Links for Academic Learning: An Alignment Protocol for Alternate Assessments Based on Alternate Achievement Standards

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As partners in the National Alternate Assessment Center (NAAC), our work focuses on research on alignment of alternate assessments evaluated with alternate achievement standards. Although we do not conduct state alignment studies, we can provide a list of vendors who have been trained in the use of the LAL.

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Introduction

No Child Left Behind and other legislation emphasize the importance of measuring the academic achievement of all students, even those with the most significant cognitive disabilities. Students' academic test results are used to guide policy concerning student learning and assign sanctions or rewards for students and educators. If assessments are designed to measure students' knowledge and skills, both the assessment and student expectations, which are usually articulated in academic content standards, should be closely aligned

The purpose of this manual is to prepare professionals to conduct an alignment study using the *Links for Academic Learning* (LAL). LAL was developed to examine the alignment of academic content standards, extended standards (if applicable), professional development activities, instruction, achievement (or performance) standards and alternate assessments based on alternate achievement standards. Many of the alignment procedures and statistics are based on previously developed alignment methods, such as Webb (1997), Surveys of Enacted Curriculum (Porter & Smithson, 2001), and Achieve (Rothman, Slattery, Vranek, & Resnick, 2002). The alignment criteria used in these established alignment procedures are also used in LAL alignment method and include: (a) content centrality, (b) performance centrality, (c) categorical concurrence, (d) depth-of-knowledge consistency, (e) range-of-knowledge correspondents, (f) balance of representation, and (e) source of challenge. A modification of Surveys of Enacted Curriculum was developed as part of the LAL procedures to measure instructional practices of teachers and the enacted curriculum for students eligible for alternate assessments based on alternate achievement standards. In addition to these alignment statistics, additional criteria were designed based on the conceptual framework developed by Browder et al. (2007) in consultation with experts in the areas of special education, content experts, measurement, accountability systems, and school practitioners.

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Challenges of Aligning Alternate Assessments Based on Alternate Achievement Standards

The alignment of alternate assessments with standards and instruction presents more challenges than alignment of general education assessments. While there is a rich history on the importance of academic content for students in the general curriculum, teaching academic content to students with significant disabilities (SWSD) is a relatively new phenomenon. Academic expectations, both content and performance expectation, for SWSD continue to be developed, debated, and researched (see Browder et al., 2004).

Since academic expectations are the foundation and starting point for alternate assessments and the curriculum, the academic expectations for SWSD need to be based on theoretically sound principles; that the rationale behind their establishment be transparent; and that these expectations be valued by teachers, educational administrators, parents and students. Because of the limited theoretical and empirical bases for teaching academic content to SWSD (Browder, Spooner, Ahlgrim-Delzell, Harris, & Wakeman, in press; Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozzine, 2006; Courtade, Spooner, & Browder, in press), alignment between academic expectations for SWSD and expectations for the general education student population (i.e., states' grade level content standards) needs to be examined.

Alternate assessments for SWSD typically take the form of performance-based, portfolio, checklist and other alternate formats more so than traditional pencil and paper tests (Thompson, Johnstone, Thurlow & Altman, 2005). These alternate formats allow more flexibility than typically found in large-scale assessment programs. This flexibility allows additional options for capturing what SWSD know and can do. Given the nature of performance-based and portfolio testing formats, along with the diverse characteristics (e.g., physical, sensory, and intellectual challenges) of students with the most significant disabilities, alternate assessments usually have greater variation in academic content, administration procedures, and scoring procedures than those typically found with tests for students who take typical large-scale tests. This variation is found not only between the different alternate assessment systems, but variation can be found within a single assessment system.

