Appendix 3-B Study 1: a. Mathematics b. Reading c. Writing

Study a: Study of the Relationship Between the NCSC Mathematics Prioritized Core Content Connectors and the Mathematics Common Core State Standards (Page 1)

Study b: Study of the Relationship Between the NCSC Reading Prioritized Core Content Connectors and the English Language Arts Common Core State Standards (Page 49)

Study c: Study of the Relationship Between the NCSC Writing Prioritized Core Content Connectors and the English/Language Arts Common Core State Standards (Page 99)

National Center and State Collaborative

NCSC GSEG Research Report

Study a: Study of the Relationship Between the NCSC Mathematics Prioritized Core Content Connectors and the Mathematics Common Core State Standards

Appendix 3-B, Study 1: a. Mathematics

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National Center and State Collaborative

Study of the Relationship Between the NCSC Mathematics Prioritized Core Content Connectors and the Mathematics Common Core State Standards

In collaboration with UNC Charlotte

Claudia Flowers, Shawnee Wakeman, and Diane Browder

May 2015

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National Center and State Collaborative.[1] (2015). *Study of Relationship Between the NCSC Mathematics Prioritized Core Content Connectors and the Mathematics Common Core State Standards.* Minneapolis, MN: University of Minnesota, National Center and State Collaborative.

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National Center and State Collaborative

The National Center and State Collaborative (NCSC) is applying the lessons learned from the past decade of research on alternate assessments based on alternate achievement standards (AA-AAS) to develop a multi-state comprehensive assessment system for students with the most significant cognitive disabilities.

NCSC is a collaborative of 24 states and five organizations. The NCSC states participating in the Spring 2015 NCSC operational assessment are: Arizona, Arkansas, Connecticut, District of Columbia, Idaho, Indiana, Pacific Assessment Consortium (PAC-6)[2], Maine, Montana, New Mexico, Rhode Island, South Carolina, South Dakota, and US Virgin Islands. As of Spring 2015, additional states are members of the NCSC Consortium, representing varying levels of participation. They are: California, Delaware, Florida, Louisiana, Maryland, New York, Oregon, Pennsylvania, Tennessee, and Wyoming.

The five NCSC partner organizations include: National Center on Educational Outcomes (NCEO) at the University of Minnesota, National Center for the Improvement of Educational Assessment (Center for Assessment), University of North Carolina at Charlotte, University of Kentucky, and edCount, LLC.

IDEAs that Work
U.S. Office of Special Education Programs

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The University of Minnesota, the administrator partner, is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.

This document is available in alternative formats upon request.

[2] The Pacific Assessment Consortium (including the entities of American Samoa, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Guam, Republic of Palau, and Republic of the Marshall Islands) partner with NCSC as one state, led by the University of Guam Center for Excellence in Developmental Disabilities Education, Research, and Service (CEDDERS).

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Executive Summary

To serve students with the most significant cognitive disabilities, the National Center and State Collaborative (NCSC) is designing an alternate assessment as part of a system that includes curriculum, instruction, and professional development resources, all aligned to the Common Core State Standards (CCSS).[3]

To support the coordinated development of all of these system components, NCSC developed the Core Content Connectors (CCCs) for each grade and content area. The CCCs are not extensions of the CCSS; rather, they "pinpoint the primary content of the CCSS and organize it in the conceptual model of the Learning Progressions Framework" (NCSC, 2013, p. 8).The Learning Progressions Framework served as the foundation for organizing content into hypothesized paths for learning. Project partners developed CCCs to articulate the relationship between CCSS and the Learning Progressions Framework.

To support the use of the CCCs in this way, the present study provided validity evidence demonstrating the relationship between the CCCs and the CCSS. The study's purposes were to (a) provide formative information to developers about whether and how they might need to revise individual CCCs to better align with the CCSS and (b) document development-stage alignment as part of a larger alignment evaluation of the assessment system. NCSC researchers used the Links for Academic Learning (LAL) model developed by Flowers, Wakeman, Browder, and Karvonen (2007) to conduct this evaluation of the relationship between the mathematics CCCs and the mathematics CCSS.

This report describes the relationship between the mathematics CCCs and the CCSS in order to provide validity evidence demonstrating the quality of alignment between the CCCs and the CCSS.

NCSC research staff examined 523 mathematics CCCs. After the rating process described below took place, NCSC prioritized for assessment up to 10 CCCs per grade and content area in grades 3-8 and 11. They then identified 78 CCCs as priorities for assessment; these are known as the mathematics prioritized CCCs. The prioritized CCCs serve as the proximal assessment targets for the operational test in 2014–2015 as well as the link between the CCSS and the model of domain-specific knowledge acquisition that guides academic instruction for students with the most significant cognitive disabilities. State partners intend to use the prioritized CCCs as a starting point for designing the alternate assessment. To determine increasing coverage within the assessment across years, additional content review is planned to occur annually.

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[3] For a full copy of the report, please contact the Arizona Department of Education Director of Alternate Assessment, Audra Ahumada, at Audra.Ahumada@azed.gov.

Researchers selected two mathematics content experts as raters for this study. All rater disagreements were reconciled by having both experts review ratings and come to a consensus. NCSC research staff used the final consensus rating in all the analyses.

Panelists used the alignment study process to review and rate the CCSS and prioritized CCCs for each of the following:

- depth of knowledge (DOK) for all of the CCSS in the target strands,[4]
- DOK for each prioritized CCC,
- closest CCSS match for each prioritized CCC,
- content centrality[5] between each prioritized CCC and selected CCSS, and
- performance centrality[6] between each prioritized CCC and selected CCSS.

Of the 523 mathematics CCCs, 78 CCCs were prioritized CCCs in grades 3–8 and grade 11. Nearly all prioritized CCCs (98.7%) were aligned to their intended CCSS. One prioritized CCC (1.2%) was matched to a non-intended CCSS. An evaluation of the content centrality of the 77 prioritized CCCs matched to their intended CCSS indicated that all (100%) were rated as having *all* or *part* of the content found in the CCSS. Similarly, an evaluation of the performance centrality of prioritized CCCs matched to their intended CCSS indicated that all (100%) were rated as having *all* or *some* of the performance found in the CCSS.

The DOK ratings indicated that at least 50% of the prioritized CCCs in grades 3–5 had DOK levels at or above the corresponding CCSS. However, less than 50% of the prioritized CCCs were at or above the CCSS DOK level in grades 6–11, a fact that suggests the prioritized CCC DOK levels might need to be adjusted to better reflect the DOK levels of the CCSS (see Exhibit 11). NCSC item developers investigated the CCC DOK levels to ensure that they reflected the appropriate levels (see Appendix B: Recommendations and Evidence for Change to Improve Alignment).

As is true of all alternate assessments, the breadth, depth, and complexity of the content covered in the AA-AAS is lower than that of standard assessments. In terms of the LAL methodology, the breadth, depth, and complexity correspond to the number of prioritized CCCs, the content and performance centrality, and the DOK. Thus, NCSC intentionally prioritized fewer CCCs for assessment and reduced the depth of the content or skills measured by the prioritized CCCs.

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[4] Target strands represent the CCSS to which researchers intended the prioritized CCCs align.

[5] Content centrality is a measure of the degree of fidelity between the content of the CCC and the content of the CCSS.

[6] Performance centrality represents the degree to which the CCC and the selected CCSS contain the same performance expectation.

Ultimately, the prioritized CCCs provide detailed information about the content and performance expected along the Learning Progressions Framework, and the findings illustrate strong alignment of prioritized CCCs to CCSS.

Recommendations for and Impact on Test Development

Researchers shared the outcomes of the alignment study with content experts involved with the NCSC project. These experts examined both the overall results of the alignment study and the detailed results to determine how to respond to issues that warranted further review and adjustment. Even though the study showed that the alignment of the mathematics prioritized CCCs to the CCSS was strong, these experts examined each instance of a mismatch between the prioritized CCCs and the intended CCSS.

Researchers have the following recommendations for item development partners based on the results from the present study. Following each recommendation is NCSC's response.

- Following the initial findings, researchers discovered a number of the instructionally-based Nature of Numbers and Operations strand 3 (NO-3) CCCs did not align to a CCSS. However, these non-aligned CCCs were designed to reflect the CCSS Mathematical Practices and were considered an important element in the Learning Progressions.
    - *Response:* The items constructed for use in the NCSC AA-AAS are now dual coded to an NO-3 and a CCSS (refer to Appendix B: Recommendations and Evidence for Change to Improve Alignment).
- In some cases the prioritized CCC did not meet grade-level CCSS; consider reviewing prioritized CCCs that did not meet the grade-level CCSS.
    - *Response:* Researchers responded to the alignment findings regarding the prioritized CCCs aligned to the off-grade CCSS mathematics (refer to Appendix B: Recommendations and Evidence for Change to Improve Alignment).
- Consider informing teachers on how to teach skills in CCCs that blends more than one CCSS.
    - *Response:* The process of developing CCCs, using both the CCSS and the Learning Progressions Framework, resulted in the creation of CCCs that reflect a blending of more than a single CCSS and the creation of multiple CCCs to address a single CCSS. Curricular documents clearly display this relationship by establishing Instructional Families to ensure that teachers can teach all related academic skills in a coherent manner.

      Instructional resources have been created that will be useful to teachers as they transition to instruction based on the CCSS for students who participate in

alternate assessment based on alternate achievement standards. When integrated, the materials and related training tools will help build the capacity of teachers to better understand the CCSS, to plan and effectively teach this challenging content, and to monitor student progress toward curricular goals.

- Consider an explanation of any discrepancies between experts and panelists' ratings.
    - *Response:* NCSC content specialists disagree with the panelists' findings regarding mathematics prioritized CCC 3.NO.1j3. The panelists incorrectly matched the CCC to a below-grade CCSS (2.NBT.3). As a result, they rated 3.NO.1j3 as having no performance centrality and far content centrality. The CCC 3.NO.1j3 (*Use place value to round to the nearest 10 or 100*) is intended to be aligned with CCSS 3.NBT.A.1 (*Use place value understanding to round whole numbers to the nearest 10 or 100*).
    - *Response:* The panelists aligned five of the six CCCs in one family, 7.NO.2f relating to proportional relationships, to on-grade CCSS. However, in the case of the mathematics prioritized CCC 7.NO.2f6 (*Solve word problems involving ratios*), the panelists aligned the CCC to a below-grade CCSS (6.RP.3) only. The NCSC content team intentionally prioritized this skill, as ratios serve a valuable purpose in the solution of proportional problems. (7.RP.A.3 - *Use proportional relationships to solve multistep ratio and percent problems*). The NCSC content team recommended this CCC be dually aligned to 6.RP.3 and 7.RP.A.3.
    - *Response:* The panelists aligned 4.DPS.1g3 (*Collect data, organize in graph (e.g. picture graph, line plot, bar graph*) to a below-grade CCSS (3.MD.3) Currently, in the NCSC Curriculum and Instruction materials, this CCC is dually aligned to CCSS 3.MD.3 and 4.MD.B.4 (*Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8*)). As such, the NCSC AA-AAS items currently are written to align to 4.MD.B.4, which require students to graph a data set of measurements in fractions of a unit. The NCSC content team recommended this CCC be dually aligned to 3.MD.3 and 4.MD.B.4.
    - *Response:* The panelists aligned the mathematics prioritized CCC 4.NO.2d7 (*Determine how many objects go into each group when given the total number of objects and groups where the number in each group or number of groups is not > 10*), to a below-grade CCSS. However, grade 4 students need to solve word problems involving multiplicative comparison (product unknown, partition unknown) using multiplication or division as shown in Table 2 of the *Common Core State Standards for Mathematics*, page 89. Therefore, the current items on the AA-AAS require students to solve word problems which require division by using drawings and equations. As such, the CCC 4.NO.2d7, should be dually aligned with CCSS 4.OA.A.1.
    - *Response:* The panelists aligned three of the four CCCs in one family, 7.GM.1h, relating to solving area, surface area, and volume problems, to on-grade CCSS.

However, in the case of the mathematics prioritized CCC 7.GM.1h2 (*Find the surface area of three-dimensional figures using nets of rectangles or triangles*), the panelists aligned the CCC to a below-grade CCSS (6.G.4). The current items on the AA-AAS allow students to apply the concept of area to find surface area of right prisms. Specifically, the items are intended to address the grade 7 geometry skill CCSS 7.G.B.4 (*Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms*). The use of nets to make connections to the symbolic and more abstract aspects of geometry is fundamental for the study of surface area. The NCSC content team recommends this CCC be dually aligned to 6.G.4 and 7.G.B.4.

- The distribution of DOK levels among the CCCs broadly mirrored that of the associated CCSS, although, as expected, the CCCs reflected slightly lower DOK levels than the CCSS. Overall, the elementary mathematics prioritized CCCs were at or above the CCSS DOK level. However, in grades 6, 7, 8, and HS, less than 50 percent of the CCCs were at or above the CCSS DOK level as written in the CCSS. This is an area of concern noted by the project regarding DOK as it could potentially produce an inappropriately low level of complexity across the assessment items at the upper grades.
    - *Response:* To address this issue, project partners conducted a concurrent review of the documents detailing item specifications and those used to train item writers. Review and revisions of these materials helped ensure that item sets at each grade level have appropriate DOK levels and range.

Study of the Relationship Between the NCSC Mathematics Prioritized Core Content Connectors and the Mathematics Common Core State Standards

Introduction

To serve students with the most significant cognitive disabilities, the National Center and State Collaborative (NCSC) is designing an alternate assessment as part of a system that includes curriculum, instruction, and professional development resources, all aligned in the Common Core State Standards (CCSS).

To support the coordinated development of all system components, NCSC developed the Core Content Connectors (CCCs) for each grade and content area. The CCCs are not extensions of the CCSS; rather, they "pinpoint the primary content of the CCSS and organize it in the conceptual model of the Learning Progressions Framework" (NCSC, 2013, p. 8). The Learning Progressions Framework (Hess, 2010) aligns curriculum resources and assessments with a common, research-based representation of the learning pathways and building blocks that support students' acquisition of the knowledge, skills, and abilities defined in the CCSS. The CCCs clarify concepts in the CCSS by "deconstructing the progress indicators in the Learning Progressions Framework . . . into teachable and assessable segments of content" (NCSC, 2011, p. 1).

To support the use of the CCCs as described, NCSC must provide validity evidence demonstrating the quality of alignment between the CCCs and the CCSS. Researchers designed this study to provide that evidence. Its purposes are (a) to provide formative information to assessment developers about whether and how they might need to revise individual CCCs to better align with the CCSS and (b) to document development-stage alignment as part of a larger alignment evaluation of the assessment system.

NCSC partner states used an iterative process and worked with content experts and severe disabilities experts to select a subset of CCCs as priorities for assessment. They based selection decisions on the importance of the content assessed, the distribution of strands in the CCSS, and grade-level CCSS alignment. Project partners used consensus decision making and prioritized for the operational assessment—scheduled for spring 2014–2015—up to 10 CCCs per grade and content area in grades 3–8 and 11.

Prioritized progress indicators along a learning progression form the basis of the CCCs prioritized for reading, which are the focus of the present study. NCSC partner states designed the prioritized CCCs to contribute to a fully aligned system of content, instruction, and assessment that focuses on the core content, knowledge, and skills needed at each grade to ensure success at the next. They serve as the proximal assessment targets and link the CCSS to the model of domain-specific knowledge acquisition that guides academic instruction for students with the most significant cognitive disabilities. State partners intend to use the prioritized CCCs as a starting point for designing the alternate assessment. To determine increasing coverage within the assessment across years, additional content review is planned to occur annually.

NCSC researchers used the Links for Academic Learning (LAL) model developed by Flowers, Wakeman, Browder, and Karvonen (2007) to conduct this evaluation of the alignment of the reading prioritized CCCs with the English language arts (ELA) CCSS.

The LAL Methodology

Flowers et al. (2007) developed the LAL alignment methodology to support the evaluation of alignment between alternate assessments based on alternate achievement standards (AA-AAS) and the academic content standards those assessments are meant to address. In developing the LAL method, Flowers et al. first considered the policy and practice requirements for evaluating AA-AAS alignment quality. According to Improving the Academic Achievement of the Disadvantaged: Final Rule (2003), these assessments must

- be aligned with a state's academic content standards,
- promote access to the general curriculum, and
- reflect the highest achievement standards possible.

With these requirements in mind, Flowers et al. (2007) analyzed the alignment methods most often used for evaluations involving general assessments. Although there were many common themes among these methods, none provided a comprehensive set of criteria that would allow evaluators to address all three of the requirements for AA-AAS systems noted above. Thus, Flowers and her colleagues developed the LAL method specifically for use with AA-AAS.

The basic premises of the LAL method include the following expectations for AA-AAS (adapted from Flowers et al., 2007):

1. The assessments must be linked to grade-level content standards.
2. The target for achievement must be academic content (e.g., reading, math, science) that is referenced to the student's assigned grade based on chronological age.
3. Functional activities and materials may be used to promote understanding, but the target skills for student achievement are academically focused.

4. Prioritization of the content, if it occurs, should reflect the major domains of the curricular area (e.g., strands of math) and have fidelity with this content and how it is typically taught in general education.
5. The alternate expectations for achievement may include a focus on prerequisite skills or some partial attainment of the grade level, but students should still have the opportunity to meet high expectations, to demonstrate a range of depth of knowledge, to achieve within their symbolic level, and to show growth across grade levels or grade bands.

Application of the LAL Methodology to NCSC Mathematics Relationship Study

Researchers translated the LAL premises into four aspects of alignment that are considered in the present study (see Exhibit 1). This approach to alignment differs from more traditional methods that focus on post-hoc evidence of, for example, test level alignment of items with standards. The LAL methodology supports up to two evaluation questions for each of the four aspects considered here. These questions represent the primary and secondary objectives for this evaluation:

Primary objective: To what extent does each prioritized CCC align with the specific CCSS it is intended to align with in terms of content centrality, performance centrality, and depth of knowledge?

Secondary objective: To what extent does the set of grade-level prioritized CCCs reflect the set of grade-level CCSS in terms of content centrality, performance centrality, and depth of knowledge?

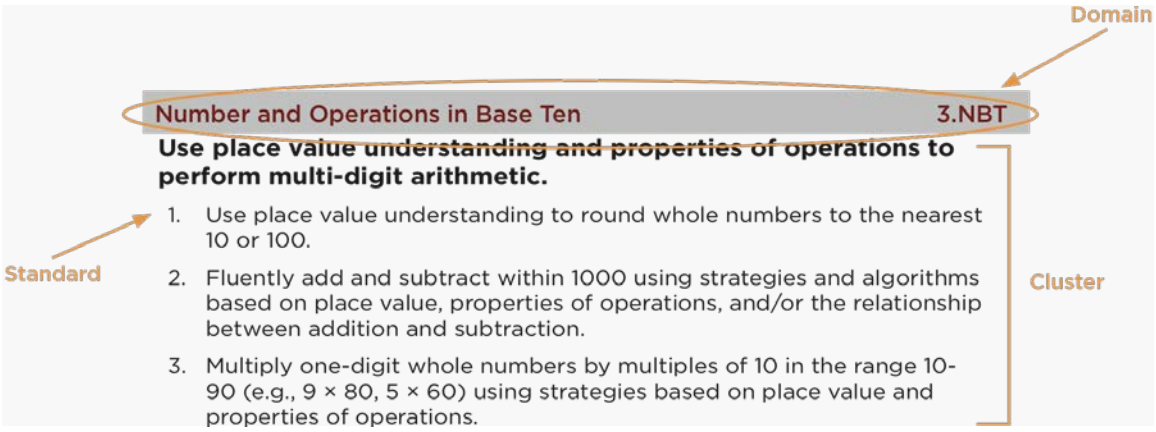
Exhibit 1. Alignment Aspects Addressed in the Mathematics Alignment Study

Aspect	Evaluation Questions
1. Domain Coverage	• To what extent does each CCC as a whole cover the range of the target CCSS?
2. Content Centrality	• To what extent does the focus of achievement in the CCC maintain fidelity with the content of the associated CCSS?
3. Performance Centrality	• To what extent does the focus of achievement in the CCC maintain fidelity with the specified performance of the associated CCSS?
4. Depth of Knowledge (DOK)	• Do the DOK levels in the CCCs reflect fidelity with the DOK levels in the associated CCSS? • To what extent does the CCC reflect the range of DOK defined in the CCSS?

Structure of the Mathematics CCSS

Mathematics CCSS are hierarchically structured and consist of three levels: domain, cluster, and standard (see Exhibit 2 for an illustration of this structure). The top level is referred to as the domain. A grade 3 example is "Number and Operations in Base Ten (NBT)." Clusters are nested at the next level within the domain. For example, the cluster "Use place value understanding and properties of operations to perform multi-digit arithmetic" is nested at the next level within the NBT domain. The lowest level, providing the greatest detail, is the standard. In Exhibit 2, "1. Use place value understanding to round whole numbers to the nearest 10 or 100" is one of the standards nested within the cluster.

Exhibit 2. Structure of the Mathematics CCSS



Note. This image was created by Karin Hess (2005).

Methodology

Raters

Researchers used their professional networks and contacts in the field to recruit raters and then selected two expert mathematics raters to participate in this study. Each rater met the following requirements:

- Must be a certified teacher or an active faculty member or consultant with expertise in significant cognitive disabilities, the assigned content area, or both, for the grade range of the panel to which s/he is assigned;
- Must have had no previous and have no current involvement in the NCSC CCCs, curriculum, or assessment development processes.

Both experts were certified, Caucasian female teachers with master's degrees.

After each expert independently completed the required ratings, NCSC researchers checked the ratings for agreement. When agreement was lacking, raters discussed the rationale for their ratings and came to a consensus. NCSC researchers used the consensus ratings for all analyses.

Rating Rubrics

Experts reviewed and rated the CCSS and the CCCs in relation to each of the five evaluation questions (see Exhibit 1). They provided the following ratings:

1. DOK for all of the CCSS in the target strands,
2. DOK for each prioritized CCC,
3. Closest CCSS match for each prioritized CCC,
4. Content centrality between each prioritized CCC and selected CCSS, and
5. Performance centrality between each prioritized CCC and selected CCSS.

Depth of knowledge (DOK) reflects the cognitive demands of the CCC or CCSS. It describes the complexity of the knowledge and skills required to perform a task. Researchers asked participants to rate DOK on a 5-point scale, which was developed by Porter, McMaken, Hwang, and Yang (2011). Refer to Exhibit 3 for the DOK rating scale.

