (is the lack of differentiation in the connectors, the assessment items, or both?)

For **Identical** ratings: If your ratings indicate a lack of differentiation ("Limited", "Partial", "Clear" rating) please use the text box that follows to explain your finings (is the lack of differentiation in the connectors, the assessment items, or both?)

Please complete all Differentiation ratings by **Sunday September 26th.**