Characteristics of Students with Significant Cognitive Disabilities

All states are required to create participation guidelines for alternate assessments based on alternate achievement standards that IEP teams use in determining student eligibility (U.S. Department of Education, 2005a). It is important to understand who is and is not eligible to participate in assessments that are not aligned to grade level achievement, as student participation in these assessments may preclude a student from earning a high school diploma. States have created diverse criteria in establishing these guidelines. Illinois (http://www.isbe.net/assessment/pdfs/43-53_iaa_partguide.pdf), for example, has two yes/no questions the IEP team asks regarding the content (alternate vs. grade level benchmarks) and instruction (degree of need for intensive incremental instruction). Kentucky (2006) bases most of its criteria on the IDEA definition of mental retardation; that is, significant subaverage general intellectual functioning, existing concurrently with deficits in adaptive behavior and manifested during the developmental period, that adversely affects a child's educational performance [U.S. Department of Education (2006, p. 46756); 300.8 (b)(2)(c)(6)].

Browder, Spooner, Wakeman, Trela, and Baker (2006) summarized research related to the academic content learning of student with significant cognitive disabilities. Collectively, the outcomes demonstrated that students with both moderate and severe intellectual disabilities can acquire academic content, although this content has been limited primarily to sight words and money to date. Effective instruction has been primarily systematic prompting and feedback with

repeated opportunities to master specific discrete or task analyzed skills in either community or classroom contexts.

One characteristic that helps to distinguish the uniqueness of students with significant cognitive disabilities is communication. Understanding how a student uses symbols to communicate and acquire academic knowledge may help states develop challenging achievement standards for this population, with links across grades or grade bands to allow continuous progress. Browder, Ahlgrim-Delzell, Courtade-Little, and Snell (2005) first described how consideration of students' level of symbolic communication could be used to identify teaching targets that link to the general curriculum. Building on this idea, Browder, Wakeman, and Flowers (2006) validated that teachers could classify their students based on three levels for academic planning: (a) awareness/presymbolic, (b) concrete symbolic, and (c) abstract symbolic. In promoting learning in the general curriculum, teachers will use printed words and pictures to build symbolic learning for students at all levels. In contrast, for students to "show what they know" in alternate assessments, some items should be achievable using gestures, objects, or highly concrete symbols as well as others that use greater abstractions.

Other characteristics that may vary for students considered in this population are sensory abilities, motor abilities, and health issues. Vision and hearing for students may range from no impairment to full impairment (i.e., blind, deaf, or blind and deaf). A motor impairment may extend from requiring minimal adaptations (e.g., modified pencils, adapted eating utensils) to requiring full personal assistance for all motor activities (e.g., wheelchair bound, positioning equipment, fed by someone else). Health issues can include any medical condition that interferes in student attendance and participation in school. If the student has any of these impairments, the impairment must occur in conjunction with a cognitive disability to be considered in this population.

Academic Expectations for Students with Significant Cognitive Disabilities

All assessments need to start with a rich description of the domain being assessed. This domain needs to be well-defined with observable behaviors and logical relationships to other constructs within the theoretical system (Crocker & Algina, 1986). Academic content standards describe what all students should know and be able to do and are a policy decision that is informed by purpose, values, and context (Gong, 2007). Some states' academic content standards and expectations of students are not accessible for students with significant disabilities. Some states have prioritized their academic content standards (e.g., extended standards or targeted skills) to operationalize how students with significant disabilities access grade-level academic content standards. For example, South Dakota has adapted content standards for language arts, reading, math, and science (http://doe.sd.gov/contentstandards/alternatestandards/index.asp).

Not only have some states' academic standards been prioritized to allow general curriculum access, but there may also be a reduction in the depth, breadth, and complexity of academic standards. Methods of teaching SWSD suggest that this population of students need systematic, direct instruction over extended periods of time to achieve mastery of skills (Browder, Wakeman, Spooner, et al., 2006). In consideration of the needs of SWSD, most states

limit the scope and depth of the academic content areas typically assessed for the general student population by prioritizing the academic domains to be assessed for SWSD.

Any prioritization of states' academic content standards for SWSD needs to ensure that the original academic domain is preserved. This process requires an examination of both the *content and performance expectations* of SWSD. Both academic content and the performance level required to master the content are contained in expectations for this population. These expectations are usually expressed in extended standards and/or test specifications to the original grade level academic standards. This process typically involves policy decisions guided by stakeholders' input resulting in unique expectations across the states.