Exhibit 3. Mathematics Depth of Knowledge Rating Scale

DOK level		Description
1	Memorize	• Recite basic mathematics facts • Recall mathematics terms and definitions • Recall formulas and computational processes
2	Perform procedures	• Use numbers to count, order, or denote • Do computational procedures or algorithms • Follow procedures/instructions • Make measurements, do computations • Solve equations/formulas, routine word problems • Organize or display data • Read or produce graphs and tables • Execute geometric constructions
3	Demonstrate understanding	• Communicate new mathematical ideas • Use representations to model mathematical ideas • Explain findings and results from data analysis • Develop/explain relationship between concepts • Explain relationships between models, diagrams, and other relationships

DOK level		Description
4	Conjecture, generalize, prove	• Determine the truth of a mathematical pattern or proposition • Write formal or informal proofs • Analyze data • Find a mathematical rule to generate a pattern or number sequence
5	Solve non-routine problems, make connections	• Apply and adapt a variety of appropriate strategies to solve problems • Apply mathematics in contexts outside mathematics • Recognize, generate, or create patterns • Synthesize content and ideas from several sources

Content centrality is a measure of the degree of fidelity between the content of a CCC and the content of a CCSS. For example, a CCC requiring students to "determine equivalent fractions" and a CCSS requiring students to "explain why a fraction is equivalent to another fraction" would have the same content ("equivalent fractions"), even though the performance is different ("determine" vs. "explain"). A CCC requiring students to "solve multiplicative comparisons" and a CCSS requiring students to "solve multistep word problems" would not have the same content ("multiplicative comparisons" vs. "word problems"), although they do have the same performance ("solve").

The content centrality rubric applied in this study appears in Exhibit 4. Raters identified the CCSS that most closely aligned to a CCC and then rated the degree of content centrality between each pair as *none*, *far*, *part*, or *all*.

Exhibit 4. Content Centrality Rubric

Rating		Description
0	None	The CCSS and the CCC do not address the same content.
1	Far	The CCC addresses some but not most of the content of the CCSS; the content of the CCC is present in the CCSS.
2	Part	The CCC addresses most of the content of the CCSS; the content of the CCC is present in the CCSS.
3	All	The CCC clearly addresses the same content as the CCSS.

Performance centrality represents the degree to which a CCC and a selected CCSS contain the same performance expectation. For example, a CCC requiring students to "solve multiplicative comparisons" and a CCSS requiring students to "solve multistep

word problems" would have the same performance expectation ("solve"), although the content is different. A CCC requiring students to "determine equivalent fractions" and a CCSS requiring students to "explain why a fraction is equivalent to another fraction" would not have the same performance expectation ("determine" vs. "explain"), although they have the same content ("equivalent fractions").

The experts rated as *none*, *some*, or *all,* the degree of performance centrality between each CCC and the CCSS identified as its closest match (see Exhibit 5).

Exhibit 5. Performance Centrality Rubric

Rating		Description
0	None	The performance of the CCSS and the CCC are not the same.
1	Some	The performance of the CCC partially matches the performance of the CCSS; the performance of the CCC is present in the CCSS.
2	All	The performance of the CCC is the same as the CCSS.

Data Collection Process

The experts gathered to participate in the study during the summer of 2012. Experts convened in person to receive a detailed training on the purpose of the study, the rubrics, and the rating process. The training included practice with rating using sample CCC and CCSS and discussion to strengthen understanding and help ensure inter-rater agreement. After the training, researchers provided the participants with the rating materials. Participants completed their ratings independently from their personal workspaces and submitted rating sheets to researchers via email for review.

This study employed a consensus model in which individual participants first made independent ratings and then discussed their ratings to reach agreement. Researchers captured both individual and consensus ratings. Researchers re-convened experts to obtain consensus ratings when needed.

Considerations for Analysis and Interpretation of Results

Alignment studies are typically conducted to evaluate the alignment between test items and standards. Developers typically create items from standards, often with the intent to provide complete or very close alignment between the item and the target standard. However, the relationship between all of the mathematics CCCs and the CCSS differs from the relationship between items and standards. When interpreting the study's results, readers must consider the characteristics and the intended purpose of the CCCs. NCSC used the CCCs to (a) identify salient academic connections between the Learning Progressions Framework and the CCSS, (b) represent the scope of the CCSS, and (c) provide a foundation for both assessment and instruction. Consequently, the CCCs differ from the CCSS in terms of organizational structure and the scope of each

CCC. NCSC has organized the CCCs by categories, strands, and sub-strands, and each individual CCC tends to be narrower and more discrete in breadth than an individual CCSS, targeting less knowledge and fewer skills.

For these reasons, researchers did not anticipate a one-to-one correspondence between each CCC and its target CCSS, or between the CCCs and the CCSS as a group, for any of the ratings. With regard to the CCSS alignment, some CCCs may be dually aligned or contain pieces of multiple CCSS. Therefore, we would expect to see many CCCs rated *part* for both content and performance centrality. Likewise, the CCCs should be similar but not identical to the CCSS in terms of DOK, showing a broadly comparable range. However, due to their generally narrower individual focus, the CCCs are likely to have slightly lower levels of DOK overall than the CCSS.

Lastly, researchers advise readers to use caution when interpreting results and proposing recommendations based on the results of this study due to the limited size of the review panel.

Findings by Alignment Aspect and Evaluation Question

CCCs Linked to Intended CCSS

Researchers evaluated the extent to which each prioritized CCC maps onto its target CCSS (i.e., they investigated whether the panelists chose the intended CCSS as the one that best aligns with the prioritized CCC).The panelists were instructed to choose the most closely aligned CCSS for each prioritized CCC; they were not provided with the intended CCSS.

For all but one of the prioritized CCCs, panelists chose as the “best match” the CCSS intended to align with the prioritized CCC based on the CCC development process (see Exhibit 6). Panelists determined that 77 of the 78 prioritized CCCs (98.7%) aligned with their intended CCSS, and panelists matched only one prioritized CCC (1.2%) with a non-intended CCSS.

Exhibit 6. Percentage of Prioritized CCCs Rated as Linked to CCSS

Grade	Matched to Intended CCSS		Matched to Non-intended CCSS	
	#	%	#	%
3	9	88.9	1	11.1
4	12	100.0	0	0.0
5	10	100.0	0	0.0
6	9	100.0	0	0.0
7	10	100.0	0	0.0
8	10	100.0	0	0.0
HS	17	100.0	0	0.0
Total	77	98.7	1	1.3

Content Centrality

To examine the degree of content centrality, researchers evaluated the extent to which the focus of achievement in each individual prioritized CCC maintains fidelity with the content of the associated CCSS. Researchers performed these analyses only for those prioritized CCCs that raters matched to their intended CCSS.

The experts rated all of the prioritized CCCs (100%) as having *all* or *part* content centrality with their associated CCSS (see Exhibit 7). They did not assign a rating of *far* or *none* for content centrality to any prioritized CCC matched to its intended CCSS.

Exhibit 7. Content Centrality Ratings for Mathematics Prioritized CCCs

Grade	*N*	All		Part		Far		None	
	#	#	%	#	%	#	%	#	%
3	9	6	67	3	33	0	0	0	0
4	12	7	58	5	42	0	0	0	0
5	10	5	50	5	50	0	0	0	0
6	9	4	44	5	56	0	0	0	0
7	10	6	60	4	40	0	0	0	0
8	10	4	40	6	60	0	0	0	0
HS	17	14	82	3	18	0	0	0	0
All	77	46	60	31	40	0	0	0	0

Performance Centrality

To examine the degree of performance centrality, researchers evaluated the extent to which the focus of achievement in each individual prioritized CCC maintains fidelity with the specified performance of the associated CCSS. Researchers performed these analyses only for those prioritized CCCs that raters matched to their intended CCSS.

The experts rated all (100%) of the prioritized CCCs as having *some* or *all* performance centrality with their associated CCSS. No prioritized CCC matched to its intended CCSS was given a rating of *some* or *none* (see

Exhibit 8).

Exhibit 8. Performance Centrality Ratings for Mathematics CCCs

Grade	*N*	All		Some		None	
	#	#	%	#	%	#	%
3	9	8	89	1	11	0	0
4	12	11	92	1	8	0	0
5	10	10	100	0	0	0	0
6	9	8	89	1	11	0	0
7	10	8	80	2	20	0	0
8	10	7	70	3	30	0	0
HS	17	14	82	3	18	0	0
All	77	66	86	11	14	0	0

Depth of Knowledge

To examine DOK, researchers evaluated the extent to which the DOK levels of each prioritized CCC maintains fidelity with the DOK levels of its associated CCSS.

Raters determined a range of DOK levels for the prioritized CCCs, with most associated with *perform* (44.8%) or *demonstrate* (34.6%) (see Exhibit 9). The majority of the prioritized CCCs with ratings of *solve* (i.e., higher level) occurred in grades 6 and 11.

Similarly, raters determined a range of DOK levels for the CCSS, (see

Exhibit 10), with most rated as *perform* (17.7%), *demonstrate* (52.6%), or *conjecture* (23.7%). The percentage of grade level CCSS rated *perform* tended to be higher for grades 3–5 while the highest percentage of CCSS rated *conjecture* were in grade 6 and above.

Exhibit 9. Percentages of Prioritized CCCs at DOK Levels

Grade	Memorize	Perform	Demonstrate	Conjecture	Solve
	%	%	%	%	%
3	0.0	44.4	33.3	11.1	11.1
4	0.0	25.0	66.7	8.3	0.0
5	0.0	50.0	40.0	10.0	0.0
6	0.0	55.6	22.2	0.0	22.2
7	0.0	50.0	30.0	10.0	10.0
8	10.0	30.0	50.0	10.0	0.0
HS	0.0	58.8	0.0	17.6	23.5
All	1.4	44.8	34.6	9.6	9.6

Exhibit 10. Percentages of CCSS at DOK Levels

Grade	Memorize %	Perform %	Demonstrate %	Conjecture %	Solve %
3	2.3	29.5	61.4	6.8	0.0
4	0.0	34.6	50.0	15.4	0.0
5	0.0	29.3	56.1	14.6	0.0
6	0.0	9.3	63.0	27.8	0.0
7	0.0	15.9	54.5	29.5	0.0
8	0.0	5.3	44.7	39.5	10.5
HS*	0.0	0.0	38.2	32.4	29.4
All	0.3	17.7	52.6	23.7	5.7

*Raters provided DOK ratings for 7 of the 11 CCSS

Researchers compared the DOK level patterns of the CCSS to the corresponding prioritized CCC and found that each prioritized CCC was rated as one of the following (a) below the CCSS DOK, (b) at the CCSS DOK, or (c) above the CCSS DOK. In general education assessment programs, it is expected that at least 50% of the assessment items have DOK levels at or above the CCSS DOK level. Alternate assessments are not designed to be at the same level of complexity as the general education assessment; however, it is expected that students have access to challenging academic materials. In grades 3–5, at least 50% of the prioritized CCCs were at or above the CCSS DOK level. In grades 6–11, less than 50% of the prioritized CCCs were at or above the CCSS DOK level, a fact that suggests the prioritized CCC DOK levels might need to be adjusted to better reflect the DOK levels of the CCSS (see Exhibit 11).

Exhibit 11. Percentage of Prioritized CCCs DOK Level Below, At, or Above CCSS DOK Level

Grade	Below %	At %	Above %	At or Above %
3	33.0	44.0	22.0	67.0*
4	25.0	67.0	8.0	75.0
5	50.0	40.0	10.0	50.0
6	56.0	22.0	22.0	44.0
7	60.0	30.0	10.0	40.0
8	60.0	30.0	10.0	40.0
HS	82.0	6.0	12.0	18.0
All	52.0	34.0	14.0	48.0

**Note*. Percent due to rounding.

Summary of Findings

Overall, the relationship between the prioritized CCCs and the CCSS is strong with regard to CCSS-match, content centrality, and performance centrality. Researchers examined the relationship between 78 mathematics CCCs and the CCSS to provide formative information to test developers so they could revise prioritized CCCs to better align to the CCSS and to document alignment as part of collection of validity evidence. The Learning Progressions Frameworks serve as the foundation for organizing content into hypothesized paths for learning. The prioritized CCCs provide detailed information about the content and performance expected along the Learning Progressions Frameworks.

An evaluation of the content centrality of prioritized CCCs matched to their intended CCSS indicated that 77 of the 78 prioritized CCCs (98.7%) were rated as having “all” or “part” of the content found in the CCSS. An evaluation of the performance centrality of individual prioritized CCCs matched to the corresponding CCSS indicated that all (100%) were rated as having “all” or “part” of the performance found in the CCSS.

The DOK ratings indicated that at least half of the prioritized CCCs in grade 3 through grade 5 had DOK levels at or above the corresponding CCSS. Less than 50 percent of the prioritized CCCs were at or above the CCSS DOK level in grade 6 through HS suggesting a possible need to adjust the prioritized CCC DOK levels to better reflect the DOK levels of the CCSS. NCSC item developers investigated these DOK levels to ensure they reflected the appropriate levels (see section Recommendations for and Impact on Test Development).

As is true of all alternate assessments, the breadth, depth, and complexity of the content covered in the AA-AAS is lower than that of standard assessments. In terms of the LAL methodology, the breadth, depth, and complexity correspond to the number of prioritized CCCs, the content and performance centrality, and the DOK. Thus, NCSC intentionally prioritized fewer CCCs for assessment and reduced the depth of the content or skills measured by the prioritized CCCs.

Ultimately, the prioritized CCCs provide detailed information about the content and performance expected along the Learning Progressions Frameworks, and the findings illustrate strong alignment of prioritized CCCs to CCSS.

Recommendations for and Impact on Test Development

Researchers shared the outcomes of the alignment study with NCSC content experts. These experts examined both the overall results of the alignment study and the detailed results to determine how to respond in areas that warranted further review and adjustment. Even though the study showed that the alignment of the mathematics prioritized CCCs to the CCSS was strong, each instance of a ‘mismatch’ between the CCC and the intended CCSS was further examined.

Researchers have the following recommendations for item development partners based on the results from the present study. Following each recommendation is NCSC's response.

- Following the initial findings, researchers discovered a number of the instructionally-based Nature of Numbers and Operations strand 3 (NO-3) CCCs did not align to a CCSS. However, these non-aligned CCCs were designed to reflect the CCSS Mathematical Practices and were considered an important element in the Learning Progressions.

    - *Response:* The items constructed for use in the NCSC AA-AAS are now dual coded to an NO-3 and a CCSS (refer to Appendix B: Recommendations and Evidence for Change to Improve Alignment).

- In addition, in some cases the prioritized CCC did not meet grade-level CCSS; consider reviewing prioritized CCCs that did not meet the grade-level CCSS.

    - *Response:* Researchers responded to the alignment findings regarding the prioritized CCCs aligned to the off-grade CCSS mathematics (refer to Appendix B: Recommendations and Evidence for Change to Improve Alignment).

- Consider informing teachers on how to teach skills in CCCs that blends more than one CCSS.

    - *Response:* The process of developing CCCs, using both the CCSS and the Learning Progressions Framework, resulted in the creation of CCCs that reflect a blending of more than a single CCSS and the creation of multiple CCCs to address a single CCSS. Curricular documents clearly display this relationship by establishing Instructional Families to ensure that teachers can teach all related academic skills in a coherent manner.

        Instructional resources have been created that will be useful to teachers as they transition to instruction based on the CCSS for students who participate in alternate assessment based on alternate achievement standards. When integrated, the materials and related training tools will help build the capacity of teachers to better understand the CCSS, to plan and effectively teach this challenging content, and to monitor student progress toward curricular goals.

- Consider an explanation of any discrepancies between experts and panelists' ratings.

    - *Response:* NCSC content specialists disagree with the panelists' findings regarding mathematics prioritized CCC 3.NO.1j3. The panelists incorrectly matched the CCC to a below-grade CCSS (2.NBT.3). As a result, they rated 3.NO.1j3 as having no performance centrality and far content centrality. The CCC 3.NO.1j3 (*Use place value to round to the nearest 10 or 100*) is intended to

be aligned with CCSS 3.NBT.A.1 (*Use place value understanding to round whole numbers to the nearest 10 or 100*).

- *Response:* The panelists aligned five of the six CCCs in one family, 7.NO.2f relating to proportional relationships, to on-grade CCSS. However, in the case of the mathematics prioritized CCC 7.NO.2f6 (*Solve word problems involving ratios*), the panelists aligned the CCC to a below-grade CCSS (6.RP.3) only. The NCSC content team intentionally prioritized this skill, as ratios serve a valuable purpose in the solution of proportional problems. (7.RP.A.3 - *Use proportional relationships to solve multistep ratio and percent problems*). The NCSC content team recommended this CCC be dually aligned to 6.RP.3 and 7.RP.A.3.

- *Response:* The panelists aligned 4.DPS.1g3 (*Collect data, organize in graph (e.g. picture graph, line plot, bar graph*) to a below-grade CCSS (3.MD.3) Currently, in the NCSC Curriculum and Instruction materials, this CCC is dually aligned to CCSS 3.MD.3 and 4.MD.B.4 (*Make a line plot to display a data set of measurements in fractions of a unit (1/2, 1/4, 1/8*)). As such, the NCSC AA-AAS items currently are written to align to 4.MD.B.4, which require students to graph a data set of measurements in fractions of a unit. The NCSC content team recommended this CCC be dually aligned to 3.MD.3 and 4.MD.B.4.

- *Response:* The panelists aligned the mathematics prioritized CCC 4.NO.2d7 (*Determine how many objects go into each group when given the total number of objects and groups where the number in each group or number of groups is not > 10*), to a below-grade CCSS. However, grade 4 students need to solve word problems involving multiplicative comparison (product unknown, partition unknown) using multiplication or division as shown in Table 2 of the *Common Core State Standards for Mathematics*, page 89. Therefore, the current items on the AA-AAS require students to solve word problems which require division by using drawings and equations. As such, the CCC 4.NO.2d7, should be dually aligned with CCSS 4.OA.A.1.

- *Response:* The panelists aligned three of the four CCCs in one family, 7.GM.1h, relating to solving area, surface area, and volume problems, to on-grade CCSS. However, in the case of the mathematics prioritized CCC 7.GM.1h2 (*Find the surface area of three-dimensional figures using nets of rectangles or triangles*), the panelists aligned the CCC to a below-grade CCSS (6.G.4). The current items on the AA-AAS allow students to apply the concept of area to find surface area of right prisms. Specifically, the items are intended to address the grade 7 geometry skill CCSS 7.G.B.4 (*Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms*). The use of nets to make connections to the symbolic and more abstract aspects of geometry is fundamental for the study of surface area. The NCSC content team recommends this CCC be dually aligned to 6.G.4 and 7.G.B.4.

- The distribution of DOK levels among the CCCs broadly mirrored that of the associated CCSS, although, as expected, the CCC reflected slightly lower DOK levels than the CCSS. Overall, the elementary mathematics prioritized CCCs were at or above the CCSS DOK level. However, in grades 6, 7, 8, and HS, less than 50 percent of the CCCs were at or above the CCSS DOK level as written in the CCSS. This is an area of concern noted by the project regarding DOK as it could potentially produce an inappropriately low level of complexity across the assessment items at the upper grades.
    - *Response:* To address this issue, project partners conducted a concurrent review of the documents detailing item specifications and those used to train item writers. Review and revisions of these materials helped ensure that item sets at each grade level have appropriate DOK levels and range.

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Appendix A: Ratings for Mathematics Prioritized CCCs

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
3	3.DPS.1g1	Collect data, organize into picture or bar graph.	3.MD.3	Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step how many more and how many less problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.	2	3	2	2
3	3.GM.1i1	Partition rectangles into equal parts with equal area.	3.G.2	Partition shapes into parts with equal areas. Express the area of each part as a unit fraction of the whole. For example, partition a shape into 4 parts with equal area, and describe the area of each part as 1/4 of the area of the shape.	3	3	3	2
3	3.ME.1d2	Measure area of rectangles by counting squares.	3.MD.6	Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).	2	2	3	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
3	3.NO.1j3	Use place value to round to the nearest 10 or 100.	2.NBT.3	Read and write numbers to 1000 using base-ten numerals, number names, and expanded form.	2	2	1	0
3	3.NO.1l3	Identify the fraction that matches the representation (rectangles and circles; halves, fourths, thirds, and eighths).	3.NF.1	Understand a fraction 1/b as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size 1/b.	3	3	3	2
3	3.NO.2c1	Solve multi-step addition and subtraction problems up to 100.	3.NBT.2	Fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.	2	3	2	2
3	3.NO.2d3	Solve multiplication problems with neither number greater than 5.	3.OA.1	Interpret products of whole numbers, e.g., interpret 5 × 7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5 × 7.	2	3	3	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
3	3.NO.2e1	Solve, or solve and check, one- or two-step word problems requiring addition, subtraction, or multiplication with answers up to 100.	3.OA.8	Solve two-step word problems using the four operations. Represent these problems using equations, with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies, including rounding.	4	3	2	2
3	3.PRF.2d1	Identify multiplication patterns in a real word setting.	3.OA.9	Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations. For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.	5	4	3	2
3	3.SE.1g1	Use =, <, or > to compare 2 fractions with the same numerator or denominator.	3.NF.3	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.	3	3	3	1

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
4	4.DPS.1g3	Collect data, organize in graph (e.g. picture graph, line plot, bar graph).	3.MD.3	Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step how many more and how many less problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets.	2	3	3	2
4	4.GM.1h2	Classify two--dimensional shapes based on attributes (# of angles).	4.G.2	Classify two-dimensional figures based on the presence or absence of parallel or perpendicular lines, or the presence or absence of angles of a specified size. Recognize right triangles as a category, and identify right triangles.	2	2	2	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
4	4.ME.1g2	Solve word problems using perimeter and area where changes occur to the dimensions of a figure.	4.MD.2	Use the four operations to solve word problems involving distances, intervals of time, liquid volumes, masses of objects, and money, including problems involving simple fractions or decimals, and problems that require expressing measurements given in a larger unit in terms of a smaller unit. Represent measurement quantities using diagrams such as number line diagrams that feature a measurement scale.	3	3	2	2
4	4.ME.1g2	Solve word problems using perimeter and area where changes occur to the dimensions of a figure.	4.MD.3	Apply the area and perimeter formulas for rectangles in real world and mathematical problems. For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.	3	3	3	2
4	4.NO.1j5	Use place value to round to any place (e.g.,., ones, tens, hundreds,	4.NBT.3	Use place value understanding to round multi-digit whole numbers to any place.	2	2	3	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
		thousands).						
4	4.NO.1m1	Determine equivalent fractions.	3.NF.3	Explain equivalence of fractions in special cases, and compare fractions by reasoning about their size.	3	3	2	2
4	4.NO.1m1	Determine equivalent fractions.	4.NF.1	Explain why a fraction a/b is equivalent to a fraction (n × a)/(n × b) by using visual fraction models, with attention to how the number and size of the parts differ even though the two fractions themselves are the same size. Use this principle to recognize and generate equivalent fractions.	3	3	2	2
4	4.NO.1n2	Compare up to 2 given fractions that have different denominators.	4.NF.2	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the	3	4	3	1

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
				conclusions, e.g., by using a visual fraction model.				
4	4.NO.2d7	Determine how many objects go into each group when given the total number of objects and the number of groups where the number in each group or number of groups is not greater than 10.	3.OA.2	Interpret whole-number quotients of whole numbers, e.g., interpret 56.	3	3	3	2
4	4.NO.2e2	Solve, or solve and check, one- or two-step word problems requiring addition, subtraction, or multiplication with answers up to 100.	4.OA.3	Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the	4	3	2	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
				reasonableness of answers using mental computation and estimation strategies, including rounding.				
4	4.PRF.1e3	Solve multiplicative comparisons with an unknown using up to 2-digit numbers with information presented in a graph or word problem (e.g., an orange hat cost $3. A purple hat cost 2 times as much. How much does the purple hat cost? [3 x 2 = p]).	4.OA.2	Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.	3	3	3	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
4	4.SE.1g2	Use =, <, or > to compare 2 fractions (fractions with a denominator or 10 or less).	4.NF.2	Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as 1/2. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols >, =, or <, and justify the conclusions, e.g., by using a visual fraction model.	3	4	3	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
5	5.GM.1c3	Use order pairs to graph given points.	5.G.1	Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate).	2	3	3	2
5	5.ME.1b2	Convert standard measurements of length.	5.MD.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving	3	3	2	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
				multi-step, real world problems.				
5	5.ME.2a1	Solve problems involving conversions of standard measurement units when finding area, volume, time lapse, or mass.	5.MD.1	Convert among different-sized standard measurement units within a given measurement system (e.g., convert 5 cm to 0.05 m), and use these conversions in solving multi-step, real world problems.	3	3	3	2
5	5.NO.1b1	Read, write, or select a decimal to the hundredths place.	5.NBT.3	Read, write, and compare decimals to thousandths.	3	2	2	2
5	5.NO.1b4	Round decimals to the next whole number.	5.NBT.4	Use place value understanding to round decimals to any place.	2	2	2	2
5	5.NO.2a5	Solve word problems that require multiplication or division.	5.NBT.6	Find whole-number quotients of whole numbers with up to four-digit dividends and two-digit divisors, using strategies based on place value, the properties of operations, and/or the relationship between multiplication and division. Illustrate and explain the calculation by using equations, rectangular	2	3	3	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
				arrays, and/or area models.				
5	5.NO.2c1	Solve 1 step problems using decimals.	5.NBT.7	Add, subtract, multiply, and divide decimals to hundredths, using concrete models or drawings and strategies based on place value, properties of operations, and/or the relationship between addition and subtraction; relate the strategy to a written method, and explain the reasoning used.	2	4	2	2
5	5.NO.2c2	Solve word problems involving the addition, subtraction, multiplication, or division of fractions.	5.NF.2	Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of	2	3	3	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
				fractions to estimate mentally and assess the reasonableness of answers. For example, recognize an incorrect result 2/5 + 1/2 = 3/7, by observing that 3/7 < 1/2.				
5	5.PRF.1a1	Determine whether the product will increase or decrease based on the multiplier.	5.NF.5	Interpret multiplication as scaling (resizing), by: a) Comparing the size of a product to the size of one factor on the basis of the size of the other factor, without performing the indicated multiplication. b) Explaining why multiplying a given number by a fraction greater than 1 results in a product greater than the given number (recognizing multiplication by whole numbers greater than 1 as a familiar case); explaining why multiplying a given number by a fraction less than 1 results in a product smaller than the given number; and relating the principle of	3	4	3	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
				fraction equivalence a/b = (n × a)/(n × b) to the effect of multiplying a/b by 1.				
5	5.PRF.1b2	Generate or select a comparison between two graphs from a similar situation.	5.OA.3	Generate two numerical patterns using two given rules. Identify apparent relationships between corresponding terms. Form ordered pairs consisting of corresponding terms from the two patterns, and graph the ordered pairs on a coordinate plane. For example, given the rule Add 3 and the starting number 0, and given the rule Add 6 and the starting number 0, generate terms in the resulting sequences, and observe that the terms in one sequence are twice the corresponding terms in the other sequence. Explain informally why this is so.	4	4	2	2
6	6.DPS.1d3	Select statement that matches mean, mode, and spread of data for 1 measure of central tendency for a given data set.	6.SP.5	Summarize numerical data sets in relation to their context, such as by: a) Reporting the number of observations. b) Describing the nature of the attribute under investigation, including	3	4	3	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
				how it was measured and its units of measurement. c) Giving quantitative measures of center (median and/or mean) and variability (interquartile range and/or mean absolute deviation), as well as describing any overall pattern and any striking deviations from the overall pattern with reference to the context in which the data were gathered. d) Relating the choice of measures of center and variability to the shape of the data distribution and the context in which the data were gathered.				
6	6.GM.1d1	Find area of quadrilaterals.	6.G.1	Find the area of right triangles, other triangles, special quadrilaterals, and polygons by composing into rectangles or decomposing into triangles and other shapes; apply these techniques in the context of solving real-world and mathematical problems.	2	3	2	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
6	6.ME.2a2	Solve one-step, real world measurement problems involving unit rates with ratios of whole numbers when given the unit rate (3 inches of snow falls per hour, how much in 6 hours).	6.RP.3	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.	5	4	3	2
6	6.NO.1d2	Locate positive and negative numbers on a number line.	6.NS.6	Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.	2	3	2	2
6	6.NO.1d4	Select the appropriate meaning of a negative number in a real world situation.	6.NS.5	Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts,	5	3	2	1

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
				explaining the meaning of 0 in each situation.				
6	6.NO.1f1	Calculate a percent of a quantity as rate per 100.	6.RP.3	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.	2	4	2	2
6	6.NO.2a6	Solve problems or word problems using up to three digit numbers and any of the four operations.	6.EE.7	Solve real-world and mathematical problems by writing and solving equations of the form x + p = q and px = q for cases in which p, q and x are all nonnegative rational numbers.	2	2	2	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
6	6.NO.2c3	Solve one step, addition, subtraction, multiplication, or division problems with fractions or decimals.	6.NS.1	Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for (2/3) ÷ (3/4) and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that (2/3)	2	3	3	2
6	6.PRF.1c1	Describe the ratio relationship between two quantities for a given situation.	6.RP.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak. For every vote candidate A received, candidate C received nearly three votes.	3	3	3	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
7	7.DPS.1k1	Analyze graphs to determine or select appropriate comparative inferences about two samples or populations.	7.SP.4	Use measures of center and measures of variability for numerical data from random samples to draw informal comparative inferences about two populations. For example, decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth-grade science book.	4	4	3	2
7	7.GM.1h2	Find the surface area of three-dimensional figures using nets of rectangles or triangles.	6.G.4	Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.	2	3	3	2
7	7.ME.2d1	Apply formula to measure area and circumference of circles.	7.G.4	Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle.	3	4	3	2
7	7.NO.2f1	Identify the proportional relationship between	7.RP.2	Recognize and represent proportional relationships between quantities.	2	3	3	1

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
		two quantities.						
7	7.NO.2f2	Determine if two quantities are in a proportional relationship using a table of equivalent ratios or points graphed on a coordinate plane.	7.RP.2	Recognize and represent proportional relationships between quantities.	3	3	3	2
7	7.NO.2f6	Solve word problems involving ratios.	6.RP.3	Use ratio and rate reasoning to solve real-world and mathematical problems, (e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations).	2	4	2	2
7	7.NO.2f6	Solve word problems involving ratios.	7.RP.3	Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.	2	3	2	2
7	7.NO.2i1	Solve multiplication problems with positive/negative numbers.	7.NS.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply	2	3	2	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
				and divide rational numbers.				
7	7.NO.2i2	Solve division problems with positive/negative numbers.	7.NS.2	Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.	2	3	2	1
7	7.PRF.1f1	Use proportional relationships to solve multistep percent problems.	7.RP.3	Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.	3	3	2	2
7	7.PRF.1g2	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.	7.EE.4	Use variables to represent quantities in a real-world or mathematical problem, and construct simple equations and inequalities to solve problems by reasoning about the quantities.	5	3	3	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
8	8.DPS.1h1	Graph bivariate data using scatter plots and identify possible associations between the variables.	8.SP.1	Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.	3	4	2	2
8	8.DPS.1k2	Analyze displays of bivariate data to develop or select appropriate claims about those data.	8.SP.4	Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they	4	5	2	1

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
				have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?				
8	8.GM.1g1	Recognize congruent and similar figures.	8.G.4	Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.	1	3	3	1

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
8	8.ME.1e1	Describe the changes in surface area, area, and volume when the figure is changed in some way (e.g., scale drawings).	8.G.4	Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.	3	3	2	2
8	8.ME.2d2	Apply the formula to find the volume of 3 dimensional shapes (e.g., cubes, spheres, and cylinders).	8.G.9	Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	3	2	3	2
8	8.NO.1k3	Use approximations of irrational numbers to locate them on a number line.	8.NS.2	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π^2). *For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations*.	3	3	2	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
8	8.PRF.1e2	Represent proportional relationships on a line graph.	8.EE.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.	2	4	2	2
8	8.PRF.1f2	Describe OR SELECT THE relationship between the two quantities Given a line graph of a situation.	8.EE.5	Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.	2	4	3	1
8	8.PRF.1g3	Solve linear equations with 1 variable.	8.EE.7	Solve linear equations in one variable.	2	2	3	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
8	8.PRF.2e2	Identify the rate of change (slope) and initial value (y-intercept) from graphs.	8.F.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.	3	4	2	2
HS	H.DPS.1b1	Complete a graph given the data, using dot plots, histograms, or box plots	S.ID.1	Represent data with plots on the real number line (dot plots, histograms, and box plots).	2		3	2
HS	H.DPS.1c1	Use descriptive stats; range, median, mode, mean, outliers/gaps to describe the data set.	S-ID.5	Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data. Recognize possible associations and trends in the data.	4	5	3	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
HS	H.GM.1b1	Use definitions to demonstrate congruency and similarity in figures.	8.G.2	Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.	2	3	3	1
HS	H.GM.1b1	Use definitions to demonstrate congruency and similarity in figures.	G-CO.7	Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	2	4	3	2
HS	H.GM.1b1	Use definitions to demonstrate congruency and similarity in figures.	G-SRT.2	Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of	2	4	3	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
				sides.				
HS	H.ME.1a2	Solve real world problems involving units of measurement	N-Q.1	Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.	5	3	3	2
HS	H.ME.1b2	Solve a linear equation to find a missing attribute given the area, surface area, or volume and the other attribute	A.REI.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	2		3	2
HS	H.PRF.1c1	Select the appropriate graphical representation of a linear model based on real world events.	F LE.1	Distinguish between situations that can be modeled with linear functions and with exponential functions. a) Prove that linear functions grow by equal differences over equal	5		2	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
				intervals, and that exponential functions grow by equal factors over equal intervals. b) Recognize situations in which one quantity changes at a constant rate per unit interval relative to one another. c) Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.				
HS	H.PRF.2b1	Translate a real-world problem into a one variable linear equation.	A-CED.1	Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.	5	5	3	2
HS	H.PRF.2b2	Solve equations with one or two variables using equations or graphs	A.REI.1	Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	2		2	1

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
HS	H.PRF.2b2	Solve equations with one or two variables using equations or graphs.	A.REI.3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.	2		2	2
HS	H.PRF.2b2	Solve equations with one or two variables using equations or graphs.	A-CED.2	2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.	2	4	3	2
HS	H.PRF.2c1	Make predictions based on a given model (for example, a weather model, data for athletes over years).	F.LE.3	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.	4		3	2
HS	HS.NO.1a1	Simplify expressions that include exponents.	A-SSE.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.	2	4	3	1
HS	HS.NO.1a1	Simplify expressions that include exponents.	N-RN.2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.	2	3	3	2

Appendix B: Recommendations and Evidence for Change to Improve Alignment

Researchers shared the outcomes of the alignment study with content experts for the NCSC project. These experts examined both the overall results of the alignment study and the detailed results to determine how to respond in areas that warranted further review and adjustment. Even though the study showed that the alignment of the mathematics prioritized CCC to the CCSS was strong, each instance of a mismatch between the CCC and the intended CCSS was further examined.

Following the initial findings of the alignment study, NCSC staff discovered that a number of the instructionally-based Nature of Numbers and Operations strand 3 (NO-3) CCCs were not aligned to CCSS. These non-aligned CCCs were designed to reflect the CCSS Mathematical Practices and were considered an important element in the Learning Progressions. The items constructed for use in the NCSC AA-AAS are now dual coded to an NO-3 and a CCSS. Exhibit B1 contains the response to the alignment findings regarding the alignment to the CCSS mathematics practices.

Exhibit B1. Non-Aligned Prioritized CCC Response

NO3 Prioritized CCC	Dual Code Prioritized CCC	New CCSS Link
3.NO.3d4	3.NO.2c1	3.NBT.2
7.NO.3c3	7.NO.2f1	7.RP.2b
8.NO.3c3	8.PRF.1f2	8.F.5
H.NO.3a2	H.PRF.2b2	A.REI.1
H.NO.3a1	H.DPS.1b1	S.ID.1

In addition, in some cases the prioritized CCC did not meet grade-level CCSS. Exhibit B2 contains the response to the alignment findings regarding the prioritized CCC aligned to the off-grade CCSS mathematics.

Exhibit B2. Off-Grade Prioritized CCC Response

Old Prioritized CCC	New Prioritized CCC	New CCSS Link
3.NO.1h1	3.NO.1j3	3.NBT.1
4.NO.1n1	4.NO.1n2	4.NF.1
4.NO.2d8	4.NO.2e2	4.OA.3
4.PRF.1d2	4.PRF.1e3	4.OA.2
5.NO.2a1	5.NO.2c1	5.NBT.7

5.SE.1b	5.PRF.2b1	5.OA-3
5.NO.1c1	5.NO.1b4	5.NBT.4
8.NO.2i4	8.NO.1k3	8.NS.2
H.GM.1a2	H.GM.1d1	G.SRT.2

National Center and State Collaborative

Study b: Study of the Relationship Between the NCSC Reading Prioritized Core Content Connectors and the English Language Arts Common Core State Standards

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National Center and State Collaborative

Study of the Relationship Between the NCSC Reading Prioritized Core Content Connectors and the English Language Arts Common Core State Standards

National Center and State Collaborative Project Report

May 2015

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National Center and State Collaborative.[7] (2015). *Study of the Relationship Between the NCSC Reading Prioritized Core Content Connectors and the English Language Arts*

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Common Core State Standards. Minneapolis, MN: University of Minnesota, National Center and State Collaborative.

National Center and State Collaborative

The National Center and State Collaborative (NCSC) is applying the lessons learned from the past decade of research on alternate assessments based on alternate achievement standards (AA-AAS) to develop a multi-state comprehensive assessment system for students with the most significant cognitive disabilities.

NCSC is a collaborative of 24 states and five organizations. The NCSC states participating in the Spring 2015 NCSC operational assessment are: Arizona, Arkansas, Connecticut, District of Columbia, Idaho, Indiana, Pacific Assessment Consortium (PAC-6)[8], Maine, Montana, New Mexico, Rhode Island, South Carolina, South Dakota, and US Virgin Islands. As of Spring 2015, additional states are members of the NCSC Consortium, representing varying levels of participation. They are: California, Delaware, Florida, Louisiana, Maryland, New York, Oregon, Pennsylvania, Tennessee, and Wyoming.

The five NCSC partner organizations include: National Center on Educational Outcomes (NCEO) at the University of Minnesota, National Center for the Improvement of Educational Assessment (Center for Assessment), University of North Carolina at Charlotte, University of Kentucky, and edCount, LLC.

IDEAs that Work
U.S. Office of Special Education Programs

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The University of Minnesota, the administrative partner, is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without

[8] The Pacific Assessment Consortium (including the entities of American Samoa, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Guam, Republic of Palau, and Republic of the Marshall Islands) partner with NCSC as one state, led by the University of Guam Center for Excellence in Developmental Disabilities Education, Research, and Service (CEDDERS).

regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.

This document is available in alternative formats upon request.

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Executive Summary

To serve students with the most significant cognitive disabilities, the National Center and State Collaborative (NCSC) is designing an alternate assessment as part of a system that includes curriculum, instruction, and professional development resources, all aligned to the Common Core State Standards (CCSS).[9]

To support the coordinated development of all of these system components, NCSC developed the Core Content Connectors (CCCs) for each grade and content area. These CCCs are not extensions of the CCSS; rather, they "pinpoint the primary content of the CCSS and organize it in the conceptual model of the Learning Progressions Frameworks" (NCSC, 2013, p. 8). The Learning Progressions Frameworks served as the foundation for organizing content into hypothesized paths for learning. CCCs were developed to articulate the relationship between CCSS and the Learning Progressions Frameworks.

To support the use of the CCCs in this way, NCSC must provide validity evidence demonstrating the quality of alignment between the CCCs and the CCSS. Researchers designed the study summarized here to provide that evidence. The study's purposes were to (a) provide formative information to developers about whether and how they might need to revise individual CCCs to better align with the CCSS and (b) document development-stage alignment as part of a larger alignment evaluation of the assessment system.

Project partners prioritized up to 10 CCCs per grade and content area in grades 3–8 and 11 for assessment; these prioritized CCCs are the focus of the present study. The prioritized CCCs, which link the CCSS and the model of domain-specific knowledge acquisition that guides academic instruction for these students, serve as the proximal assessment targets for the operational test in 2014–2015. State partners intend to use these prioritized CCCs as a starting point for designing the alternate assessment. To determine increasing coverage within the assessment across years, additional content review will occur annually.

Project partners identified 51 CCCs as priorities for assessment in reading. These CCCs are known as the reading prioritized CCCs.

Methodology

NCSC researchers used the Links for Academic Learning (LAL) model developed by Flowers, Wakeman, Browder, and Karvonen (2007) to conduct this evaluation of the alignment of the reading prioritized CCCs with the English language arts (ELA) CCSS.

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[9] For a full copy of the report, please contact the Arizona Department of Education Director of Alternate Assessment, Audra Ahumada, at Audra.Ahumada@azed.gov.

Researchers established two panels of experts in curriculum and special education for this study: one panel for the 3–5 grade span (four expert panelists) and one panel for grades 6–8 and 11 (three expert panelists). All rater disagreements were reconciled by having both experts review ratings and come to a consensus. Researchers used the final consensus rating in all the analyses. Both panels yielded an average inter-rater agreement of 0.98 for their independent ratings.

Panelists used the alignment study process to review and rate the CCSS and prioritized CCCs for each of the following:

Depth of knowledge (DOK) for all of the CCSS in the target strands,[10]

DOK for each prioritized CCC,

Closest CCSS match for each prioritized CCC,

Content centrality[11] between each prioritized CCC and selected CCSS, and

Performance centrality[12] between each prioritized CCC and selected CCSS.

Data Collection Process

The panelists gathered to participate in the alignment study from January 15–18, 2013. On the morning of the first day, all panelists convened to receive a detailed training on the purpose of the study, the rubrics, and the rating process. The training included practice with rating using sample CCCs and CCSS and group discussion to strengthen panelist understanding and help ensure inter-rater agreement.

After the training, the participants separated into their panels to begin the rating process. Each panel included a researcher who acted as a facilitator and answered questions regarding the application of the rubrics for DOK, content centrality, and performance centrality. This study employed a consensus model in which individual panelists first made independent ratings and then discussed their ratings in groups to reach agreement. Researchers captured both individual and consensus ratings. The facilitators observed the group discussions, recorded the consensus ratings, and took notes describing the panel's decision-making process and the rationale for panelists' ratings.

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[10] Target strands represent the CCSS to which researchers intended the prioritized CCCs align.

[11] Content centrality is a measure of the degree of fidelity between the content of the CCC and the content of the CCSS.

[12] Performance centrality represents the degree to which the CCC and the selected CCSS contain the same performance expectation.

For each grade, the panelists first rated DOK for each of the CCSS in the target areas. After completing the DOK ratings for the CCSS, the panelists reviewed the CCCs to rate DOK, identify the closest matching CCSS, and rate the degree of content centrality and performance centrality for each CCC–CCSS matched pair.

Results

Panelists chose the intended CCSS as the best match for 46 out of 51 (90.20%) prioritized CCCs. In all of the misaligned cases, simple edits to the wording could clarify the intended linkage; NCSC could also consider documenting dual alignment where appropriate.

Panelists gave ratings of *some* or *all* for content centrality to 45 of the 46 prioritized CCCs that they correctly matched to their intended CCSS. They assigned a rating of *none* for content centrality to one prioritized CCC because it covered only a small part of the CCSS. NCSC could add additional content from the CCSS to this CCC, and/or NCSC could document the rationale for targeting the particular content of this CCC.

The panelists rated 43 of the 46 prioritized CCCs as having *some* or *all* performance centrality with their associated CCSS. NCSC could revise specific CCCs to better reflect the performance focus of their associated CCSS, and/or NCSC could document the reasons for differences in expected performance.

The distribution of DOK levels among the prioritized CCCs broadly mirrors that of their associated CCSS, although, as expected, the CCCs reflect slightly lower DOK levels; NCSC should consider documenting the reasons for this difference.

Overall, the alignment between the prioritized CCCs and the CCSS was strong in domain coverage, content centrality, performance centrality, and DOK. NCSC could strengthen the degree of alignment in a few cases by making simple revisions to the wording of the CCC, noting dual alignment where appropriate, and documenting the reasons for differences in content, performance, and DOK.

As is true of all alternate assessments, the breadth, depth, and complexity of the content covered in the AA-AAS are reduced compared to those of standard assessments, In terms of the LAL methodology, these terms correspond to the reduced number of prioritized CCCs, the narrowness of the content and performance centrality, and the lower DOK levels. Thus, NCSC intended to prioritize fewer CCCs for assessment than CCSS and reduced the depth of the content or skills measured by the prioritized CCCs. Overall, the distribution of DOK levels among the prioritized CCCs broadly mirrors that of their associated CCSS, although, as expected, the prioritized CCCs have slightly lower DOK levels than their associated CCSS.

Recommendations for and Impact on Test Development

Researchers shared the outcomes of the alignment study with content experts involved with the NCSC project. These experts examined both the overall results of the alignment study and the detailed results to determine how to respond to issues that warranted further review and adjustment. Even though the study showed that the alignment of the reading prioritized CCCs to the CCSS was strong, these experts examined each instance of a mismatch between the prioritized CCCs and the intended CCSS.