Alternate Assessments

In the past, students with moderate and severe disabilities were often exempted from large-scale assessments. In the mid-1990s the National Center for Education Outcomes (NCEO) drew attention to this practice, noting that students not included in accountability systems could easily be bypassed in efforts to measure educational progress (Erickson, Thurlow, & Thor, 1995). Since the passage of the 1997 amendments of the Individuals with Disabilities Education Act (IDEA), inclusion of all students with disabilities in accountability systems has been mandatory.

The term "alternate assessment" was coined to refer to assessments administered to students who could not participate in general education testing programs, even with accommodations. There have been three types of alternate assessments: those based on grade-level achievement standards (GLAS), those based on alternate achievement standards (AAS), and those based on modified achievement standards (MAS).

Alternate assessments assess the same grade-level *content* standards, but differ in expectations for achievement. Alternate assessments based on GLAS assess grade level content at the same achievement level as that addressed by the general assessment. The assessment procedures may be different from the regular assessment but proficiency on these alternate assessments must be equivalent to proficient performance on the regular assessment for the same grade. Alternate assessments based on MAS are designed to be "aligned with grade-level content standards, but are modified in such a manner that they reflect reduced breadth or depth of grade-level content" (U.S. Department of Education, 2005b, p. 74625).

Alternate assessments based on AAS (AA-AAS) are designed for students with the most significant cognitive disabilities. According to federal regulations [NCLB, 2002, 34 C.F.R. § 200.1(d)], these assessments must be aligned to academic content standards, promote access to the general curriculum, and reflect the highest achievement standards possible, but differ in complexity from grade level achievement standards through a narrower range of the content and a reflection of a different set of expectations. Alternate achievement standards should represent a consensus among experienced teachers, parents, and other appropriate individuals regarding the performance expected of SWSD who participate in a challenging instructional program. Alternate achievement standards must be defined in a way that supports individual growth

through a linkage to different content across grades. This link across grade levels or grade bands is referred to as *progress alignment* or *vertical relationship*.

Links for Academic Learning

Links for Academic Learning (LAL) is an alignment methodology designed for AA-AAS. The LAL model goes beyond the examining the degree of match between standards and assessments to consider other criteria relevant for students with significant cognitive disabilities (SWSD). Some alternate assessments allow the teacher to select the academic content, design the assessment items/tasks, and administer the assessment; that is, the assessments vary for all students depending on the individual needs of the student. When content varies by teacher, it is not feasible to conduct an alignment study for every alternate assessment but it is possible to describe the degree of match between the alternate assessment system and the academic content standards.

Other alignment models have been applied to AA-AAS in both research and practice (Achieve, 2000, 2002; Almond & Bechard, 2005; Roach, Elliott, & Webb, 2005; Tindal, 2006). NAAC convened an alignment panel to review these applications. This panel concluded that earlier methods were incomplete due to both the unique characteristics of the AA-AAS and the student population. The LAL was developed to respond to this need. Applying the LAL requires a) understanding criteria developed from a conceptual foundation, b) reviewing the measures of these criteria, c) implementing data collection methods that apply these measures to a state's unique standards and AA-AAS, and d) reporting alignment results based on the LAL criteria.

Conceptual Foundation for the Criteria for Linking to Grade Level Academic Content

Logical and empirical evidence are important to document the extent to which alternate assessment reflect the process or skills that are specified by the domain definition (AERA, APA, & NCME, 1999). As described in non-regulatory guidance related to alternate achievement standards (U.S. Department of Education, 2005b), there should be a clear *link* to the grade level content standards in which the student is enrolled. The non-regulatory guidance also clarifies that "prerequisite or enabling skills" that can be linked to skills need to be proficient in grade level content are acceptable. While these skills may be acceptable for inclusion, they may be problematic for alignment purposes unless they are derived directly from the grade level standard. When derived from other resources (e.g., early childhood expectations), they may not link to an academic content standard. Second, their continued use in demonstrating student knowledge may perpetuate a lack of differentiation or vertical growth in the content between grade levels.