Researchers have the following recommendations for item development partners based on the results of the present study. Following each recommendation is NCSC's response.

Because the process of developing the prioritized CCCs resulted in the creation of CCCs that reflected a blending of more than a single CCSS and the creation of multiple CCCs to address a single CCSS, consider including information on non-prioritized CCCs aligned to CCSS. Also, consider clarifying instances in which a prioritized CCC aligns with more than one CCSS.

Response: Other curricular documents clearly display this relationship by establishing Instructional Families to ensure that teachers can teach all related academic skills in a coherent manner.

Response: With regard to reading prioritized CCC 3.RL.k2, the content specialists concurred with the panelists' ratings and have double-coded CCC 3.RL.k2 to both CCSS standards 3.RL.2 and 3.SL.2.

Response: Content specialists modified the information provided in this study's results: They added the non-prioritized CCC that content developers had developed to align with the CCSS panelists matched with CCC 3.RL.k2.

Panelists noted that they gave a rating of *none* to CCC 5.RL.c2 for both content and performance centrality, though it had in fact covered a small portion of the CCSS. The CCC of note is one of three reading CCCs established to address one CCSS - 5.RL.2; consider the content and performance centrality of these CCCs.

Response: The alignment to a portion of the CCSS was intentional. As stated above, other NCSC curricular documents clarify this relationship by establishing Instructional Families to ensure that teachers can teach all related academic skills in a coherent manner.

Both CCCs 3.RWL.h2 and 4.RWL.h2 were incorrectly associated with the decoding-based CCSS RF.3; review the skills of the CCCs and intended CCSS.

Response: Panelists assigned a rating of none to two additional prioritized CCCs, 3.RWL.h2 and 4.RWL.h2, noting that the skill of "identifying" in these prioritized CCCs was not the same as the skill of "decoding" required in the intended CCSS match. These CCCs were incorrectly associated with the decoding-based CCSS RF.3. The panelists were right to point out this error. Content experts re-coded

both prioritized CCCs to align with CCSS RF.4: “Read with sufficient accuracy and fluency to support comprehension.”

Overall, the reading prioritized CCCs met the criteria for having a depth of knowledge of greater than 50% of the DOK level of the CCSS. However, consider addressing the inconsistencies across grades; these inconsistencies could potentially produce an inappropriately low level of complexity across the assessment items.

Response: To address this issue, project partners conducted a concurrent review of the documents detailing item specifications and the documents used to train item writers. Review and revision of these materials helped ensure that item sets at each grade level have appropriate DOK levels and range.

Study of the Relationship Between the NCSC Reading Prioritized Core Content Connectors and the English Language Arts Common Core State Standards

Introduction

To serve students with the most significant cognitive disabilities, the National Center and State Collaborative (NCSC) is designing an alternate assessment as part of a system that includes curriculum, instruction, and professional development resources, all aligned with the Common Core State Standards (CCSS).

To support the coordinated development of all system components, NCSC developed the Core Content Connectors (CCCs) for each grade and content area. The CCCs are not extensions of the CCSS; rather, they "pinpoint the primary content of the CCSS and organize it in the conceptual model of the Learning Progressions Frameworks" (NCSC, 2013, p. 8). The Learning Progressions Frameworks (Hess, 2010) align curriculum resources and assessments with a common, research-based representation of the learning pathways and building blocks that support students' acquisition of the knowledge, skills, and abilities defined in the CCSS. The CCCs clarify concepts in the CCSS by "deconstructing the progress indicators in the Learning Progressions Frameworks . . . into teachable and assessable segments of content" (NCSC, 2011, p. 1).

To support the use of the CCCs as described, NCSC must provide validity evidence demonstrating the quality of alignment between the CCCs and the CCSS. Researchers designed this study to provide that evidence. Its purposes are to (a) provide formative information to assessment developers about whether and how they might need to revise individual CCCs to better align with the CCSS and (b) document development-stage alignment as part of a larger alignment evaluation of the assessment system.

NCSC partner states used an iterative process and worked with content experts and severe disabilities experts to select a subset of CCCs as priorities for assessment. They based selection decisions on the importance of the content assessed, the distribution of strands in the CCSS, and grade-level CCSS alignment. Project partners used consensus decision making and prioritized for the operational assessment—scheduled for spring 2014–2015—up to 10 CCCs per grade and content area in grades 3–8 and 11.

Prioritized progress indicators along a learning progression form the basis of the CCCs prioritized for reading, which are the focus of the present study. NCSC partner states

designed the prioritized CCCs to contribute to a fully aligned system of content, instruction, and assessment that focuses on the core content, knowledge, and skills needed at each grade to ensure success at the next. They serve as the proximal assessment targets and link the CCSS to the model of domain-specific knowledge acquisition that guides academic instruction for students with the most significant cognitive disabilities. State partners intend to use the prioritized CCCs as a starting point for designing the alternate assessment. To determine increasing coverage within the assessment across years, additional content review is planned to occur annually.

NCSC researchers used the Links for Academic Learning (LAL) model developed by Flowers, Wakeman, Browder, and Karvonen (2007) to conduct this evaluation of the alignment of the reading prioritized CCCs with the English language arts (ELA) CCSS.

The LAL Methodology

Flowers et al. (2007) developed the LAL alignment methodology to support the process of evaluating the alignment between alternate assessments based on alternate achievement standards (AA-AAS) and the academic content standards those assessments are meant to address. In developing the LAL method, Flowers et al. (2007) first considered the policy and practice requirements for evaluating alignment quality for AA-AAS. According to Improving the Academic Achievement of the Disadvantaged: Final Rule (2003), these assessments must

- Be aligned with a state's academic content standards,
- Promote access to the general curriculum, and
- Reflect the highest achievement standards possible.

With these requirements in mind, Flowers et al. (2007) analyzed the alignment methods most often used in evaluations involving general assessments. Although there were many common themes among these methods, none provided a comprehensive set of criteria that would allow evaluators to address all three of the requirements noted above for AA-AAS systems. Thus, Flowers and her colleagues developed the LAL method specifically for use with AA-AAS.

The basic premises of the LAL method include the following expectations for AA-AAS (adapted from Flowers et al., 2007):

1. The assessments must be linked to grade-level content standards.
2. The target for achievement must be academic content (e.g., reading, math, science) that corresponds to the student's assigned grade based on chronological age.
3. Functional activities and materials may be used to promote understanding, but the target skills for student achievement are academically focused.

4. Prioritization of the content, if it occurs, should reflect the major domains of the curricular area (e.g., strands of ELA) and have fidelity with this content and how it is typically taught in general education.
5. The alternate expectations for achievement may include a focus on prerequisite skills or some partial attainment of the grade level, but students should still have the opportunity to meet high expectations, to demonstrate a range of depth of knowledge, to achieve within their symbolic level, and to show growth across grade levels or grade bands.

Application of the LAL Methodology to NCSC Reading Alignment Study

Researchers translated the LAL premises into four aspects of alignment that are considered in the present study (see Exhibit 1). This approach to alignment differs from more traditional methods that focus on post-hoc evidence of, for example, test level alignment of items with standards. The LAL methodology supports two evaluation questions for each of the four aspects. These questions represent the primary and secondary objectives of this evaluation:

Primary: To what extent does each CCC prioritized for assessment align with the specific CCSS it is intended to align with in terms of content centrality, performance centrality, and depth of knowledge?

Secondary: To what extent does the set of grade-level CCC reflect the set of grade-level CCSS in terms of content centrality, performance centrality, and depth of knowledge? (Note: For the current study, researchers addressed the secondary question only for the evaluation of aspect four, depth of knowledge.)

Exhibit 12. Alignment Aspects Addressed in the Reading Alignment Study

Aspect	Evaluation Questions
5. Domain Coverage	To what extent does each CCC map onto its target CCSS?
6. Content Centrality	To what extent does the focus of achievement in the CCC maintain fidelity with the content of the associated CCSS?
7. Performance Centrality	To what extent does the focus of achievement in the CCC maintain fidelity with the specified performance of the associated CCSS?
8. Depth of Knowledge (DOK)	**a.** Do the DOK levels in the CCCs reflect fidelity with the DOK levels in the associated CCSS? **b.** To what extent does the CCC reflect the range of DOK defined in the CCSS?

Methodology

Panelists

Researchers established two panels of experts in curriculum and special education, one panel for the 3–5 grade span and one panel for grades 6–8 and 11. Each panelist met the following requirements:

- Must be a certified teacher or an active faculty member or consultant with expertise in significant cognitive disabilities, the assigned content area, or both, for the grade range of the panel to which s/he is assigned;
- Must have had no previous and have no current involvement in the NCSC CCCs, curriculum, or assessment development processes.

Using professional networks and contacts in the field, NCSC researchers recruited seven panelist participants with various demographic characteristics (gender, ethnicity, and education level; see Exhibit 2). Of the seven panelists, all currently conduct or have conducted professional development for teachers in their content area; five currently hold or have held a leadership role in curriculum planning at the district level; and five have taught future teachers in a higher education setting.

Exhibit 13. Demographic Characteristics of Expert Panelists

Demographic Variable		Number of Panelists
Gender	Female	6
	Male	1
Ethnicity	Asian/Pacific Islander	1
	Caucasian	4
	Hispanic	2
Degree	Bachelor's degree	1
	Master's degree	4
	Doctorate	2

Rating Rubrics

Panelists reviewed and rated the CCSS and the prioritized CCCs in relation to each of the five evaluation questions (see Exhibit 1). They provided the following ratings:

6. DOK for all of the CCSS in the target strands,
7. DOK for each prioritized CCC,
8. Closest CCSS match for each prioritized CCC,
9. Content centrality between each prioritized CCC and selected CCSS, and

10. Performance centrality between each prioritized CCC and selected CCSS.

Depth of knowledge (DOK) reflects the cognitive demands of the CCCs or CCSS. It describes the complexity of the knowledge and skills required to perform a task. This study employed Webb's (1999) DOK rubric, as allowed by the LAL alignment methodology (see Exhibit 3). Panelists also referred to a matrix comparing Webb's DOK levels against Bloom's taxonomy (Hess, 2005) when rating DOK for the CCCs and CCSS.

Exhibit 14. Depth of Knowledge Rubric

DOK Level		Description
1	Recall	Recall or recognition of a fact, information, concept, or procedure
2	Basic application of skill/concept	Use of information, conceptual knowledge, following or selecting appropriate procedures, two or more steps with decision points along the way, routine problems, organizing/displaying data
3	Strategic thinking	Requires reasoning, developing a plan or sequence of steps to approach problem; requires some decision making and justification; abstract and complex; often more than one possible answer
4	Extended thinking	An investigation or application to real world; requires time to research, think, and process multiple conditions of the problem or task; non-routine manipulations, across disciplines/content areas/multiple sources

Content centrality is a measure of the degree of fidelity between the content of a CCC and the content of a CCSS. For example, a CCC requiring students to "identify and define parts of speech" and a CCSS requiring students to "correctly use parts of speech" would have the same content ("parts of speech"), even though the performance is different ("identify and define" vs. "correctly use"). A CCC requiring students to "identify and define parts of speech" and a CCSS requiring students to "identify and define different punctuation marks" would not have the same content ("parts of speech" vs. "punctuation marks"), although they do have the same performance ("identify and define").

The content centrality rubric applied in this study appears below in Exhibit 4. Panelists identified the CCSS that most closely aligned to a CCC and then rated the degree of content centrality between each pair as *none*, *some*, or *all*. For any rating of *none*, researchers asked panelists to provide a rationale.

Exhibit 15. Content Centrality Rubric

Rating		Description
0	None	The CCSS and the CCC do not address the same content.
1	Some	The CCC addresses some of the content of the CCSS; the content of the CCC is present in the CCSS.
2	All	The CCC clearly address the same content as the CCSS.

Performance centrality represents the degree to which a CCC and a selected CCSS contain the same performance expectation. For example, a CCC requiring students to "identify and define parts of speech" and a CCSS requiring students to "identify and define different punctuation marks" would have the same performance expectation ("identify and define"), although the content is different. A CCC requiring students to "identify and define parts of speech" and a CCSS requiring students to "correctly use parts of speech" would not have the same performance expectation ("identify and define" vs. "correctly use"), although they do have the same content ("parts of speech").

The panelists rated the degree of performance centrality between each CCC–CCSS pair as *none*, *some*, or *all* (see Exhibit 5). For any rating of *none*, researchers asked panelists to provide a rationale.

Exhibit 16. Performance Centrality Rubric

Rating		Description
0	None	The performance of the CCSS and the CCC are not the same.
1	Some	The performance of the CCC partially matches the performance of the CCSS; the performance of the CCC is present in the CCSS.
2	All	The performance of the CCC is the same as the CCSS.

Data Collection Process

The panelists gathered to participate in the alignment study from January 15–18, 2013 (see Appendix A: Agenda).[13] On the morning of the first day, all panelists convened to receive a detailed training on the purpose of the study, the rubrics, and the rating

[13] In addition to the CCCs prioritized for assessment, which are the focus of this report, panelists completed the same rating process for many of the non-prioritized CCCs in grades 3-8 and high school. These ratings are available upon request.

process. The training included practice with rating using sample CCCs and CCSS and group discussion to strengthen panelist understanding and help ensure inter-rater agreement.

After the training, the participants separated into their panels to begin the rating process. Each panel included a researcher who acted as a facilitator and answered questions regarding the application of the rubrics for DOK, content centrality, and performance centrality. This study employed a consensus model in which individual panelists first made independent ratings and then discussed their ratings in groups to reach agreement. Researchers captured both individual and consensus ratings. The facilitators observed the group discussions, recorded the consensus ratings, and took notes describing the panel's decision-making process and the rationale for their ratings.

For each grade, the panelists first rated DOK for each of the CCSS in the target areas: reading: literature; reading: informational text; reading: foundational skills; and language. (The CCCs in this section of the NCSC assessment do not address the CCSS in speaking and listening or writing). After completing the DOK ratings for the CCSS, the panelists reviewed the CCCs to rate DOK, identify the closest matching CCSS, and rate the degree of content centrality and performance centrality for each CCC–CCSS matched pair.

Inter-rater Agreement

During the study, the facilitators for each panel monitored the independent and group ratings and retrained or clarified panelists' understanding of the rating rubrics, as appropriate. The consensus process used in this study required each panel to come to 100% agreement on each consensus rating that researchers used for analysis. To further ensure the reliability of the panelists' ratings, researchers calculated inter-rater agreement for panelists' initial independent ratings. Both panels had high inter-rater agreement for all ratings, with an average agreement of 0.98 for both panels (see Exhibit 6).

Exhibit 17. Inter-rater Agreement by Panel

Rating	Panel 1: Grades 3–5	Panel 2: Grades 6–8 and 11
CCSS DOK	0.97	0.99
CCC DOK	0.97	0.94
CCC match to CCSS	1.00	1.00
Content centrality	0.97	0.98
Performance centrality	1.00	1.00
Average	0.98	0.98

Participant Evaluation

At the conclusion of the study, panelists completed an evaluation of the alignment study's process. Researchers asked panelists to rate their agreement—*strongly agree* (4), *agree* (3), *disagree* (2), or *strongly disagree* (1)—with a series of statements about the study. Panelists' evaluations reflect high levels of satisfaction with the process and the outcomes of the study (see Exhibit 7).

Exhibit 18. Participant Evaluation Results

Statement	Average Rating
1. Facilities were appropriate to the work.	4.0
2. Introductory presentation and training sessions were clear.	4.0
3. Introductory and training materials were clear.	4.0
4. The process used was appropriate to the work.	4.0
5. The process used resulted in good information about the CCCs and CCSS.	4.0
6. I feel like I was able to make a contribution to the sessions.	4.0
7. I am satisfied with the group-consensus DOK ratings.	4.0
8. I am confident that my matching of the CCCs to particular standards is reasonable.	4.0
9. I am confident that my DOK ratings are reasonable.	4.0

Considerations for Analysis and Interpretation of Results

Readers of this study must consider the characteristics and the intended purpose of the CCCs when interpreting the study's results. The relationship between the reading prioritized CCCs and the CCSS differs from the relationship between test items and content standards that is the typical focus of alignment studies. Developers typically create items from standards, often with the intent to provide complete or very close alignment between the item and the target standard. In contrast, NCSC uses the CCCs to (a) identify salient academic connections between the Learning Progression Framework and the CCSS, (b) represent the scope of the CCSS, and (c) provide a foundation for both assessment and instruction. Consequently, the CCCs differ from the CCSS in terms of both organizational structure and the scope of each CCC. NCSC has organized the CCCs by categories, strands, and sub-strands, and each individual CCC tends to be narrower in breadth than an individual CCSS, targeting less knowledge and fewer skills.

For these reasons, researchers did not anticipate a one-to-one correspondence between each CCC and its target CCSS, or between the CCCs and the CCSS as a group, for any of the ratings. With regard to CCSS alignment (domain coverage), some

CCCs may be dually aligned or contain pieces of multiple CCSS. Therefore, we would expect to see many CCCs rated *some* for both content and performance centrality. Likewise, the CCCs should be similar but not identical to the CCSS in terms of DOK, showing a broadly comparable range. However, due to their generally narrower individual focus, the CCCs are likely to have slightly lower levels of DOK overall than the CCSS.

Results by Alignment Aspect and Evaluation Question

Domain Coverage

To examine the degree of domain coverage, researchers evaluated the extent to which each prioritized CCC mapped onto its target CCSS (i.e., they investigated whether the panelists chose the intended CCSS as the one that best aligns with the CCC). Researchers instructed panelists to choose the most closely aligned CCSS for each CCC; researchers did not identify the intended CCSS.

For the majority of CCCs, panelists chose as the "best match" the CCSS intended to align with the CCC (see Exhibit 8). Panelists determined that 46 of the 51 CCCs (90.2%) aligned with their intended CCSS, and panelists matched only five CCCs (9.8%) with non-intended CCSS. The five CCCs matched to non-intended CCSS were in grade 3 (three CCC, or 33.3%), grade 6 (one CCC, or 14.3%), and grade 11 (one CCC, or 14.3%). Panelists identified a matching CCSS for all CCCs in all grades. The appendices include a full list of the prioritized CCCs and their identified matches (see Appendix B: Ratings for Reading Prioritized CCCs).

Exhibit 19. Domain Coverage: Number and Percentage by Grade

Grade	Matched to Intended CCSS		Matched to Non-intended CCSS		No Match to CCSS		Total
	#	%	#	%	#	%	
3	6	66.7	3	33.3	0	0.0	9
4	9	100.0	0	0.0	0	0.0	9
5	7	100.0	0	0.0	0	0.0	7
6	6	85.7	1	14.3	0	0.0	7
7	5	100.0	0	0.0	0	0.0	5
8	7	100.0	0	0.0	0	0.0	7
HS	6	85.7	1	14.3	0	0.0	7
Total	46	90.2	5	9.8	0	0.0	51

The table below presents the results for those prioritized CCCs matched to an unintended CCSS (see Exhibit 9). Content that appears only in the intended CCSS is shaded red; content that appears only in the non-intended selected CCSS is shaded blue; and content that appears in both the intended and non-intended CCSS is shaded purple.

For four of the five prioritized CCCs matched to non-intended CCSS, the panelists identified the intended CCSS as an alternate possibility, but they ultimately chose the non-intended CCSS as the best match because of their interpretation of the most important or focal portion of the CCC. For example, CCC 3.RL.h1, “Answer questions related to the relationship between characters, setting, events, characters and conflicts, setting and conflicts,” is intended to be aligned to a CCSS related to asking and answering questions to demonstrate understanding of a text; but the panelists selected a different CCSS that more closely aligned with the part of the CCC about the relationship between characters and other parts of the story. Likewise, CCC 6.RL.b3, “Use specific details from the text (words, interactions, thoughts, motivations) to support inferences or conclusions about characters including how they change during the course of the story,” is intended to be aligned to a CCSS related to citing textual evidence to support summaries and inferences; but the panelists selected a different CCSS that was more closely aligned with the part of the CCC about character development.

For one of the five prioritized CCCs (3.RL.k2) aligned with a non-intended CCSS, panelists did not consider the intended CCSS at all because it is a speaking and listening standard, whereas the CCC is in the reading literary texts strand. This represents an exception to the intended alignment strands, and this report recommends that NCSC should explicitly address such instances (see the Summary section).

Exhibit 20. CCCs Matched to Non-intended CCSS

CCC	Intended CCSS	Panelists' CCSS match
3.RL.h1 **Answer questions related to the relationship between characters**, setting, events, characters and conflicts, setting and conflicts.	RL.3.1 **Ask and answer questions to demonstrate understanding** of a text, referring explicitly to the text as the basis for the answers.	RL.3.3 Describe **characters** in a story (e.g., their traits, motivations, or feelings) and **explain how their actions contribute** to the sequence of events.
3.RL.k2 **Determine the central message, lesson, moral, and key details** of **a text read aloud or information presented in diverse media and formats**, **including visually, quantitatively, and orally**.	SL.3.2 **Determine the main ideas** and supporting details of **a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally**.	RL.3.2 Recount stories, including fables, folktales, and myths from **diverse** cultures; **determine the central message, lesson, or moral** and explain how it is conveyed through **key details** in the text.
3.RWL.h2 **Identify grade level words** with **accuracy**.	RF.3.4 **Read with sufficient accuracy** and fluency to support comprehension.	RF.3.3 Know and apply **grade-level** phonics and word analysis skills in **decoding words**.
6.RL.b3 **Use specific details from the text** (words, interactions, thoughts, motivations) to **support inferences or conclusions** about **characters including how they change during the course of the story**.	RL.6.1 **Cite the textual evidence** to support an analysis of what **the text says explicitly** as well as **inferences** drawn from the text.	RL.6.3 Describe how a particular story's or drama's plot unfolds in a series of episodes as well as **how the characters respond or change as the plot moves toward a resolution**.
1112.RWL.c3 Develop and explain ideas for **why authors made specific word choices within a text**.	11-12.RI.6 Determine an **author's point of view or purpose in a text in which the rhetoric is particularly effective**, analyzing how style and content contribute to the power, persuasiveness, or beauty of the text.	11-12.RL.4 Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; **analyze the impact of specific word choices on meaning and tone**, including words with multiple meanings or language that is particularly fresh, engaging, or beautiful. (Include Shakespeare as well as other authors.)

Note: Content that appears only in the intended CCSS is shaded red; content that appears only in the non-intended selected CCSS is shaded blue; and content that appears in both the intended and non-intended CCSS is shaded purple.

Content Centrality

To examine the degree of content centrality, researchers evaluated the extent to which the content in each individual CCC maintains fidelity with the content of the associated CCSS.

The panelists rated the majority of the CCCs (88.2%) as having *some* or *all* content centrality with their associated CCSS (see Exhibit 10). They assigned a rating of *none* to only one of the CCC and its intended CCSS. This grade 5 CCC (5.RL.c2) reads, "Summarize a text from beginning to end in a few sentences." The associated CCSS (5.RL.2) reads, "Determine a theme of a story, drama, or poem from details in the text, including how characters in a story or drama respond to challenges or how the speaker in a poem reflects upon a topic; summarize the text." The panelists explained that the rating of *none* reflected their evaluation of the CCC as covering only a small portion of the CCSS.

This analysis excludes the content centrality ratings for the five CCCs matched to non-intended CCSS, since these ratings do not represent a comparison between the CCCs and the target CCSS. The content centrality ratings for each of the five CCCs are included in the full list of the content centrality ratings for each prioritized CCC and the associated CCSS (see Appendix B: Ratings for Reading Prioritized CCCs).

Exhibit 21. Content Centrality for Reading Prioritized CCCs

Grade	All		Some		None		Non-intended CCSS		Total
	#	%	#	%	#	%	#	%	
3	4	44.4	2	22.2	0	0.0	3	33.3	9
4	6	66.7	3	33.3	0	0.0	0	0.0	9
5	4	57.1	2	28.6	1	14.3	0	0.0	7
6	1	14.3	5	71.4	0	0.0	1	14.3	7
7	4	80.0	1	20.0	0	0.0	0	0.0	5
8	3	42.9	4	57.1	0	0.0	0	0.0	7
HS	2	28.6	4	57.1	0	0.0	1	14.3	7
Total	24	47.1	21	41.2	1	2.0	5	9.8	51

Performance Centrality

To examine the degree of performance centrality, researchers evaluated the extent to which the specified performance in each individual CCC maintains fidelity with the specified performance in the associated CCSS.

The panelists rated the majority of the prioritized CCCs as having *some* or *all* performance centrality with their associated CCSS; they assigned a rating of *none* or no performance centrality to three of the CCCs matched to their intended CCSS: one each in grades 3, 4, and 5 (see Exhibit 11). The CCCs in grades 3 and 4 require students to "identify grade level words," whereas the associated CCSS refer to "decoding"; the

panelists explained that identifying did not necessarily imply decoding. The panelists gave the grade 5 CCC a rating of none for both performance and content centrality, and they gave the same reason for this performance centrality rating—the CCC covered only a small portion of the CCSS.

Exhibit 22. Performance Centrality for Reading Prioritized CCCs

Grade	All		Some		None		Non-intended CCSS		Total
	#	%	#	%	#	%	#	%	
3	3	33.33	2	22.22	1	11.11	3	33.33	9
4	4	44.44	4	44.44	1	11.11	0	0.00	9
5	3	42.86	3	42.86	1	14.29	0	0.00	7
6	1	14.29	5	71.43	0	0.00	1	14.29	7
7	1	20.00	4	80.00	0	0.00	0	0.00	5
8	2	28.57	5	71.43	0	0.00	0	0.00	7
HS	2	28.57	4	57.14	0	0.00	1	14.29	7
Total	16	31.37	27	52.94	3	5.88	5	9.80	51

This analysis excludes the performance centrality ratings for the five CCCs matched to non-intended CCSS, since these ratings do not represent a comparison between the CCCs and the target CCSS. However, the performance centrality ratings for each of these five CCCs are included in the full list of the performance centrality ratings for each prioritized CCC and its associated CCSS (see Appendix B: Ratings for Reading Prioritized CCCs).

Depth of Knowledge

To examine DOK, researchers evaluated both the extent to which each individual prioritized CCC's DOK levels reflect fidelity with its associated CCSS's DOK levels, as well as the extent to which the CCCs as a whole reflect the range of DOK defined in target CCSS.

Panelists determined a range of DOK levels for target CCSS (see Exhibit 12), with most at levels 2 or 3 (14 and 24, respectively), 6 at level 1, and 2 at level 4. In all grades, the majority of the CCSS had a DOK level of 2 or higher, with average DOK values ranging from 2.0 to 2.9. Although the DOK averages did not show a clear pattern by grade level, the higher grades tended to include more CCSS at higher DOK levels.

Similarly, panelists associated most CCCs with DOK levels 2 and 3 (22 and 16, respectively), 7 at level 1, and 1 at level 4 (see Exhibit 13). In all grades, the majority of CCCs had a DOK of 2 or higher, with DOK averages ranging from 1.8 to 2.8. Although the DOK averages did not show a clear pattern by grade level, the higher grades tended to include more CCSS at higher DOK levels.

Exhibit 23. Depth of Knowledge: Number and Percentage of CCSS by Grade

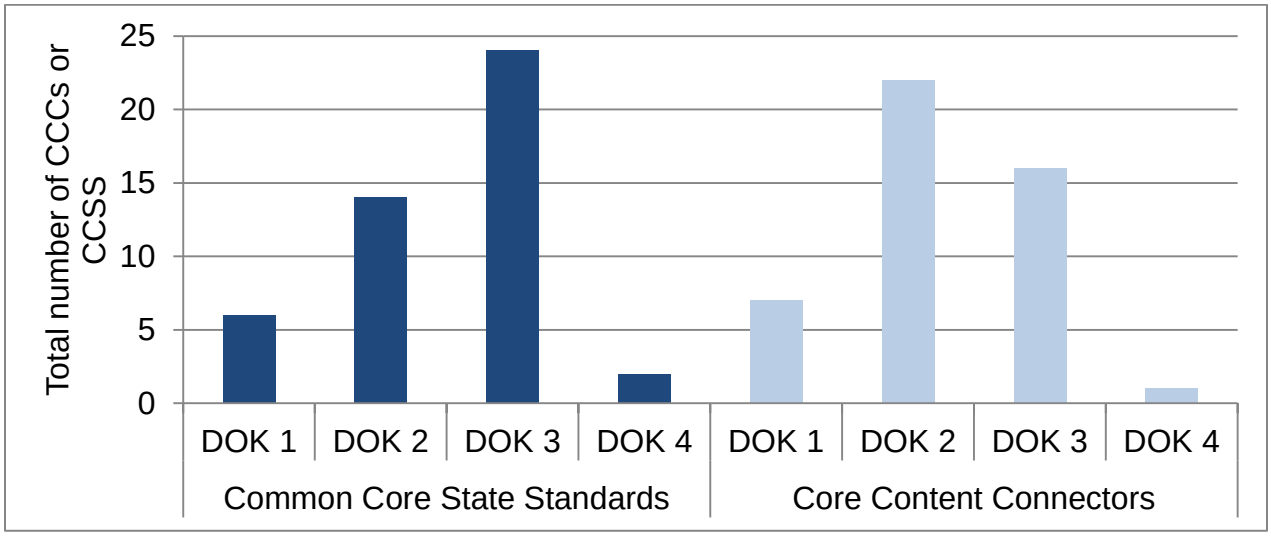
Grade	DOK 1		DOK 2		DOK 3		DOK 4		Non-intended CCSS		Total	DOK Index
	#	%	#	%	#	%	#	%	#	%		
3	1	11.1	4	44.4	1	11.1	0	0.0	3	33.3	9	2.0
4	1	11.1	5	55.6	3	33.3	0	0.0	0	0.0	9	2.2
5	0	0.0	1	14.3	6	85.7	0	0.0	0	0.0	7	2.9
6	1	14.3	3	42.9	2	28.6	0	0.0	1	14.3	7	2.2
7	1	20.0	0	0.0	4	80.0	0	0.0	0	0.0	5	2.6
8	1	14.3	1	14.3	4	57.1	1	14.3	0	0.0	7	2.7
HS	1	14.3	0	0.0	4	57.1	1	14.3	1	14.3	7	2.8
Total	6	11.8	14	27.5	24	47.1	2	3.9	5	9.8	51	2.5

Exhibit 24. Depth of Knowledge: Number and Percentage of CCCs by Grade

Grade	DOK 1		DOK 2		DOK 3		DOK 4		Non-intended CCSS		Total	Average DOK
	#	%	#	%	#	%	#	%	#	%		
3	2	22.2	3	33.3	1	11.1	0	0.0	3	33.3	9	1.8
4	3	33.3	5	55.6	1	11.1	0	0.0	0	0.0	9	1.8
5	0	0.0	4	57.1	3	42.9	0	0.0	0	0.0	7	2.4
6	1	14.3	5	71.4	0	0.0	0	0.0	1	14.3	7	1.8
7	0	0.0	1	20.0	4	80.0	0	0.0	0	0.0	5	2.8
8	1	14.3	2	28.6	4	57.1	0	0.0	0	0.0	7	2.4
HS	0	0.0	2	28.6	3	42.9	1	14.3	1	14.3	7	2.8
Total	7	13.7	22	43.1	16	31.4	1	2.0	5	9.8	51	2.2

A comparison of CCCs and CCSS DOK level patterns showed a higher number of CCCs at DOK level 2 than level 3; the opposite was true for the CCSS. In other words, the CCC's DOK index values were slightly lower than the CCSS's. However, the overall range and distribution of DOK for the target CCSS and the CCC was similar (see Exhibit 14).

Exhibit 25. Depth of Knowledge: Total Number of CCCs and Matched CCSS



To further examine the relationship between the CCC's DOK and the CCSS's DOK, researchers compared the DOK of each CCC to the DOK of its target CCSS (see Exhibit 15). These comparisons yielded a 0 (zero) when DOK ratings for the CCC and CCSS were equal; a positive integer (e.g., 1) when the CCC's DOK was one or more DOK levels higher than the CCSS's DOK; and a negative integer (e.g., -1) when the CCC's DOK was one or more DOK levels lower than its CCSS's DOK. This comparison showed that in most grades, more than half of the CCCs had the same DOK as their target CCSS. Researchers used the comparison of the CCCs and CCSS DOK ratings to calculate the average difference in DOK ratings by grade. The average difference by grade ranged from -0.44–0.20; the average difference across all CCCs was -0.04. The appendices include a full list of the DOK ratings for each of the CCC–CCSS matches (see Exhibit 15).

Exhibit 26. Depth of Knowledge: Comparison of CCC to Target CCSS by Grade

Grade	Same DOK		CCC: Higher DOK		CCC: Lower DOK		Average Difference
	#	%	#	%	#	%	
3	3	50.0	1	16.7	2	33.3	-0.3
4	5	55.6	0	0.0	4	44.4	-0.4
5	4	57.1	0	0.0	3	42.9	-0.4
6	2	33.3	1	16.7	3	50.0	-0.3
7	4	80.0	1	20.0	0	0.0	0.2
8	4	57.1	1	14.3	2	28.6	-0.3
HS	4	66.7	1	16.7	1	16.7	0.0
Total	26	56.5	5	10.9	15	32.6	0.0

Summary of Results

For 46 out of 51 CCCs, panelists chose the intended CCSS as the best match. They identified the intended CCSS as an alternate possibility in four of the five cases in which they selected an unintended CCSS, (i.e., they recognized the linkage between the CCC and the intended CCSS). For the fifth CCC, the panelists did not consider the intended CCSS at all because it is a speaking and listening standard. In all of these cases, NCSC made simple edits to the text to clarify the intended linkage.

For 45 of the 46 CCCs that panelists correctly matched to their intended CCSS, panelists gave ratings of *some* or *all* for content centrality within the pair. They assigned a rating of *none* for content centrality to one CCC because they indicated that it covered only one small part of the CCSS. NCSC confirmed that this CCC was one of three CCCs intentionally designed to address one CCSS.

The panelists rated 43 of the 46 CCCs as having *some* or *all* performance centrality with their associated CCSS. NCSC noted that the lower CCC DOK levels were intentional, given the reduced breadth, depth, and complexity of AA-AAS.

As is true of all alternate assessments, the breadth, depth, and complexity of the content covered in the AA-AAS is lower than that of standard assessments. In reference to LAL methodology, these terms correspond to the reduced number of prioritized CCCs, the narrowness of the content and performance centrality, and the lower DOK levels. Thus, NCSC intended to prioritize fewer CCCs for assessment than CCSS and reduced the depth of the content or skills measured by the prioritized CCCs. Overall, the distribution of DOK levels among the CCCs broadly mirrors that of their associated CCSS, although, as expected, the CCCs have slightly lower DOK levels than the CCSS.

Overall, the alignment between the prioritized CCCs in reading and the CCSS is strong with regard to domain coverage, content centrality, performance centrality, and DOK.

Recommendations for and Impact on Test Development

Researchers shared the outcomes of the alignment study with NCSC project content experts. These experts examined both the overall results of the alignment study and the detailed results to determine how to respond to issues that warranted further review and adjustment. Even though the study showed that the alignment of the reading prioritized CCCs to the CCSS was strong, each instance of a mismatch between the prioritized CCCs and the intended CCSS was further examined.

Researchers have the following recommendations for item development partners based on the results of the present study. Following each recommendation is NCSC's response.

Because the process of developing the prioritized CCCs resulted in the creation of CCCs that reflected a blending of more than a single CCSS and the creation of multiple CCCs to address a single CCSS, consider including information on non-prioritized CCCs aligned to CCSS. Also, consider clarifying instances in which a prioritized CCC aligns with more than one CCSS.

Response: Other curricular documents clearly display this relationship by establishing Instructional Families to ensure that teachers can teach all related academic skills in a coherent manner.

Response: With regard to reading prioritized CCC 3.RL.k2, the content specialists concurred with the panelists' judgments and have double-coded CCC 3.RL.k2 to both CCSS standards 3.RL.2 and 3.SL.2.

Response: Content specialists modified the information provided in this study's results: They added the non-prioritized CCC that content developers had developed to align with the CCSS that panelists matched with CCC 3.RL.k2.

- Panelists noted that they gave a rating of *none* to CCC 5.RL.c2 was for both content and performance centrality though it had in fact covered a small portion of the CCSS. The CCC of note is one of three reading CCCs established to address one CCSS—5.RL.2; consider the content and performance centrality of these CCCs.

  Response: The alignment to a portion of the CCSS was intentional. As stated above, other NCSC curricular documents clarify this relationship by establishing Instructional Families to ensure that teachers can teach all related academic skills in a coherent manner.

Both CCCs, 3.RWL.h2 and 4.RWL.h2 were incorrectly associated with the decoding-based CCSS RF.3; review the skills of the CCCs and intended CCSS.

Response: Panelists assigned a rating of *none* to two additional prioritized CCCs, 3.RWL.h2 and 4.RWL.h2, noting that the skill of "identifying" in these prioritized CCCs was not the same as the skill of "decoding" required in the intended CCSS match. These CCCs were incorrectly associated with the decoding-based CCSS RF.3. The panelists were right to point out this error. Content experts recoded

both prioritized CCCs to align with CCSS RF.4: “Read with sufficient accuracy and fluency to support comprehension.”

Overall, the reading prioritized CCCs met the criteria for having a depth of knowledge of greater than 50% of the DOK level of the CCSS. However, consider addressing the inconsistencies across grades; these inconsistencies could potentially produce an inappropriately low level of complexity across the assessment items.

Response: To address this issue, project partners conducted a concurrent review of the documents detailing item specifications and the documents used to train item writers. Review and revisions of these materials helped ensure that item sets at each grade level have appropriate DOK levels and range.

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Appendix A: Agenda

Day 1: Tuesday, January 15, 2013

Time	Activity
8:00 to 8:30 am	Registration, welcome and introductions
8:30 to 10:00 am	Full group training
10:00 to 10:15 am	Break
10:15 to 11:45 am	CCSS DOK ratings: grades 3 and 6
11:45 am to 12:45 pm	Lunch
12:45 to 2:15 pm	CCC alignment ratings: grades 3 and 6
2:15 to 2:30 pm	Break
2:30 to 4:30 pm	CCSS DOK ratings: grades 4 and 7
4:30 pm	Wrap-up and dismiss

Day 2: Wednesday, January 16, 2013

Time	Activity
8:00 to 8:30 am	Registration, welcome and logistics
8:30 to 10:00 am	CCC alignment ratings: grades 4 and 7
10:00 to 10:15 am	Break
10:15 to 11:45 am	CCSS DOK ratings: grades 5 and 8
11:45 am to 12:45 pm	Lunch
12:45 to 2:45 pm	CCC alignment ratings: grades 5 and 8
2:45 to 3:00 pm	Break
3:00 to 4:30 pm	CCC alignment ratings: HS and non-prioritized
4:30 pm	Wrap-up and dismiss

Day 3: Thursday, January 17, 2013

Time	Activity
8:00 to 8:30 am	Registration, welcome and logistics
8:30 to 10:00 am	CCC alignment ratings: non-prioritized
10:00 to 10:15 am	Break
10:15 to 11:45 am	CCC alignment ratings: non-prioritized
11:45 am to 12:45 pm	Lunch
12:45 to 2:45 pm	CCC alignment ratings: non-prioritized
2:45 to 3:00 pm	Break
3:00 to 4:30 pm	CCC alignment ratings: non-prioritized
4:30 pm	Wrap-up and dismiss

Day 4: Friday, January 18, 2013

Time	Activity
8:00 to 8:30 am	Registration, welcome and logistics
8:30 to 10:00 am	CCC alignment ratings: non-prioritized
10:00 to 10:15 am	Break
10:15 to 11:45 am	CCC alignment ratings: non-prioritized
11:45 am to 12:45 pm	Lunch
12:45 to 2:45 pm	CCC alignment ratings: non-prioritized
2:45 to 3:00 pm	Break
3:00 to 4:30 pm	CCC alignment ratings: non-prioritized
4:30 pm	Wrap-up and dismiss

Appendix B: Ratings for Reading Prioritized CCCs

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
3	3.RL.h1	Answer questions related to the relationship between characters, setting, events, characters and conflicts, setting and conflicts.	3.RL.3	Describe characters in a story (e.g., their traits, motivations, or feelings) and explain how their actions contribute to the sequence of events.	2	2	2	1
3	3.RL.i2	Answer literal questions and refer to text to support your answer.	3.RL.1	Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.	1	3	2	1
3	3.RL.k2	Determine the central message, lesson, moral, and key details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.	3.RL.2	Recount stories, including fables, folktales, and myths from diverse cultures; determine the central message, lesson, or moral and explain how it is conveyed through key details in the text.	3	3	2	1

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
3	3.RI.h1	Identify the purpose of a variety of text features.	3.RI.5	Use text features and search tools (e.g., key words, sidebars, hyperlinks) to locate information relevant to a given topic efficiently.	2	2	1	0
3	3.RI.h4	Use illustrations (e.g., maps, photographs) in informational texts to answer questions.	3.RI.7	Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).	1	2	2	2
3	3.RI.i2	Determine the main idea of text read, read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.	3.RI.2	Determine the main idea of a text; recount the key details and explain how they support the main idea.	2	2	1	1
3	3.RI.k5	Determine the main idea of a text; recount the key details and explain how they support the main idea.	3.RI.2	Determine the main idea of a text; recount the key details and explain how they support the main idea.	3	2	2	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
3	3.RWL.h2	Identify grade level words with accuracy.	3.RF.3	Know and apply grade-level phonics and word analysis skills in decoding words.	1	1	1	0
3	3.RWL.i2	Use sentence context as a clue to the meaning of a new word, phrase, or multiple meaning word.	3.L.4.a	Use sentence-level context as a clue to the meaning of a word or phrase.	2	2	2	2
4	4.RL.i1	Refer to details and examples in a text when explaining what the text says explicitly.	4.RL.1	Refer to details and examples in a text when explaining what the text says explicitly and when drawing inferences from the text.	2	3	2	1
4	4.RL.k2	Determine the theme of a story, drama, or poem; refer to text to support answer.	4.RL.2	Determine a theme of a story, drama, or poem from details in the text; summarize the text.	3	3	2	2
4	4.RL.l1	Describe character traits (e.g., actions, deeds, dialogue, description, motivation, interactions); use details from text to support description.	4.RL.3	Describe in depth a character, setting, or event in a story or drama, drawing on specific details in the text (e.g., a character's thoughts, words, or actions).	2	2	1	1

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
4	4.RI.h4	Use information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on Web pages) to answer questions.	4.RI.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.	1	2	2	2
4	4.RI.l1	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams, timelines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.	4.RI.7	Interpret information presented visually, orally, or quantitatively (e.g., in charts, graphs, diagrams time lines, animations, or interactive elements on Web pages) and explain how the information contributes to an understanding of the text in which it appears.	2	2	1	1
4	4.RI.i3	Determine the main idea of an informational text.	4.RI.2	Determine the main idea of a text and explain how it is supported by key details; summarize the text.	2	3	2	1

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
4	4.RWL.i2	Use context to determine the meaning of unknown or multiple meaning words, or words showing shades of meaning.	4.L.4.a	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 4 reading and content, choosing flexibly from a range of strategies.	2	2	2	2
4	4.RWL.j1	Use general academic and domain specific words and phrases accurately.	4.L.6	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases, including those that signal precise actions, emotions, or states of being (e.g., quizzed, whined, stammered) and that are basic to a particular topic (e.g., wildlife, conservation, and endangered when discussing animal preservation).	1	2	2	2
4	4.RWL.h2	Identify grade level words with accuracy and on successive attempts.	4.RF.3	Know and apply grade-level phonics and word analysis skills in decoding words.	1	1	1	0

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
5	5.RL.b1	Refer to details and examples in a text when explaining what the text says explicitly.	5.RL.1	Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.	2	3	1	1
5	5.RL.c2	Summarize a text from beginning to end in a few sentences.	5.RL.2	Determine a theme of a story, drama, or poem from details in the text, including how characters in a story or drama respond to challenges or how the speaker in a poem reflects upon a topic; summarize the text.	2	3	0	0
5	5.RL.d1	Compare characters, settings, events within a story; provide or identify specific details in the text to support the comparison.	5.RL.3	Compare and contrast two or more characters, settings, or events in a story or drama, drawing on specific details in the text (e.g., how characters interact).	3	3	2	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
5	5.RI.d5	Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts.	5.RI.5	Compare and contrast the overall structure (e.g., chronology, comparison, cause/effect, problem/solution) of events, ideas, concepts, or information in two or more texts.	3	3	2	2
5	5.RI.c4	Determine the main idea, and identify key details to support the main idea.	5.RI.2	Determine two or more main ideas of a text and explain how they are supported by key details; summarize the text.	2	3	2	1
5	5.RI.e2	Determine the author's purpose.	5.RI.8	Explain how an author uses reasons and evidence to support particular points in a text, identifying which reasons and evidence support which point(s).	3	3	1	1
5	5.RWL.a2	Use context to determine the meaning of unknown or multiple meaning words or phrases.	5.L.4.a	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 5 reading and content, choosing flexibly from a range of strategies.	2	2	2	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
6	6.RL.b2	Refer to details and examples in a text when explaining what the text says explicitly.	6.RL.1	Cite the textual evidence to support an analysis of what the text says explicitly as well as inferences drawn from the text.	2	3	1	1
6	6.RL.b3	Use specific details from the text (words, interactions, thoughts, motivations) to support inferences or conclusions about characters including how they change during the course of the story.	6.RL.3	Describe how a particular story's or drama's plot unfolds in a series of episodes as well as how the characters respond or change as the plot moves toward a resolution.	2	2	1	1
6	6.RL.c3	Summarize a text from beginning to end in a few sentences without including personal opinions.	6.RL.2	Determine a theme or central idea of a text and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.	2	2	1	1