While the requirement of linking to grade level content standards gives states flexibility to determine the content of alternate assessments, it does not exempt states from designing assessments that measure an academic domain with interpretable results and accurately reflecting what the student knows and can do (e.g., appropriate inferences being made from the assessment outcomes). For this reason, criteria for judging alignment between expectations, alternate

assessments, and instructional practices and resources should be as strenuous as those used for the assessment of students in the general population. Because of the unique characteristics of SWSD, testing formats, instructional practices, and opportunity for alternate achievement standards, additional alignment criteria need to be considered for alternate assessments. For example, Peer Review Notes from the U. S. Department of Education (2005) clearly delineate that states must provide documentation of the alignment of all assessments (including alternate assessments) and the State's academic content and achievement standards (p. 18). As these assessments vary across states on multiple issues (e.g., format, level of standardization, participation requirements, included content standards, etc.), alignment methodologies must be sensitive to both the flexibility given to states to capture the understanding of students with significant disabilities and the technical requirements of the assessment.

Browder et al. (2007) suggested several criteria for linking to grade level academic content standards. These criteria were validated with experts in the fields of measurement and special education as well as state stakeholders. As a result, the criteria were refined with clarified language to accurately reflect the alignment information states need for technical adequacy along with additional information regarding the alignment of instruction to the academic content standards. Based on the validation of the LAL, eight alignment criteria (see Table 1) are used to guide the alignment process. Elaborated descriptions of each criterion are described in the remainder of this section.

To be linked to grade level standards, 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. Functional activities and materials may be used to promote understanding, but the target skills for student achievement are academically focused. Some prioritization of the content will occur in setting this expectation, but it 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. The content will differ from grade level in range, balance, and depth of knowledge, but the expected achievement is for students to demonstrate learning of grade referenced academic content. Some differentiation in content across grade levels or bands should be evident in the standards and assessment. Issues of sources of challenge present in the assessment should be minimized or resolved prior to implementation. Finally, the alignment between the instructional program including professional development and the academic content standards should be evident.

Table 1: Criteria for Instruction and Assessment that Links to Grade Level Content

1. The content is academic and includes the major domains/strands of the content area as reflected in state and national standards (e.g., reading, math, science).
2. The content is referenced to the student's assigned grade level (based on chronological age).
3. The focus of achievement maintains fidelity with the content of the original grade level standards (content centrality) and when possible, the specified performance.
4. The content differs from grade level in range, balance, and DOK, but matches high expectations set for students with significant cognitive disabilities.
5. There is some differentiation in content across grade levels or grade bands.
6. The expected achievement for students is for the students to show learning of grade referenced academic content.
7. The potential barriers to demonstrating what students know and can do are minimized in the assessment.
8. The instructional program promotes learning in the general curriculum.

Criterion 1: The Content is Academic

The core domain of academic content of AA-AAS is not assumed, but instead evaluated as a first step in the process. As described earlier, academic content has been underrepresented in past instruction and research with SWSD. Sometimes the translation of content standards produces targets that are not "really" language arts, mathematics, or science. LAL uses guidance from the national curricular professional societies (i.e., National Council of Teachers of English [NCTE], the National Council of Teacher of Mathematics [NCTM], and the National Research Council) to define what is "academic." To be inclusive of students with the most significant disabilities, states sometimes target foundational skills. Foundational skills are those skills which are the assumed competence at all grade levels specific to an academic context (e.g., not simply sitting in a chair). They are commonly embedded in academic instruction (e.g., orienting a book, turning a page). The philosophy of the LAL is that foundational skills *are important and appropriate* to capture early academic achievement, but these skills are *not* aligned because they are outside the academic domain described in national curricular professional societies. Most extended standards and assessment tasks/items should be academic, but not necessarily 100% given the need to include foundational skills to capture early learning. It also would be questionable to assess proficiency based on achievement of foundational skills alone. Extended standards and AA tasks/items that are rated *not academic* are not included in the alignment study.

Criterion 2: Referenced by Grade Level

Because students with significant cognitive disabilities have often been served in ungraded classes, thinking about content by grade level can be new for some educators. The LAL provides feedback on the extent to which the states intend for any extended standards and

the AA tasks/items to be referenced to specific grade levels or grade bands. No judgment is made about whether they actually do align at the second step.

Criterion 3: Fidelity with Grade Level Content and Performance

Extending content and defining performance for the heterogeneous population of students who participate in AA-AAS is challenging and can produce targets for learning that "miss the mark." NAAC has provided examples on it's website to consider "Is it plumb or is it square?" (www.naacpartners.org). In the LAL, when a state uses extended standards these are compared to the state standard for content and performance centrality. If the extended standards are aligned to the grade level standards, the AA items are then aligned with these extended standards. If they do not align or the state does not use the extended standards, the AA items/tasks are aligned with the state standards. Content centrality (from the Achieve model) is rated using a three-point scale (i.e., near, far, none) in which the expert rates the quality of the link between the extended standard and the grade level standard. Content reviewers examine each extended standard (if applicable) and each AA item/task and evaluate if the subject-area content is a near, far, or no link as described in the corresponding grade level standards. For example, an extended standard of *Identify weather conditions* may have no link to the grade level content standard *Analyze and identify types of clouds*. An extended standard of *Identify clouds* may be considered a far link because even though it is dealing with clouds, it still does not address the total domain of the original standard which is types of clouds. A near link for an extended standard would be *Identify cumulous and not cumulous clouds*.

While the content fidelity should remain high (i.e., either a near or far match), alternate achievement standards allow for an alternate level of performance (i.e., not grade level performance) of the standards. Performance centrality is the degree of match between the types of performance (e.g., select, identify, compare, analyze, and evaluation) described in the extended standards and AA items/tasks and the types of performance found in the grade level content standards. Therefore an extended standard of "identify" would have some of the same performance as "analyze and identify", which would be acceptable. Performance centrality is rated on a three-point rating scale (all, some, or none).

In the conceptual foundation of the LAL, the goal is for close to 100% match (near or far) on content centrality. In contrast, the performance centrality match may be lower due to the difficulty of creating ways for students who do not yet have fluent use of printed symbols (e.g., words, pictures) to show achievement. For example, if the content standard is "*Compare and contrast genres of literature*," a student who does not recognize printed words can show achievement related to the content (e.g., experiences with genres of literature like poetry, plays, stories), but may have few options to compare and contrast. S/he may identify the type of genre, for example. Whenever possible, a performance match is the goal. How far below 100% performance centrality requires some professional judgment about whether enough attention has been given to the use of assistive technology and symbol options for more students to show what they know.

Note: Content and performance centrality are only considered for items that are academic. An item can be academic, but not have content centrality for several reasons. It may

be *mismatched* to the wrong grade level standard (e.g., clerical error). Sometimes the target item has been overstretched or "watered down" so that the link is lost. Sometimes due to *backmapping* or *retrofitting* the content is the functional activity. The use of functional activities in AA-AAS should be encouraged, but the test is whether the response the student is learning to make shows academic learning.

Criterion 4: The Content Differs in Range, Balance, and Depth of Knowledge (DOK)

While the first three criteria focus on item to standard match, criterion 4 examines the extended standard to grade level standard and the AA to grade level standard match. Criterion 4 most closely resembles the work of Webb (1997). Measures of categorical concurrence, range-of-knowledge, balance of representation, and depth of knowledge (DOK) are included in criterion 4. The range and balance should match the state's priorities with consideration given to some coverage in all major strands of academic content. The LAL is based on the assumption that the DOK between the AA and any extended standards should match, but the DOK of the AA and extended standards should be skewed to lower levels than the state standards. This is a key difference between grade level achievement and alternate achievement. To establish these DOK levels the researchers examined Bloom and Marzano's work on learning taxonomies. As Marzano's work focused more on higher thinking skills that may not be as applicable to this population, Bloom's taxonomy tended to be a better fit. Still, Bloom's taxonomy required modification; the scale was extended downward to incorporate a level that captures the response processes for students with the most significant cognitive disabilities. The final, six-level taxonomy is included in Appendix A. Other taxonomies may be considered for determining DOK (e.g., Webb's levels for DOK, Tindal, Tyler).