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
6	6.RI.b4	Summarize information gained from a variety of sources including media or texts.	6.RI.7	Integrate information presented in different media or formats (e.g., visually, quantitatively) as well as in words to develop a coherent understanding of a topic or issue.	2	3	1	1
6	6.RI.c2	Provide a summary of the text distinct from personal opinions or judgments.	6.RI.2	Determine a theme or central idea and how it is conveyed through particular details; provide a summary of the text distinct from personal opinions or judgments.	2	2	1	1
6	6.RWL.a1	Use context to determine the meaning of unknown or multiple meaning words or phrases.	6.L.4.a	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 6 reading and content, choosing flexibly from a range of strategies.	2	1	2	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
6	6.RWL.c1	Use general academic and domain specific words and phrases accurately.	6.L.6	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.	1	2	1	1
7	7.RL.i2	Use two or more pieces of textual evidence to support inferences, conclusions, or summaries of text.	7.RL.1	Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	3	3	2	1
7	7.RL.j1	Analyze the development of the theme or central idea over the course of the text.	7.RL.2	Determine a theme or central idea of a text and analyze its development over the course of the text; provide an objective summary of the text.	3	3	1	1
7	7.RI.j1	Use two or more pieces of evidence to support inferences, conclusions, or summaries of text.	7.RI.1	Cite several pieces of textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text.	3	3	2	1

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
7	7.RI.l1	Compare/contrast how two or more authors write about the same topic.	7.RI.9	Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.	3	3	2	1
7	7.RWL.g1	Use context as a clue to determine the meaning of a grade appropriate word or phrase.	7.L.4.a	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 7 reading and content, choosing flexibly from a range of strategies.	2	1	2	2
8	8.RL.i2	Use two or more pieces of evidence to support inferences, conclusions, or summaries of text.	8.RL.1	Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.	3	3	2	1
8	8.RL.j2	Analyze the development of the theme or central idea over the course of the text including its relationship to the characters, setting, and plot.	8.RL.2	Determine a theme or central idea of a text and analyze its development over the course of the text, including its relationship to the characters, setting, and plot; provide an objective summary of the text.	3	3	1	1

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
8	8.RI.j1	Use two or more pieces of evidence to support inferences, conclusions, or summaries of text.	8.RI.1	Cite the textual evidence that most strongly supports an analysis of what the text says explicitly as well as inferences drawn from the text.	3	3	1	1
8	8.RI.l1	Analyze a case in which two or more texts provide conflicting information on the same topic and identify where the texts disagree on matters of fact or interpretation.	8.RI.9	Analyze a case in which two or more texts provide conflicting information on the same topic and identify where the texts disagree on matters of fact or interpretation.	3	3	2	2
8	8.RI.k4	Identify an argument or claim that the author makes.	8.RI.8	Delineate and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient; recognize when irrelevant evidence is introduced.	2	4	1	1

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
8	8.RWL.g1	Use context as a clue to the meaning of a grade-appropriate word or phrase.	8.L.4.a	Determine or clarify the meaning of unknown and multiple-meaning words or phrases based on grade 8 reading and content, choosing flexibly from a range of strategies.	2	1	2	2
8	8.RWL.i1	Use general academic and domain specific words and phrases accurately.	8.L.6	Acquire and use accurately grade-appropriate general academic and domain-specific words and phrases; gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.	1	2	1	1
11	1112.RL.b1	Use two or more pieces of evidence to support inferences, conclusions, or summaries of the plot, purpose or theme within a text.	11-12.RL.1	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.	3	3	1	1

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
11	1112.RL.d1	Analyze how an author's choices concerning how to structure specific parts of a text (e.g., the choice of where to begin or end a story, the choice to provide a comedic or tragic resolution) contribute to its overall structure and meaning.	11–12.RL.5	Analyze how an author's choices concerning how to structure specific parts of a text (e.g., the choice of where to begin or end a story, the choice to provide a comedic or tragic resolution) contribute to its overall structure and meaning as well as its aesthetic impact.	3	3	1	1
11	1112.RI.b1	Use two or more pieces of evidence to support inferences, conclusions, or summaries of text.	11–12.RI.1	Cite strong and thorough textual evidence to support analysis of what the text says explicitly as well as inferences drawn from the text, including determining where the text leaves matters uncertain.	3	3	1	1
11	1112.RI.d1	Determine the author's point of view or purpose in a text.	11–12.RI.6	Determine an author's point of view or purpose in a text in which the rhetoric is particularly effective, analyzing how style and content contribute to the power, persuasiveness, or beauty of the text.	2	3	1	1

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
11	1112.RWL.c3	Develop and explain ideas for why authors made specific word choices within a text.	11–12.RL.4	Determine the meaning of words and phrases as they are used in the text, including figurative and connotative meanings; analyze the impact of specific word choices on meaning and tone, including words with multiple meanings or language that is particularly fresh, engaging, or beautiful. (Include Shakespeare as well as other authors.)	3	3	1	1
11	1112.RI.e1	Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.	11–12.RI.7	Integrate and evaluate multiple sources of information presented in different media or formats (e.g., visually, quantitatively) as well as in words in order to address a question or solve a problem.	4	4	2	2

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Content Centrality	Performance Centrality
11	1112.RWL.b1	Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position in a sentence) as a clue to the meaning of a word or phrase.	11–12.L.4.a	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 11–12 reading and content, choosing flexibly from a range of strategies.	2	1	2	2

Appendix C: Evidence for Change to Improve Alignment

Subsequent to the timeframe of this study, project partners prioritized several additional reading CCCs for inclusion on the NCSC AA-AAS reading test (see Exhibit 17). The inclusion of the supplemental reading CCCs helped to ensure that the reading test covered the intended domain.

Exhibit 27. Supplemental Reading Prioritized CCCs Matched to Intended CCSS

CCSS	CCC
6.RI.3. Analyze in detail how a key individual, event, or idea is introduced, illustrated, and elaborated in a text (e.g., through examples or anecdotes).	**6.RI.g4** Determine how key individuals, events, or ideas are elaborated or expanded on in a text.
6.RI.8. Trace and evaluate the argument and specific claims in a text, distinguishing claims that are supported by reasons and evidence from claims that are not.	**6.RI.g6** Evaluate the claim or argument; determine if it is supported by evidence.
7.RI.3. Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individuals or events, or how individuals influence ideas or events).	**7.RI.j5** Analyze the interactions between individuals, events, and ideas in a text (e.g., how ideas influence individuals or events, or how individuals influence ideas or events)
7.RI.8. Trace and evaluate the argument and specific claims in a text, assessing whether the reasoning is sound and the evidence is relevant and sufficient to support the claims.	**7.RI.k4** Evaluate the claim or argument to determine if they are supported by evidence.
8.RI.5 Analyze in detail the structure of a specific paragraph in a text, including the role of particular sentences in developing and refining a key concept.	**8.RI.k2** Determine how the information in each section contributes to the whole or to the development of ideas.
11–12.RI.2 Determine two or more central ideas of a text and analyze their development over the course of the text, including how they interact and build on one another to provide a complex analysis; provide an objective summary of the text.	**1112.RI.b5** Determine how key details support the development of the central idea of a text.

National Center and State Collaborative

Study c: Study of the Relationship among the NCSC Writing Prioritized Core Content Connectors and the English/Language Arts Common Core State Standards

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National Center and State Collaborative

Study of the Relationship among the NCSC Writing Prioritized Core Content Connectors and the English/Language Arts Common Core State Standards

May 2015

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[14] Contributing partners include in alphabetical order: Lauren Deters, Claudia Flowers, Ellen Forte, Bill Herrera, Allison Kerbel, Lori Nebelsick-Gullett, Aminah Perkins, Rachel Quenemoen, Martha Thurlow, Elizabeth Towles-Reeves, Charlene Turner, and Shawnee Wakeman.

National Center and State Collaborative

The National Center and State Collaborative (NCSC) is applying the lessons learned from the past decade of research on alternate assessments based on alternate achievement standards (AA-AAS) to develop a multi-state comprehensive assessment system for students with significant cognitive disabilities.

NCSC is a collaborative of 24 states and five organizations. The NCSC states participating in the Spring 2015 NCSC operational assessment are: Arizona, Arkansas, Connecticut, District of Columbia, Idaho, Indiana, Pacific Assessment Consortium (PAC-6),[15] Maine, Montana, New Mexico, Rhode Island, South Carolina, South Dakota, and US Virgin Islands. As of Spring 2015, additional states are members of the NCSC Consortium, representing varying levels of participation. They are: California, Delaware, Florida, Louisiana, Maryland, New York, Oregon, Pennsylvania, Tennessee, and Wyoming.

The five NCSC partner organizations include: National Center on Educational Outcomes (NCEO) at the University of Minnesota, National Center for the Improvement of Educational Assessment (Center for Assessment), University of North Carolina at Charlotte, University of Kentucky, and edCount, LLC.

IDEAs that Work
U.S. Office of Special Education Programs

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The University of Minnesota, the administrative partner, is committed to the policy that all persons shall have equal access to its programs, facilities, and employment without regard to race, color, creed, religion, national origin, sex, age, marital status, disability, public assistance status, veteran status, or sexual orientation.

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[15] The Pacific Assessment Consortium (including the entities of American Samoa, Commonwealth of the Northern Mariana Islands, Federated States of Micronesia, Guam, Republic of Palau, and Republic of the Marshall Islands) partner with NCSC as one state, led by the University of Guam Center for Excellence in Developmental Disabilities Education, Research, and Service (CEDDERS).

This document is available in alternative formats upon request.

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Executive Summary

To serve students with the most significant cognitive disabilities, the National Center and State Collaborative (NCSC) is designing an alternate assessment as part of a system that includes curriculum, instruction, and professional development resources, all aligned to the Common Core State Standards (CCSS). To support the coordinated development of all of these system components, NCSC developed the Core Content Connectors (CCCs) for each grade and content area. These CCCs are not extensions of the CCSS; rather, they "pinpoint the primary content of the CCSS and organize it in the conceptual model of the Learning Progressions Framework" (NCSC, 2013, p. 8). The Learning Progressions Frameworks served as the foundation for organizing content into hypothesized paths for learning. CCCs were developed to articulate the relationship between CCSS and the Learning Progressions Frameworks.[16]

Project partners prioritized three (3) CCCs in ELA/Writing per grade to be developed as selected- and constructed-response items for the NCSC assessments. With regard to the writing constructed-response items, project partners based the three-trait analytic scoring rubrics on up to six CCC expectations and two CCSS Language standards per grade in grades 3-8 and 11; students in grades K-2 and 9-10 are not assessed and, thus, researchers did not identify prioritized CCCs for analysis. NCSC identified 21 CCCs prioritized for writing assessment development. Across grades 3 – 8, and 11, a total of 36 CCCs were identified for the development of standards-based writing rubrics, known as the rubric-trait CCCs. The rubrics were developed to distinguish between different levels of performance, here on referred to as rubric-trait CCCs. Together, these 57 CCCs are the focus of the present study. The prioritized CCCs, which link the CCSS and the model of domain-specific knowledge acquisition that guides academic instruction for these students, serve as the assessment targets for the operational test in 2014-15. State partners intend to use these prioritized CCCs as a starting point for designing the alternate assessment. To determine increasing coverage within the assessment across years, additional content review will occur annually.

To support the use of the CCCs in this way, NCSC must provide validity evidence demonstrating the quality of alignment between the CCCs and the CCSS. Researchers designed the study described here to provide that evidence. Its purposes are to (a) provide formative information to developers about whether and how they might need to revise individual CCCs to better align with the CCSS and (b) document development-stage alignment as part of a larger alignment evaluation of the assessment system.

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[16] For a full copy of the report, please contact the Arizona Department of Education Director of Alternate Assessment, Audra Ahumada, at Audra.Ahumada@azed.gov.

Methodology

NCSC researchers used the Links for Academic Learning (LAL) model developed by Flowers, Wakeman, Browder, and Karvonen (2007) to evaluate the alignment of the writing prioritized CCCs with the English language arts (ELA) CCSS.

Researchers established two panels of experts in curriculum and special education for this study, one for the 3-5 grade span and one for grades 6-8 and 11. The consensus process used in this study required each panel to come to 100% agreement on each rating researchers used for analysis. Both panels yielded an average inter-rater agreement of 0.97 for all of their independent ratings.

Panelists used the alignment study process to review and rate the CCSS and prioritized CCCs for each of the following:

1. Depth of Knowledge (DOK) for all of the CCSS in the target strands[17];
2. DOK for each prioritized CCC;
3. Closest CCSS match for each prioritized CCC;
4. Content centrality[18] between each prioritized CCC and selected CCSS; and
5. Performance centrality[19] between each prioritized CCC and selected CCSS.

Data Collection Process

The panelists gathered to participate in the alignment study from June 4 to 7, 2013 (see Appendix A: Agenda). On the morning of the first day, all panelists convened to receive a detailed training on the purpose of the study, the rubrics, and the rating process. The training included rating practice using sample CCCs and CCSS and group discussion to strengthen understanding and help ensure inter-rater agreement. Though the study and the report emphasized the prioritized CCCs and rubric-trait CCCs, the study time permitted researchers to collect data on all writing CCCs.

After the training, the participants separated into their panels to begin the rating process. Each panel included a researcher to act as a facilitator and to answer questions regarding the application of the rubrics for DOK, content centrality, and performance centrality. This study employed a consensus model in which individual panelists first made independent ratings and then discussed their ratings in groups to

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[17] Target strands represent the CCSS to which researchers intended the prioritized CCCs align.

[18] Content centrality is a measure of the degree of fidelity between the content of the CCC and the content of the CCSS.

[19] Performance centrality represents the degree to which the CCC and the selected CCSS contain the same performance expectation.

reach agreement. Researchers captured both individual and consensus ratings. The facilitators observed the group discussions, recorded the consensus ratings, and took notes describing the panel's decision-making process and the rationale for their ratings.

For each grade, the panelists first rated the DOK for each of the CCSS in the target strands (Writing and Language). After completing the DOK ratings for the CCSS, the panelists reviewed the prioritized CCCs to rate DOK, identify the closest matching CCSS, and rate the degree of content centrality and performance centrality for each CCC-CCSS matched pair.

Results

Of the 21 prioritized CCCs, panelists aligned 20 (95.2%) CCCs to their intended CCSS, also known as target CCSS. One prioritized CCC (4.8%) was aligned to a non-intended CCSS. Analyses in this report excludes the prioritized CCC matched to non-intended CCSS since these ratings do not represent a comparison between the prioritized CCC and the target CCSS.

Of the 36 rubric-trait CCCs, panelists chose the intended CCSS as the best match for 36 of 36 rubric-trait CCCs (100%).

An evaluation of the content centrality of prioritized CCCs and rubric-trait CCCs panelists matched to their intended CCSS indicated that all 20 prioritized CCCs (100%) and all 36 rubric-trait CCCs (100%) were rated as having "all" or "some" of the content found in the CCSS. Similarly, an evaluation of the performance centrality of the prioritized CCCs matched to their intended CCSS indicated that the 20 prioritized and all 36 rubric-trait CCCs panelists matched to the intended CCSS were rated as having "all" or "some" of the performance centrality found in the CCSS. When panelists chose a rating of "some" for one of the centrality indices, they often evaluated the CCC as being one part of the overall CCSS, which is permissible given that the CCCs are based on both the CCSS and the Learning Progressions Framework.

In general, panelists rated the depth of knowledge for the prioritized CCCs slightly lower than that of the CCSS. A comparison of DOK ratings of the prioritized CCCs and their intended CCSS illustrate fidelity to DOK levels of their CCSS. The majority of prioritized CCCs (70%) had DOK ratings at the same level as their target CCSS, the average difference across all grades being -0.2. A comparison of DOK ratings of the rubric-trait CCCs and their target CCSS revealed a greater difference of -0.8. The majority of rubric-trait CCCs (63.9%) were given a DOK rating lower than their target CCSS, while only 30.6% and 5.6% of their CCCs were rated at the same level or higher, respectively.

Overall, the prioritized CCCs and their alignment to intended CCSS was strong with regard to content centrality, performance centrality, and DOK. Given that NCSC did not intend for every prioritized CCC to encompass all aspects of its intended CCSS, researchers expected ratings of "some" for both content and performance centrality as well as lower ratings for DOK, and viewed documentation supporting these ratings as helpful but not necessarily indicative of a need to revise a CCC.

As is true of all alternate assessments, the breadth, depth, and complexity of the content covered in the AA-AAS are reduced compared to those of standard assessments, In terms of the LAL methodology, these terms correspond to the reduced number of prioritized CCCs, the narrowness of the content and performance centrality, and the lower DOK levels. Thus, NCSC intended to prioritize fewer CCCs for assessment than CCSS and reduced the depth of the content or skills measured by the prioritized CCCs. Overall, the distribution of DOK levels among the prioritized CCCs and rubric-trait CCCs broadly mirrors that of their associated CCSS, although, as expected, the prioritized CCCs and rubric-trait CCCs have slightly lower DOK levels than their associated CCSS.

Recommendations for and Impact on Test Development

Researchers shared the outcomes of the writing alignment study with NCSC content experts. These experts examined both the overall results of the alignment study and the detailed results to determine how to respond in areas that warranted further review and adjustment. Even though the study provided evidence for a strong relationship between prioritized CCCs and the intended CCSS, researchers examined each instance of a 'mismatch' between the prioritized CCCs and the intended CCSS.

Researchers have the following recommendations for item development partners based on the results from the present study. Following each recommendation is NCSC's response.

Because the process of developing the prioritized CCCs resulted in the creation of CCCs that reflected a blending of more than a single CCSS and the creation of multiple CCCs to address a single CCSS, consider including information on non-prioritized CCCs aligned to CCSS. Also, consider clarifying instances in which a prioritized CCC aligns with more than one CCSS.

Response: Other curricular documents display this relationship by establishing Instructional Families to ensure that teachers can teach all related academic skills in a coherent manner. NCSC provided professional development and created resources related to writing instruction. State partners were able to present this curricular information in their respective states to promote student opportunity to develop literacy skills. In addition, publically available instructional resources are available on the NCSC WIKI which include all the CCCs and additional resources to support instruction of ELA/Writing.

Panelists rated some of the writing prioritized CCCs as having "some" content and performance centrality with their target CCSS. NCSC could strengthen the degree of alignment in a few cases by making simple revisions to the text of the prioritized CCCs and documenting the reasons for differences in content, performance, and DOK.

Response: The alignment to a portion of the CCSS was intentional. As stated above, other NCSC curricular documents clarify this relationship by establishing

Instructional Families to ensure that teachers can teach all related academic skills in a coherent manner.

- NCSC should consider documenting the reasons for the slightly lower CCC DOK level as compared to the CCSS DOK level.
  - *Response*: Regulatory language permits the AA-AAS to reduce the depth, breadth, and complexity of the covered content.

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Study of the Relationship among the NCSC Writing Prioritized Core Content Connectors and the English/Language Arts Common Core State Standards

Introduction

To serve students with the most significant cognitive disabilities, the National Center and State Collaborative (NCSC) is designing an alternate assessment as part of a system that includes curriculum, instruction, and professional development resources, all aligned to the Common Core State Standards (CCSS). To support the coordinated development of all system components, NCSC developed the Core Content Connectors (CCCs) for each grade and content area. The CCCs are not extensions of the CCSS; rather, they "pinpoint the primary content of the CCSS and organize it in the conceptual model of the Learning Progressions Framework" (NCSC, 2013, p. 8). The Learning Progressions Frameworks (Hess, 2010) aligns curriculum resources and assessments with a common, research-based representation of the learning pathways and building blocks that support students' acquisition of the knowledge, skills, and abilities defined in the CCSS. The CCCs clarify concepts in the CCSS by "deconstructing the progress indicators in the Learning Progressions Framework... into teachable and assessable segments of content" (NCSC, 2011, p. 1).

NCSC partner states used an iterative process and worked with content experts and severe disabilities experts to select a subset of CCCs as priorities for assessment. They based selection decisions on the importance of the content assessed, with reference to the distribution of strands in the CCSS, and with attention to grade-level CCSS alignment. Project partners prioritized three (3) CCCs in ELA/Writing per grade and content area in grades 3-8 and 11 for the operational assessment scheduled for 2014-15. NCSC identified 21 CCCs prioritized for writing assessment development and a a total of 36 CCCs for the development of standards-based writing rubrics, here on referred to as rubric-trait CCCs. Together, these 57 CCCs are the focus of the present study. Prioritized progress indicators along a learning progression form the basis of the CCCs prioritized for writing, which are the focus of the present study. Even prior to developing the assessment, NCSC must provide validity evidence demonstrating the quality of alignment between the prioritized CCCs and the CCSS.

The prioritized CCCs and rubric-trait CCCs are designed to contribute to a fully aligned system of content, instruction, and assessment that focuses on the core content, knowledge, and skills needed at each grade to ensure success at the next. They serve

as the assessment targets and link the CCSS to the model of domain-specific knowledge acquisition that guides academic instruction for students with the most significant cognitive disabilities. State partners intend to use the prioritized CCCs as a starting point for designing the alternate assessment. To determine increasing coverage within the assessment across years, additional content review is planned to occur annually.

To support the use of the prioritized CCCs as described, NCSC must provide validity evidence demonstrating the quality of alignment between the prioritized CCCs and the CCSS. Researchers designed this study to provide that evidence. Its purposes are (a) to provide formative information to assessment developers about whether and how they might need to revise individual prioritized CCC to better align with the CCSS and (b) to document development-stage alignment as part of a larger alignment evaluation of the assessment system.

NCSC researchers used the Links for Academic Learning (LAL) model developed by Flowers, Wakeman, Browder, and Karvonen (2007) to evaluate the alignment of the writing prioritized CCCs with the English language arts (ELA) CCSS.

The LAL Methodology

Flowers et al. (2007) developed the LAL alignment methodology to support the evaluation of alignment between alternate assessments based on alternate achievement standards (AA-AAS) and the academic content standards those assessments are meant to address. In developing the LAL method, Flowers et al. (2007) first considered the policy and practice requirements for evaluating alignment quality for AA-AAS. According to the US Department of Education, Federal Register (December 9, 2003), these assessments must:

- Be aligned with a state's academic content standards;
- Promote access to the general curriculum; and
- Reflect the highest achievement standards possible.