Webb (1997) provides acceptable values for the alignment indices of categorical concurrence, range-of-knowledge, balance of representation, and depth of knowledge (DOK). AAs are not expected to meet the same degree of alignment found in the general education assessments. The alignment indices should agree with the decisions states made and the rationale provided for reducing the scope and depth of the grade level content standards. The alignment experts should be aware of current research being conducted on students with significant disabilities acquisition of academic knowledge and skills and question omission of content areas. Furthermore, evaluation of the acceptable level of DOK should be based on whether the AA has a span of DOK that is appropriate and challenging for students with significant cognitive disabilities.

Criterion 5: Differentiation across Grade Levels or Grade Bands

While criterion 2 captures the AA's reference to the grade level standard, it also is important to consider whether the actual AA tasks show changing expectations over time and are age appropriate. For example, students may learn to recognize and use coins in elementary school, but there should be some change in expectation by middle and secondary levels (e.g., using dollars, recognizing prices). Extending standards for access with students with significant cognitive disabilities should not lead to achievement of the same academic skills year after year. Webb (2005) describes five types of vertical relationships: (a) *broader*—higher-grade standards reflect broader application of target skill or knowledge; (b) *deeper*—higher-grade standard reflect

deeper mastery of the target skill or knowledge; (c) *prerequisite*--lower-grade standards reflects a different by prerequisite skill for mastery of the higher grade standard; (d) *new*—the higher-grade is a new skill or knowledge unrelated to skills or knowledge covered at prior grades; and (e) *identical*—higher-grade standard appear identical to one of the lower-grade standards. To show vertical alignment, items would reflect primarily the first four types of vertical relationships and the fifth, identical items across grades, would be minimized. The LAL provides a description of the type of relationship between standards and AA items.

Criterion 6: Expected Achievement of Students is Grade Referenced Academic Content

States' alternate achievement standards must link to grade level content. The LAL assumes that what is actually counted toward a score that will be classified as "proficient" should be clearly linked to academic content. Inferences about student learning are more difficult to make when these scores incorporate aspects of teachers or program performance. The strongest inference can be made that the student learned the content if: a) there is evidence the student did not already have the skill (e.g., through use of pretest, baseline or previous year's learning), b) the skill is performed without teacher prompting, and c) the skill is performed across materials/lessons to show mastery of the concept versus rote memory of one specific response. Typically the criteria or rubric used to score each student response and the overall assessment provide information on what "counts" for proficiency.

Criterion 7: Barriers to Performance

Because of complex disabilities that students with significant cognitive disabilities sometimes have, it can be difficult to demonstrate achievement. This may be especially true if the only means to show learning is through symbolic representation like words and pictures. Some students may need to show learning in a meaningful context using everyday objects. Consideration also needs to be given to know how students with sensory and physical challenges can both access the assessment materials and show learning. LAL examines whether the AA items/tasks are difficult because of the knowledge and skills they target or for other reasons not related to the item/task content, such as sensory and physical challenges. This criterion considers whether the student performance accurately reflect the intended content standard rather than the disability.

Criterion 8: Instructional Program Promotes Learning in the General Curriculum

The LAL model of alignment gives consideration to the alignment of instruction to content standards. This is especially important given the conceptual shift many educators must make to teach this population content that links to state standards. In the LAL, consideration is given to the content teachers are addressing through the use of the *Curriculum Indicator Survey* (CIS; see Appendix B for examples) and to the extent that the professional development materials reflect the eight criteria for alignment and program quality indicators for this population.

The CIS is based on the work of Porter and Smithson (2001) and collects information about academic content taught, intensity of instruction by content area, and other instructional

practices. The CIS is a five-part survey. Part 1 asks for background information on the teacher (e.g., educational experience, characteristics of case load, instructional influences). In Part 2, teachers provide information about the types of students on their case load, based on students' levels of symbolic communication. They are then asked to select a single student on their case load who will serve as the "target student" for the remaining three parts of the survey. Parts 3-5 measure the English language arts, math, and science curriculum being taught to the target student during the current academic year. States can select the form of the survey (e.g., long with fine grain descriptors under each topic strand or short with descriptions of each topic strand), the method to use to collect the data (e.g., electronic versus paper), and the number of teachers to participate.

The content standards addressed in the CIS were developed using the national standards from NCTE, NCTM, and the National Research Council as the foundation. The specific content standards and performance indicators were developed using model curriculum frameworks from Massachusetts (http://www.doe.mass.edu/mcas/alt/resources.html) and the consensus frameworks and expanded benchmarks of The Colorado Enhanced Assessment Grant (http://www.cde.state.co.us/cdesped/EAG.asp#Prod). Topics in the CIS are linked to each state's unique content standards at the state's strand level. All surveys were reviewed by content specialists for adequate content coverage at the coarse and fine grain levels and by an SEC expert for construction, clarity, and content. The CIS was also piloted with special education teachers. A series of validation studies on the CIS is in progress and will be completed by December 2007.

For Criterion 8, consideration is also given to whether professional development materials link to state standards and promote overall program quality. A modified version of the eight criteria for alignment is considered in reviewing teacher training materials (e.g., are examples given to teachers that are academic and clearly linked to grade level standards?). Consideration is also given to whether program quality indicators are emphasized in the professional training (e.g., use of assistive technology, promotion of self-determination).

Development and Evaluation of the Alignment Criteria

The development of the LAL occurred in a three-step process. First, through the National Alternate Assessment Center a panel of alignment experts was convened to review alignment of AA-AAS. After a review of current alignment procedures, consensus was reached that a new method was needed to address the challenges. Next, the criteria or "values" for the alignment was derived from current federal policy and related needs of the population by a team of special educators, measurement experts, and general education experts (Browder, Wakeman, et al., 2007).

Once these criteria were developed and defined, five measurement experts, five special education experts, and 20 state directors of AA-AAS were asked to review two manuscripts that described the alignment criteria and review an alignment report demonstrating how the alignment criteria were applied to a state's AA-AAS. All reviewers completed a survey and participated in a focus group (phone call or face-to-face meeting) that examined the importance of the each criteria and recommend changes in the criteria. Generally, most of the criteria were rated by experts as being important to provide evidence of the degree of alignment of alternate

assessment systems, ranging from 2.5 (criterion 1 by measurement experts) to 5.0 on a 5-point Likert-type scale (1=not important to 5=extremely important). The reason for the lower rating (2.5) on criterion 1 was states are not required to be aligned to national standards but states are required to align to the state's grade level content standards. The criterion was retained with the understanding that the alignment report should clearly indicate that being aligned to national standards is not required. Experts expressed some concerns about criterion 8 (the instructional program promotes learning in the general curriculum). While this criterion is important for fairness and opportunity to learn, some reviewers did not believe it should be included in an alignment study. Since the LAL was designed as a comprehensive view of alignment and instruction is a key component in many alternate assessments, this criterion would be included but states may have an option of not including this criterion for peer review.

After revisions to the alignment criteria based on the expert review, the criteria were rearranged into a clearer sequence and some of the criteria were changed. The new eight criteria were tested by conducting three states' alignment studies (Flowers, Browder, Wakeman, & Karvonen, 2007a, 2007b, 2007c).