With these requirements in mind, Flowers et al. (2007) analyzed the alignment methods most often used for evaluations involving general assessments. Although there were many common themes among these methods, none provided a comprehensive set of criteria that would allow evaluators to address all three of the requirements noted above for AA-AAS systems. Thus, Flowers and her colleagues developed the LAL method specifically for use with AA-AAS.

The basic premises of the LAL method include the following expectations for AA-AAS (adapted from Flowers et al., 2007):

6. The assessments must be linked to grade-level content standards;

7. The target for achievement must be academic content (e.g., reading, writing, math, science) that corresponds to the student's assigned grade based on chronological age;
8. Functional activities and materials may be used to promote understanding, but the target skills for student achievement are academically-focused;
9. Prioritization of the content, if it occurs, should reflect the major domains of the curricular area (e.g., strands of ELA) and have fidelity with this content and how it is typically taught in general education;
10. The alternate expectations for achievement may include a focus on prerequisite skills or some partial attainment of the grade level, but students should still have the opportunity to meet high expectations, to demonstrate a range of depth of knowledge, to achieve within their symbolic level, and to show growth across grade levels or grade bands.

Application of the LAL Methodology to NCSC Writing Relationship Study

Researchers translated the LAL premises into four aspects of alignment considered in the present study (see Exhibit 1). This approach to alignment differs from more traditional methods that focus on post-hoc evidence of, for example, test level alignment of items with standards. The LAL methodology supports two evaluation questions for each of the four aspects. These questions represent the primary and secondary objectives for this evaluation:

Primary: To what extent does each prioritized CCC align with the specific CCSS it is intended to reflect in terms of content centrality, performance centrality, and depth of knowledge?

Secondary: To what extent does the set of grade-level prioritized CCC reflect the set of grade-level CCSS in terms of content centrality, performance centrality, and depth of knowledge? (Note: For the current study, the secondary question was addressed only for the evaluation of aspect four, Depth of Knowledge.)

Exhibit 28. Alignment Aspects Addressed in the Writing Alignment Study

Aspect	Evaluation Questions
9. Domain Coverage	To what extent does each prioritized CCC map onto its target CCSS?
10. Content Centrality	To what extent does the focus of achievement in the prioritized CCC maintain fidelity with the content of the associated CCSS?
11. Performance Centrality	To what extent does the focus of achievement in the prioritized CCC maintain fidelity with the specified performance of the associated CCSS?

12. Depth of Knowledge (DOK)	**c.** Do the DOK levels in the prioritized CCC reflect fidelity with the DOK levels in the associated CCSS? **d.** To what extent do the prioritized CCC reflect the range of DOK defined in the CCSS?

Methodology

Panelists

Researchers established two panels of experts in curriculum and special education, one for the 3-5 grade span and one for grades 6-8 and 11-12. Each panelist met the following requirements:

- Must be a certified teacher or an active faculty member or consultant with expertise in significant cognitive disabilities, the assigned content area, or both, for the grade range of the panel to which s/he is assigned;
- Must have had no previous and have no current involvement in the NCSC CCCs, curriculum, or assessment development processes.

Using professional networks and contacts in the field, NCSC researchers recruited eight panelist participants with various demographic characteristics (gender, ethnicity, and education level) (see Exhibit 2). The panel consisted of four teachers at the elementary and high school levels, three university faculty, and one state special education consultant. Four of the panelists were severe disabilities experts and four panelists were writing content experts.

Exhibit 29. Demographic Characteristics of Expert Panelists

Demographic Variable		Number of Panelists
Gender	Female	6
	Male	2
Ethnicity	Asian/Pacific Islander	1
	Caucasian	5
	Hispanic	2
Degree	Bachelor's degree	1
	Master's degree	4
	Doctorate	3

Rating Rubrics

Panelists reviewed and provided ratings of the CCSS and the prioritized CCCs in relation to each of the five evaluation questions (see Exhibit 1). They provided the following ratings:

11. DOK for all of the CCSS in the target strands;
12. DOK for each prioritized CCC;
13. Closest CCSS match for each prioritized CCC;
14. Content centrality between each prioritized CCC and selected CCSS; and
15. Performance centrality between each prioritized CCC and selected CCSS.

Depth of knowledge (DOK) describes the complexity of the knowledge and skills required to perform a task. This study employed Webb's (1999) DOK rubric, as allowed by the LAL alignment methodology (see Exhibit 3). Panelists also referred to a matrix outlining Webb's DOK levels against Bloom's taxonomy (Hess, 2005) when rating DOK for the CCCs and CCSS.

Exhibit 30. Depth of Knowledge Rubric

DOK Level		Description
1	Recall	Recall or recognition of a fact, information, concept, or procedure
2	Basic Application of Skill/Concept	Use of information, conceptual knowledge, following or selecting appropriate procedures, two or more steps with decision points along the way, routine problems, organizing/displaying data
3	Strategic Thinking	Requires reasoning, developing a plan or sequence of steps to approach problem; requires some decision making and justification; abstract and complex; often more than one possible answer
4	Extended Thinking	An investigation or application to real world; requires time to research, think, and process multiple conditions of the problem or task; non-routine manipulations, across disciplines/content areas/multiple sources

Content centrality is a measure of the degree of fidelity between the content of the prioritized CCC and the content of the CCSS. For example, a CCC requiring students to "identify and define parts of speech" and a CCSS requiring students to "correctly use parts of speech" would have the same content ("parts of speech"), even though the performance is different ("identify and define" vs. "correctly use"). A CCC requiring students to "identify and define parts of speech" and a CCSS requiring students to "identify and define different punctuation marks" would not have the same content ("parts of speech" vs. "punctuation marks"), although they do have the same performance ("identify and define").

The content centrality rubric applied in this study appears below (see Exhibit 4). Panelists identified the CCSS that was the closest match to a prioritized CCC and then rated the degree of content centrality between each pair as “none,” “some,” or “all.” For any rating of “none,” researchers asked panelists to provide a rationale.

Exhibit 31. Content Centrality Rubric

Rating		Description
0	None	The CCSS and the prioritized CCC do not address the same content
1	Some	The prioritized CCC addresses some of the content of the CCSS; the content of the CCC is present in the CCSS
2	All	The prioritized CCC clearly address the same content as the CCSS

Performance centrality represents the degree to which the prioritized CCC and the selected CCSS contain the same performance expectation. For example, a CCC requiring students to “identify and define parts of speech” and a CCSS requiring students to “identify and define different punctuation marks” would have the same performance expectation (“identify and define”), although the content is different. A CCC requiring students to “identify and define parts of speech” and a CCSS requiring students to “correctly use parts of speech” would not have the same performance expectation (“identify and define” vs. “correctly use”), although they have the same content (“parts of speech”).

The panelists rated as “none,” “some,” or “all” the degree of performance centrality between each prioritized CCC and the CCSS identified as its closest match (see Exhibit 5). For any ratings of “none,” researchers asked panelists to provide a rationale.

Exhibit 32. Performance Centrality Rubric

Rating		Description
0	None	The performance of the CCSS and the prioritized CCC are not the same
1	Some	The performance of the prioritized CCC partially matches the performance of the CCSS; the performance of the CCC is present in the CCSS
2	All	The performance of the prioritized CCC is the same as the CCSS

Data Collection Process

The panelists gathered to participate in the alignment study from June 4 to 7, 2013 (see Appendix A: Agenda). On the morning of the first day, all panelists convened to receive a detailed training on the purpose of the study, the rubrics, and the rating process. The training included rating practice using sample CCCs and CCSS and group discussion to strengthen understanding and help ensure inter-rater agreement. Though the study emphasized the prioritized CCCs and the rubric-trait CCCs for scoring of the writing assessment, the study time permitted researchers to collect data on all CCCs.

After the training, the participants separated into their panels to begin the rating process. Each panel included a researcher to act as a facilitator and to answer questions regarding the application of the rubrics for DOK, content centrality, and performance centrality. This study employed a consensus model in which individual panelists first made independent ratings and then discussed their ratings in groups to reach agreement. Researchers captured both individual and consensus ratings. The facilitators observed the group discussions, recorded the consensus ratings, and took notes describing the panel's decision-making process and the rationale for their ratings.

For each grade, the panelists first rated the DOK for each of the CCSS in the target strands (Writing and Language). After completing the DOK ratings for the CCSS, the panelists reviewed the prioritized CCCs and the rubric-trait CCCs for scoring of the writing assessment to rate DOK, identify the closest matching CCSS, and rate the degree of content centrality and performance centrality for each CCC-CCSS matched pair.

The panelists completed ratings for all the writing CCCs with an emphasis on prioritized CCCs and the CCCs for scoring of the writing assessment. Although panelists reviewed both the full set of CCCs and for the subset of CCCs prioritized for assessment, researchers did not identify the prioritized CCCs or the CCCs for scoring of the writing assessment to the panelists at any point during the study.

Inter-rater Agreement

During the study, the facilitators for each panel monitored the independent and group rating processes and clarified panelists' understanding of the rating rubrics when appropriate. The consensus process used in this study required each panel to come to 100% agreement on each consensus rating researchers used for analysis. To further ensure the reliability of the panelists' ratings, researchers calculated inter-rater agreement for all panelists' independent ratings. Both panels had high inter-rater agreement for all ratings, with an average agreement of 0.95 for panel 1 and 0.98 for panel 2 (see Exhibit 6).

Exhibit 33. Inter-rater Agreement by Panel

Rating	Panel 1: Grades 3-5	Panel 2: Grades 6-8 and HS

CCSS DOK	0.96	0.99
CCC DOK	0.94	0.96
CCC Match to CCSS	0.96	0.96
Content Centrality	0.93	0.98
Performance Centrality	0.97	1.00
Average	0.95	0.98

Participant Evaluation

At the conclusion of the study, panelists also completed an evaluation of the alignment study's process. Researchers asked panelists to rate their agreement—strongly agree (4), agree (3), disagree (2), or strongly disagree (1)—with a series of statements about the study. The results of these evaluations reflect high levels of satisfaction with the process and the outcomes of the alignment study (see Exhibit 7).

Exhibit 34. Participant Evaluation Results

Statement	Average Rating
10. Facilities were appropriate to the work.	4.0
11. Introductory presentation and training sessions were clear.	4.0
12. Introductory and training materials were clear.	4.0
13. The process used was appropriate to the work.	4.0
14. The process used resulted in good information about the CCCs and CCSS.	4.0
15. I feel like I was able to make a contribution to the sessions.	4.0
16. I am satisfied with the group-consensus DOK ratings.	4.0
17. I am confident that my matching of the CCCs to particular standards is reasonable.	4.0
18. I am confident that my DOK ratings are reasonable.	4.0

Considerations for Analysis and Interpretation of Results

Readers of this study must consider the characteristics and the intended purpose of the CCCs when interpreting the study's results. The relationship between the CCCs and the CCSS differs from the relationship between test items and content standards that is the typical focus of alignment studies. Developers typically create items from standards, often with the intent to provide complete or very close alignment between the item and the target standard. In contrast, NCSC uses the CCCs to identify salient academic connections between the Learning Progression Framework and the CCSS, represent

the scope of the CCSS, and provide a foundation for both assessment and instruction. Consequently, the CCCs differ from the CCSS both in terms of organizational structure and in terms of the scope of each CCC. NCSC has organized the CCCs by different categories, strands, and sub-strands, and each individual CCC tends to be narrower and more discrete in breadth than an individual CCSS, targeting less knowledge and fewer skills.

For these reasons, researchers did not anticipate a one-to-one correspondence between each prioritized CCC or rubric-trait CCC and its target CCSS, or between the prioritized CCCs or rubric-trait CCCs and the CCSS as a group, for any of the ratings. With regard to CCSS alignment (domain coverage), some prioritized CCCs or rubric-trait CCCs may be dually aligned or contain pieces of multiple CCSS. Therefore researchers expected to see many prioritized CCCs or rubric-trait CCCs rated “some” for both content and performance centrality. Likewise, the prioritized CCCs or rubric-trait CCCs should be similar but not identical to the CCSS in terms of DOK, showing a broadly comparable range. However, due to their generally narrower individual focus, the prioritized CCCs or rubric-trait CCCs are likely to have slightly lower levels of DOK overall than the CCSS.

Findings by Alignment Aspect and Evaluation Question

Domain Coverage

To examine the degree of domain coverage, researchers evaluated the extent to which each prioritized CCC mapped onto its target CCSS (i.e., the panelists chose the intended CCSS as the one that best aligns with the prioritized CCC). Researchers instructed panelists to choose the most closely aligned CCSS for each prioritized CCC; they were not provided with a list of intended CCSS.

For the majority of prioritized CCCs, panelists chose as the “best match” the CCSS intended to align with the prioritized CCC based on the CCC development process (see Exhibit 8). Panelists determined that 20 of the 21 prioritized CCCs (95.2%) aligned with their intended CCSS (see Exhibit 8). Panelists aligned one prioritized CCC (4.8%) to a non-intended CCSS. When the panelists selected a non-intended CCSS, they identified the intended CCSS as another possible match. However, panelists agreed that this prioritized CCC did include the content of the intended CCSS as well. Panelists determined all 36 of the rubric-trait CCCs (100%) aligned with intended CCSS (see Exhibit 9). The appendices include a full list of the prioritized CCCs and their identified CCSS matches (see Appendix B and C).

Exhibit 35. Percentage of Prioritized CCCs Rated as Linked to CCSS

Grade	Matched to Intended CCSS		Matched to Non-intended CCSS		No Match to CCSS		Total
	#	%	#	%	#	%	

3	3	100.0	0	0.0	0	0.0	3
4	3	100.0	0	0.0	0	0.0	3
5	2	66.7	1	33.3	0	0.0	3
6	3	100.0	0	0.0	0	0.0	3
7	3	100.0	0	0.0	0	0.0	3
8	3	100.0	0	0.0	0	0.0	3
11	3	100.0	0	0.0	0	0.0	3
Total	20	95.2	1	4.8	0	0.0	21

Exhibit 36. Percentage of Rubric-trait CCCs Rated as Linked to CCSS

	Matched to Intended CCSS		Matched to Non-intended CCSS		No Match to CCSS		Total
	#	%	#	%	#	%	
3	5	100.0	0	0.0	0	0.0	5
4	4	100.0	0	0.0	0	0.0	4
5	4	100.0	0	0.0	0	0.0	4
6	5	100.0	0	0.0	0	0.0	5
7	6	100.0	0	0.0	0	0.0	6
8	6	100.0	0	0.0	0	0.0	6
11	6	100.0	0	0.0	0	0.0	6
Total	36	100.0	0	0.0	0	0.0	36

Content Centrality

To examine the degree of content centrality, researchers evaluated the extent to which the focus of achievement in each individual prioritized CCC maintains fidelity with the content of the associated CCSS.

The panelists rated 100% of the prioritized CCCs and rubric-trait CCCs as having "some" or "all" content centrality with their associated CCSS (see

Exhibit 11 and Exhibit 12). They did not assign a “none” content centrality rating to any prioritized CCC at any grade-level.

Exhibit 37. Content Centrality: Number and Percentage by Grade for Prioritized CCCs

Grade	All		Some		None		Total
	#	%	#	%	#	%	
3	0	0.0	3	100.0	0	0.00	3
4	1	33.3	2	66.7	0	0.00	3
5	1	33.3	1	33.3	0	0.00	2
6	1	33.3	2	66.7	0	0.00	3
7	2	66.7	1	33.3	0	0.00	3
8	0	0.0	3	100.0	0	0.00	3
11	2	66.7	1	33.3	0	0.00	3
Total	7	33.3	13	61.9	0	0.00	20

Exhibit 38. Content Centrality: Number and Percentage by Grade for Rubric-trait CCCs

Grade	All		Some		None		Total
	#	%	#	%	#	%	
3	2	40.0	3	60.0	0	0.00	5
4	3	75.0	1	25.0	0	0.00	4
5	3	75.0	1	25.0	0	0.00	4
6	3	60.0	2	40.0	0	0.00	5
7	4	66.7	2	33.3	0	0.00	6
8	4	66.7	2	33.3	0	0.00	6
11	1	16.7	5	83.3	0	0.00	6
Total	20	55.6	16	44.4	0	0.00	36

Performance Centrality

To examine the degree of performance centrality, researchers evaluated the extent to which the focus of achievement in each individual prioritized CCC maintains fidelity with the specified performance of its associated CCSS.

Panelists rated 100% of the prioritized CCCs and rubric-trait CCCs as having “some” or “all” performance centrality with their target CCSS (see Exhibit 12 and Exhibit 13). They did not assign a “none” performance centrality rating to any prioritized CCC at any grade-level.

Exhibit 39. Performance Centrality: Number and Percentage by Grade for Prioritized CCCs

Grade	All		Some		None		Total
	#	%	#	%	#	%	
3	0	0.0	3	100.0	0	0.00	3
4	0	0.0	3	100.0	0	0.00	3
5	1	50.0	1	50.0	0	0.00	2
6	1	33.3	2	66.7	0	0.00	3
7	2	66.7	1	33.3	0	0.00	3
8	0	0.0	3	100.0	0	0.00	3
11-12	2	66.7	1	33.3	0	0.00	3
Total	6	30.0	14	70.0	0	0.00	20

Exhibit 40. Performance Centrality: Number and Percentage by Grade for Rubric-trait CCCs

	All		Some		None		
Grade	#	%	#	%	#	%	**Total**
3	3	60.0	2	40.0	0	0.00	5
4	3	75.0	1	25.0	0	0.00	4
5	3	75.0	1	25.0	0	0.00	4
6	3	60.0	2	40.0	0	0.00	5
7	4	66.7	2	33.3	0	0.00	6
8	4	66.7	2	33.3	0	0.00	6
11	1	16.7	5	83.3	0	0.00	6
Total	21	58.3	15	41.7	0	0.00	36

Depth of Knowledge

To examine DOK, researchers evaluated both the DOK levels of its intended CCSS and the extent to which each individual prioritized CCC's DOK levels reflect fidelity to DOK levels of the CCSS they aligned with. Researchers also examined the extent to which prioritized CCCs as a whole reflect the range of DOK defined in the target CCSS in each grade level.

Panelists determined a range of DOK levels for the intended CCSS aligned with prioritized CCCs, with most at level 2 and 3 (see Exhibit 14). Specifically, 75% were at level 2 and 25% at level 3. CCSS for grades 3-8 had 50% or more of their DOK ratings at level 2. Grades 5 and 11 had the highest levels of CCSS DOK ratings at level 3 with 50% and 66.7%, respectively.

Panelists determined a range of DOK levels for target CCSS aligned with rubric-trait CCCs, with most at level 3 (see Exhibit 15). Grades 3-8 had 100% of their target CCSS DOK ratings at level 3. Grade 11 had DOK levels for all of its CCSS at level 2.

Exhibit 41. Depth of Knowledge: Number and Percentage of Intended CCSS by Grade for Prioritized CCCs

Grade	DOK 1		DOK 2		DOK 3		DOK 4		Total	Average DOK
	#	%	#	%	#	%	#	%		
3	0	0.0	3	100.0	0	0.0	0	0.0	3	2.0
4	0	0.0	2	75.0	1	25.0	0	0.0	3	2.3
5	0	0.0	1	50.0	1	50.0	0	0.0	2	2.5
6	0	0.0	3	100.0	0	0.0	0	0.0	3	2.0
7	0	0.0	3	100.0	0	0.0	0	0.0	3	2.0
8	0	0.0	2	66.7	1	33.3	0	0.0	3	2.3
11	0	0.0	1	33.3	2	66.7	0	0.0	3	2.7
Total	0	0.00	15	75.0	5	25.0	0	0.0	20	2.3

Exhibit 42. Depth of Knowledge: Number and Percentage of Intended CCSS by Grade for Rubric-trait Prioritized CCCs

Grade	DOK 1		DOK 2		DOK 3		DOK 4		Total	Average DOK
	#	%	#	%	#	%	#	%		
3	0	0.0	0	0.0	5	100.0	0	0.0	5	3.0
4	0	0.0	0	0.0	4	100.0	0	0.0	4	3.0
5	0	0.0	0	0.0	4	100.0	0	0.0	4	3.0
6	0	0.0	0	0.0	5	100.0	0	0.0	5	3.0
7	0	0.0	0	0.0	6	100.0	0	0.0	6	3.0
8	0	0.0	0	0.0	6	100.0	0	0.0	6	3.0
11	0	0.0	6	100.0	0	0.0	0	0.0	6	2.0
Total	0	0.00	6	16.7	30	83.3	0	0.0	36	2.8

Panelists' determinations of DOK levels for the prioritized CCCs showed greater range but less variation than panelists' determinations of DOK levels for the intended CCSS. Across grades, panelists rated 95% of CCCs at DOK level 2 and 5% of CCCs at DOK level 3 (see Exhibit 16). As was true of the CCSS DOKs aligned with prioritized CCCs, the majority of DOK ratings for the prioritized CCCs were at level 2.

Panelists' determinations of DOK levels for the rubric-trait CCCs showed greater variation than the panelists' determinations of DOK levels for the intended CCSS. Across grades, panelists rated 16.7% of rubric-trait CCCs at DOK level 1, 58.3% at DOK level 2, 25% at DOK level 3, and 0% at DOK level 4 (see Exhibit 17). The earlier grades exhibited the highest frequency of DOK levels 1 and 3 (grades 3-6 and grades 3-5, respectively).Grades 4-11 exhibited the highest frequency of DOK level 2.

Exhibit 43. Depth of Knowledge: Number and Percentage of Prioritized CCCs by Grade

Grade	DOK 1		DOK 2		DOK 3		DOK 4		Total	Average DOK
	#	%	#	%	#	%	#	%		
3	0	0.0	2	66.7	1	33.3	0	0.0	3	2.3
4	0	0.0	3	75.0	0	0.0	0	0.0	3	2.0
5	0	0.0	2	100.0	0	0.0	0	0.0	2	2.0
6	0	0.0	3	100.0	0	0.0	0	0.0	3	2.0
7	0	0.0	3	100.0	0	0.0	0	0.0	3	2.0
8	0	0.0	3	100.0	0	0.0	0	0.0	3	2.0
11	0	0.0	3	100.0	0	0.0	0	0.0	3	2.0
Total	0	0.0	19	95.0	1	5.0	0	0.0	20	2.1

Exhibit 44. Depth of Knowledge: Number and Percentage of Rubric-trait CCCs by Grade

Grade	DOK 1		DOK 2		DOK 3		DOK 4		Total	Average DOK
	#	%	#	%	#	%	#	%		
3	1	20.0	1	20.0	3	60.0	0	0.0	5	2.4
4	1	25.0	1	25.0	2	50.0	0	0.0	4	2.3
5	1	25.0	1	25.0	2	50.0	0	0.0	4	2.3
6	1	20.0	4	80.0	0	0.0	0	0.0	5	1.8
7	1	16.7	5	83.3	0	0.0	0	0.0	6	1.8
8	1	16.7	5	83.3	0	0.0	0	0.0	6	1.8
11	0	0.0	4	66.7	2	33.3	0	0.0	0	2.3
Total	6	16.7	21	58.3	9	25.0	0	0.0	6	2.1

Researchers also compared average DOK ratings for prioritized CCCs and their CCSS. These comparisons yielded a zero for cases in which the DOK ratings for the CCC and CCSS were equal, a positive integer (e.g., 1) when the prioritized CCC DOK was one or more DOK levels higher than the CCSS DOK, and a negative integer (e.g., -1) when the prioritized CCC DOK was one or more DOK levels lower than the CCSS DOK. Researchers calculated the average difference in DOK levels by grade.

The direction comparison of the average DOK levels for the CCSS and the prioritized CCCs showed that the DOKs for the prioritized CCCs, in general, were slightly lower than the levels for the CCSS. The difference in the average DOK rating for prioritized CCCs and their target CCSS was -0.2, with largest difference in grade 11 (-0.7) and its smallest difference in grades 6 and 7 (0.0; see Exhibit 18). The comparison of average DOK ratings for rubric-trait CCCs yielded a larger difference (see Exhibit 19). The difference in the average DOK rating for prioritized CCCs and their target CCSS was -0.8, with largest difference in grades 6-8 (-1.2).

Exhibit 45. Comparison of Depth of Knowledge Index for CCSS and Prioritized CCCs

Grade	CCC DOK Index	CCSS DOK Index	Difference
3	2.3	2.0	0.3
4	1.8	2.3	-0.3
5	2.0	2.5	-0.5
6	2.0	2.0	0.0
7	2.0	2.0	0.0
8	2.0	2.3	-0.3
11	2.0	2.7	-0.7
Total	2.0	2.2	-0.2

Exhibit 46. Comparison of Depth of Knowledge Index for CCSS and Rubric-trait CCCs

Grade	Rubric-trait CCC DOK Index	CCSS DOK Index	Difference
3	2.4	3.0	-0.6
4	2.3	3.0	-0.8
5	2.3	3.0	-0.8
6	1.8	3.0	-1.2
7	1.8	3.0	-1.2
8	1.8	3.0	-1.2
11	2.3	2.0	0.3
Total	2.1	2.8	-0.8*

*The difference in averages is rounded to nearest tenth.

To further examine the relationship between prioritized CCCs and CCSS DOKs, researchers compared the DOK of each prioritized CCC to the DOK of its target CCSS. Because an individual prioritized CCC is often narrower in scope than an individual CCSS, an individual prioritized CCC often exhibits a slight reduction in cognitive complexity when compared to its intended CCSS.

As expected, the comparison between each prioritized CCC and its intended CCSS showed that, in all grades, 70% of the CCCs had the same DOK as that of their intended CCSS, while 5% had a higher DOK and % had a lower DOK (see Exhibit 20). For the prioritized CCCs, the average difference in DOK levels by grade ranged from -0.7 to 0.3.The average difference across all grades was -0.2, indicating that DOK levels for the prioritized CCCs were slightly lower than the DOKs of the intended CCSS.

When researchers compared the rubric-trait CCCs with the intended CCSS, they found that 30.6% of rubric-trait CCCs had the same DOK level as the intended CCSS, 5.6% had a higher DOK, and 63.9% had a lower DOK (see Exhibit 21). The rubric-trait CCCs

DOKs at grades 4-5 and 11 were either the same as the intended CCSS or lower than the CCSS. All rubric-trait CCCs at grades 6-7 had the same DOK as the intended CCSS. In grade 11, most rubric-trait CCCs had lower DOK ratings (66.7%); the remaining CCCs had DOKs at the same level as the intended CCSS (33.3%). Grade 3 was the only grade that contained a rubric-trait CCC with a DOK rating higher than its intended CCSS (n=1; 33.3%). For the rubric-trait CCCs, the average difference in DOKs by grade ranged from -1.2 to -.3. The average difference across all grades was -0.8, indicating that panelists rated the DOKs of rubric-trait CCCs lower than the DOKs of the intended CCSS.

Exhibit 47. Depth of Knowledge: Comparison of Prioritized CCCs to Target CCSS

Grade	Same DOK		CCC: Higher DOK		CCC: Lower DOK		Average Difference
	#	%	#	%	#	%	
3	2	66.7	1	33.3	0	0.0	0.3
4	2	66.7	0	0.0	1	33.3	-0.3
5	1	50.0	0	0.0	1	50.0	-0.5
6	3	100.0	0	0.0	0	0.0	0.0
7	3	100.0	0	0.0	0	0.0	0.0
8	2	66.7	0	0.0	1	33.3	-0.3
11	1	33.3	0	0.0	2	66.7	-0.7
Total	14	70.0	1	5.0	5	25.0	-0.2

Exhibit 48. Depth of Knowledge: Comparison of Rubric-trait CCCs to Target CCSS

Grade	Same DOK		CCC: Higher DOK		CCC: Lower DOK		Average Difference
	#	%	#	%	#	%	
3	3	60.0	0	0.0	2	40.0	-0.6
4	2	50.0	0	0.0	2	50.0	-0.8
5	2	50.0	0	0.0	2	50.0	-0.8
6	0	0.0	0	0.0	5	100.0	-1.2
7	0	0.0	0	0.0	6	100.0	-1.2
8	0	0.0	0	0.0	6	100.0	-1.2
11	4	66.7	2	33.3	0	0.0	0.3
Total	11	30.6	2	5.6	23	63.9	-0.8

Summary and Recommendations

Overall, the alignment between the prioritized CCCs in writing and the CCSS is strong with regard to the match of the prioritized CCCs to the intended CCSS, content centrality, performance centrality, and DOK. For 95.2% of the prioritized CCCs and 100% of the rubric-trait CCCs, panelists chose the intended CCSS as the best match.

Panelists rated 100% of the prioritized CCCs as having “all” or “some” content and performance centrality, and did not assign a “none” rating to any CCC at any grade-level for either type of centrality. Both the CCSS and the CCCs included a range of DOK levels, although, as expected, the CCCs had slightly lower DOK levels compared to those of the CCSS.

As is true of all alternate assessments, the breadth, depth, and complexity of the content covered in the AA-AAS is lower than that of standard assessments. In terms of the LAL methodology, the breadth, depth, and complexity correspond to the number of prioritized CCCs, the content and performance centrality, and the DOK. Thus, NCSC intentionally prioritized fewer CCCs for assessment and reduced the depth of the content or skills measured by the prioritized CCCs.

Ultimately, the prioritized CCCs and rubric-trait CCCs provide detailed information about the content and performance expected along the Learning Progressions Framework, and the findings illustrate strong alignment of prioritized CCCs to the CCSS.

Recommendations for and Impact on Test Development

Researchers shared the outcomes of the writing alignment study with NCSC content experts. These experts examined both the overall results of the alignment study and the detailed results to determine how to respond in areas that warranted further review and adjustment. Even though the study provided evidence for a strong relationship between prioritized CCCs and the intended CCSS, researchers examined each instance of a ‘mismatch’ between the CCCs and the intended CCSS.

Researchers have the following recommendations for item development partners based on the results from the present study. Following each recommendation is NCSC’s response.

Because the process of developing the prioritized CCCs resulted in the creation of CCCs that reflected a blending of more than a single CCSS and the creation of multiple CCCs to address a single CCSS, consider including information on non-prioritized CCCs aligned to CCSS. Also, consider clarifying instances in which a prioritized CCC aligns with more than one CCSS.

Response: Other curricular documents display this relationship by establishing Instructional Families to ensure that teachers can teach all related academic skills in a coherent manner. NCSC provided professional development and created resources related to writing instruction. State partners were able to

present this curricular information in their respective states to promote student opportunity to develop literacy skills. In addition, publically available instructional resources are available on the NCSC WIKI which include all the CCCs and additional resources to support instruction of ELA/Writing.

Panelists rated them some of the writing prioritized CCCs as having “some” content and performance centrality with their target CCSS. NCSC could strengthen the degree of alignment in a few cases by making simple revisions to the text of the prioritized CCCs and documenting the reasons for differences in content, performance, and DOK.

Response: The alignment to a portion of the CCSS was intentional. As stated above, other NCSC curricular documents clarify this relationship by establishing Instructional Families to ensure that teachers can teach all related academic skills in a coherent manner.

- NCSC should consider documenting the reasons for the slightly lower CCC DOK level as compared to the CCSS DOK level.
  - *Response*: Regulatory language permits the AA-AAS to reduce the depth, breadth, and complexity of the covered content.

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Appendix A: Agenda

Tuesday, June 4, 2013

Time	Activity
8:00 to 8:30 am	Registration, breakfast, welcome, and introductions
8:30 to 10:00 am	Full group training
10:00 to 10:15 am	Break
10:15 am to 12:00 pm	Begin rating and calibration
12:00 to 1:00 pm	Lunch
1:00 to 3:00 pm	Continue rating
3:00 to 3:15 pm	Break
3:15 to 4:25 pm	Continue rating
4:30 pm	Wrap-up and dismiss

Wednesday, June 5 through Friday, June 7, 2013

Time	Activity
8:00 to 8:30 am	Breakfast
8:30 to 10:00 am	Continue rating
10:00 to 10:15 am	Break
10:15 am to 12:00 pm	Continue rating
12:00 to 1:00 pm	Lunch
1:00 to 3:00 pm	Continue rating
3:00 to 3:15 pm	Break
3:15 to 4:25 pm	Continue rating
4:30 pm	Wrap-up and dismiss

Appendix B: Ratings for Writing Prioritized Core Content Connectors

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Conte Central
3	3.WI.l3	Take brief notes (e.g., graphic organizers, notes, labeling, listing) from sources.	3.W.8	Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.	2	2	S
3	3.WI.p1	Include text features (e.g., numbers, labels, diagrams, charts, graphics) to enhance clarity and meaning.	3.W.2a	Introduce a topic and group related information together; include illustrations when useful to aiding comprehension.	2	2	S
3	3.WL.o1	Follow steps to complete a short research project (e.g., determine topic, locate information on a topic, organize information related to the topic, draft a permanent product).	3.W.4	With guidance and support from adults, produce writing in which the development and organization are appropriate to task and purpose.	3	2	S
4	4.WI.p1	Include formatting (e.g., headings, bulleted information), illustrations, and multimedia when useful to promote understanding.	4.W.2a	Introduce a topic clearly and group related information in paragraphs and sections; include formatting (e.g., headings), illustrations, and multimedia when useful to aiding comprehension.	2	2	S

4	4.WI.q1	Provide a concluding statement or section to support the information presented.	4.W.2e	Provide a concluding statement or section related to the information or explanation presented.	2	2	A
4	4.WL.o1	Produce a clear coherent permanent product (e.g., produce a story, select/generate responses to form paragraph or essay, create a visual display) that is appropriate to the specific task, purpose (e.g. to entertain), or audience.	4.W.4	Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.	2	3	S
5	5.WI.b3	Organize ideas, concepts, and information (using definition, classification, comparison/contrast, and cause/effect).	5.W.4	Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience. (Grade-specific expectations for writing types are defined in standards 1–3 above.)	2	2	S
5	5.WI.d1	Support a topic with relevant facts, definitions, concrete details, quotations, or other information and examples.	5.W.2b	Develop the topic with facts, definitions, concrete details, quotations, or other information and examples related to the topic.	2	2	S

5	5.WL.h1	Produce a clear coherent permanent product (e.g., select/generate responses to form paragraph or essay) that is appropriate to the specific task, purpose (e.g. to entertain), or audience.	5.W.4	Produce clear and coherent writing in which the development and organization are appropriate to task, purpose, and audience.	2	3	A
6	6.WI.h2	Produce a clear coherent permanent product (e.g. select/generate responses to form paragraph/essay) that is appropriate to the specific task (e.g., topic), purpose (e.g., to inform), or audience (e.g., reader).	6.W.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	2	2	S
6	6.WL.c1	Organize ideas and event so that they unfold naturally.	6.W.3a	Engage and orient the reader by establishing a context and introducing a narrator and/or characters; organize an event sequence that unfolds naturally and logically.	2	2	S
6	6.WL.c3	Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another.	6.W.3c	Use a variety of transition words, phrases, and clauses to convey sequence and signal shifts from one time frame or setting to another.	2	2	A

7	7.WI.o1	Produce a clear coherent permanent product (e.g. select/generate responses to form paragraph/essay) that is appropriate to the specific task (e.g., topic), purpose (e.g., to inform), or audience (reader).	7.W.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	2	2	S
7	7.WL.l1	Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events.	7.W.3d	Use precise words and phrases, relevant descriptive details, and sensory language to capture the action and convey experiences and events.	2	2	A
7	7.WL.o1	Provide a concluding statement or paragraph that follows from the narrated experiences or events.	7.W.3e	Provide a conclusion that follows from and reflects on the narrated experiences or events.	2	2	A
8	8.WI.o1	Produce a clear coherent permanent product (e.g. select/generate responses to form paragraph/essay) that is appropriate to the specific task (e.g., topic), purpose (e.g., to inform), or audience (e.g., reader).	8.W.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	2	2	S

8	8.WP.j1	Gather relevant information (e.g., highlight in text, quote or paraphrase from text or discussion) from print and/or digital sources.	8.W.8	Gather relevant information from multiple print and digital sources, using search terms effectively; assess the credibility and accuracy of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and following a standard format for citation.	2	3	S
8	8.WP.k2	Creates an organizational structure in which ideas are logically grouped to support the writer's claims.	8.W.1	Write arguments to support claims with clear reasons and relevant evidence.	2	2	S
11-12	1112.WI.b2	Create an organizational structure for writing that groups information logically (e.g., cause/effect, compare/contrast, descriptions and examples), to support paragraph focus.	11-12.W.2	Write informative/explanatory texts to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.	2	3	S

11-12	1112.WI.b4	Provide the facts, extended definitions, concrete details, quotations, or other information and examples that are most relevant to the focus and appropriate for the audience.	11-12.W.2b	Develop the topic thoroughly by selecting the most significant and relevant facts, extended definitions, concrete details, quotations, or other information and examples appropriate to the audience's knowledge of the topic.	2	3	A
11-12	1112.WP.f1	Produce a clear coherent permanent product (e.g., select/generate responses to form paragraphs or essay) that is appropriate to the specific task, purpose, or audience.	11-12.W.4	Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.	2	2	A

Appendix C: Ratings for Writing Rubric-Trait Core Content Connectors

Grade	CCC	CCC Text	CCSS	CCSS Text	CCC DOK	CCSS DOK	Conter Central
3	3.WL.j1	Set up the context for the story and introduce a narrator and/or characters.	3.W.3a	Establish a situation and introduce a narrator and/or characters; organize an event sequence that unfolds naturally.	3	3	S
3	3.WL.j2	Sequence events in writing that unfold naturally.	3.W.3a	Establish a situation and introduce a narrator and/or characters; organize an event sequence that unfolds naturally.	3	3	S
3	3.WL.k1	Use dialogue and descriptions of actions, thoughts, and feelings to develop a story.	3.W.3b	Use dialogue and descriptions of actions, thoughts, and feelings to develop experiences and events or show the response of characters to situations.	3	3	S
3	3.WL.l1	Use temporal words and phrases to signal event order.	3.W.3c	Use temporal words and phrases to signal event order.	1	3	A
3	3.WL.m1	Provide a concluding statement or paragraph that follows from the narrated experiences or events.	3.W.3d	Provide a sense of closure.	2	3	A
4	4.WL.j1	Orient the reader by setting up the context for the story and introducing a narrator and/or characters.	4.W.3a	Orient the reader by establishing a situation and introducing a narrator and/or characters; organize an event sequence that unfolds naturally.	3	3	S

4	4.WL.k1	Use dialogue and description to develop experiences and events or show the responses of characters to situations.	4.W.3b	Use dialogue and description to develop experiences and events or show the responses of characters to situations.	3	3	A
4	4.WL.k2	Use concrete words and phrases and sensory details to convey experiences and events.	4.W.3d	Use concrete words and phrases and sensory details to convey experiences and events precisely.	1	3	A
4	4.WL.m1	Provide a concluding statement or paragraph that follows from the narrated experiences or events.	4.W.3e	Provide a conclusion that follows from the narrated experiences or events.	2	3	A
5	5.WL.b1	Orient the reader by establishing a situation and introducing a narrator and/or characters.	5.W.3a	Orient the reader by establishing a situation and introducing a narrator and/or characters; organize an event sequence that unfolds naturally.	3	3	S
5	5.WL.c2	Use narrative techniques, such as dialogue, description, and pacing, to develop experiences and events or show the responses of characters to situations.	5.W.3b	Use narrative techniques, such as dialogue, description, and pacing, to develop experiences and events or show the responses of characters to situations.	3	3	A
5	5.WL.d1	Use concrete words and phrases and sensory details to convey experiences and events precisely.	5.W.3d	Use concrete words and phrases and sensory details to convey experiences and events precisely.	1	3	A

5	5.WL.g1	Provide a concluding statement or paragraph that follows from the narrated events.	5.W.3e	Provide a conclusion that follows from the narrated experiences or events.	2	3	A
6	6.WI.b2	Organize ideas, concepts, and information (e.g., using definition, classification, comparison/contrast, cause/effect).	6.W.2a	Introduce a topic; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.	2	3	S
6	6.WI.c1	Provide an introduction that includes context/background information to establish a central idea or focus about a topic.	6.W.2a	Introduce a topic; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.	2	3	S

6	6.WI.d1	Develop the topic (add additional information related to the topic) with relevant facts, definitions, concrete details, quotations, or other information and examples.	6.W.2b	Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.	2	3	A
6	6.WI.d2	Use precise language and domain-specific vocabulary to inform about or explain the topic.	6.W.2d	Use precise language and domain-specific vocabulary to inform about or explain the topic.	1	3	A
6	6.WI.g1	Provide a concluding statement or section that follows from and summarizes the information presented.	6.W.2f	Provide a concluding statement or section that follows from the information or explanation presented.	2	3	A
7	7.WI.j2	Organize ideas, concepts, and information (using definition, classification, comparison/contrast, and cause/effect).	7.W.2a	Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/ effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.	2	3	S

7	7.WI.j3	Introduce a topic clearly, previewing information to follow and summarizing stated focus.	7.W.2a	Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information, using strategies such as definition, classification, comparison/contrast, and cause/ effect; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.	2	3	S
7	7.WI.k1	Use transitional words, phrases, and clauses to connect ideas and to create cohesion within writing.	7.W.2c	Use appropriate transitions to create cohesion and clarify the relationships among ideas and concepts.	2	3	A
7	7.WI.l1	Use precise language and domain-specific vocabulary to inform about or explain the topic.	7.W.2d	Use precise language and domain-specific vocabulary to inform about or explain the topic.	1	3	A
7	7.WI.m1	Develop the topic (add additional information related to the topic) with relevant facts, definitions, concrete details, quotations, or other information and examples.	7.W.2b	Develop the topic with relevant facts, definitions, concrete details, quotations, or other information and examples.	2	3	A

7	7WI.n1	Provide a concluding statement or section that follows from and supports the information presented.	7.W.2f	Provide a concluding statement or section that follows from and supports the information or explanation presented.	2	3	A
8	8.WI.j2	Create an organizational structure for writing that groups information logically (e.g., cause/effect, compare/contrast, descriptions and examples), to support paragraph focus.	8.W.2	Write informative/explanatory texts to examine a topic and convey ideas, concepts, and information through the selection, organization, and analysis of relevant content.	2	3	S
8	8.WI.j3	Provide a clear introduction, previewing information to follow and summarizing stated focus.	8.W.2a	Introduce a topic clearly, previewing what is to follow; organize ideas, concepts, and information into broader categories; include formatting (e.g., headings), graphics (e.g., charts, tables), and multimedia when useful to aiding comprehension.	2	3	S
8	8.WI.k1	Use transitional words, phrases, and clauses to connect ideas and to create cohesion within writing.	8.W.2c	Use appropriate and varied transitions to create cohesion and clarify the relationships among ideas and concepts.	2	3	A

8	8.WI.l1	Use precise language and domain-specific vocabulary to inform about or explain the topic.	8.W.2d	Use precise language and domain-specific vocabulary to inform about or explain the topic.	1	3	A
8	8.WI.m1	Develop the topic (e.g., add additional information related to the topic) with relevant well chosen facts, definitions, concrete details, quotations, or other information and examples.	8.W.2b	Develop the topic with relevant, well-chosen facts, definitions, concrete details, quotations, or other information and examples.	2	3	A
8	8WI.n1	Provide a concluding statement or section that follows from and supports the information or explanation presented.	8.W.2f	Provide a concluding statement or section that follows from and supports the information or explanation presented.	2	3	A
11-12	1112.WP.b3	Introduce claim(s) for an argument that reflects knowledge of the topic.	11-12.W.1a	Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence.	2	2	S

11-12	1112.WP.b4	Use context or related text to establish the significance of the claim(s).	11-12.W.1a	Introduce precise, knowledgeable claim(s), establish the significance of the claim(s), distinguish the claim(s) from alternate or opposing claims, and create an organization that logically sequences claim(s), counterclaims, reasons, and evidence.	3	2	S
11-12	1112.WP.b6	Create a writing organizational structure (e.g., introduce claim(s), distinguish supporting and opposing claims and relevant evidence for each, provides conclusion) logically sequencing claim(s), counterclaims, reason, and evidence.	11-12.W.1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.	3	2	S
11-12	1112.WP.c1	Develop clear claim(s) with the most relevant evidence for a topic or text.	11-12.W.1b	Develop claim(s) and counterclaims fairly and thoroughly, supplying the most relevant evidence for each while pointing out the strengths and limitations of both in a manner that anticipates the audience's knowledge level, concerns, values, and possible biases.	2	2	S

11-12	1112.WP.c3	Use words, phrases, and clauses to clarify the relationship among claims, counterclaims, reasons, and evidence.	11-12.W.1b	Use words, phrases, and clauses as well as varied syntax to link the major sections of the text, create cohesion, and clarify the relationships between claim(s) and reasons, between reasons and evidence, and between claim(s) and counterclaims.	2	2	S
11-12	1112.WP.e1	Provide a concluding statement or section that supports the argument presented by stating the significance of the claim and/or presenting next steps related to the topic.	11-12.W.1e	Provide a concluding statement or section that follows from and supports the argument presented.	2	2	A