Measurement of the Criteria

Traditional alignment procedures focus on the degree of overlap among academic content standards and assessments (e.g., Webb, Achieve, SEC), and the enacted curriculum (i.e., SEC). LAL examines the academic focus and additional dimensions, which include equality and fairness, pedagogical implications, differentiation across grades, and alignment to achievement standards. Many states have developed extended standards or prioritized grade level standards that articulate the targeted academic domain for students with significant cognitive disabilities. This requires examining the alignment of an additional educational component that are is not traditional examined in the general education assessments. Examining the alignment between grade level standards and these prioritized standards should be examined and described in the alignment processes. Another example of an additional education component to examine for alignment is teacher professional development. Some alternate assessments require the teachers to select the targeted standards and skills and design the alternate assessment activities that measure the targeted standard. Examining the alignment between professional development and other educational elements becomes essential in light of involvement of teachers. An illustration of the educational elements that are considered in the LAL alignment process is displayed in Figure 1.

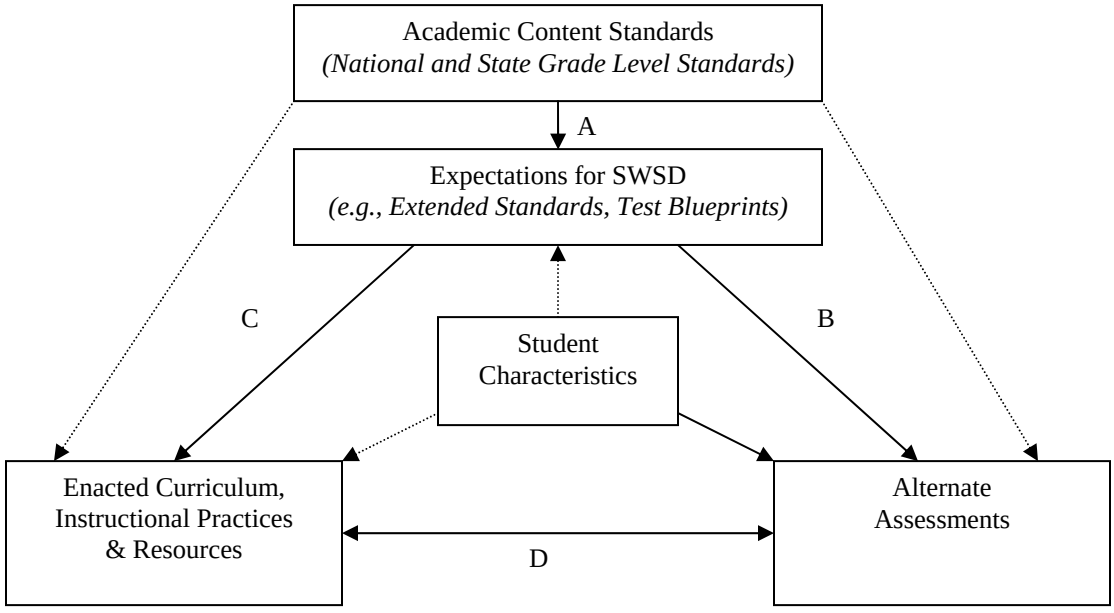


Figure 1. Educational components included in an alignment study.

Statistics describing the overlap among elements of the educational system usually include a description of item content, assessment content coverage, and depth of knowledge (e.g., Webb, SEC, and Achieve). The product of the alignment analysis is a set of statistics that describes the degree of intersection, or alignment, between the content embedded in state content standards, content in state assessments, and content in instruction. When alternate assessments

are designed by the student's teacher and the content and standards vary for students, the alignment results do not provide summary information about the content coverage of a single alternate assessment but information about the alternate assessment system. When AA-AAS have common items/tasks the statistics reported are similar to those used for general education assessments.

Both quantitative and qualitative data are used to evaluate the degree of alignment between the alternate assessments and grade level content standards. The following sections outlines what information is rated and by whom; what forms are used and how ratings are done; and what kinds of results are reported. Variations may need to be considered in light of states' unique assessment systems are also provided. A summary of this information is provided in Appendix C.

CRITERION 1: The content is academic and includes the major domains/strands of the content area as reflected in state and national standards (e.g., ELA, math, science).

What is rated: Extended standards (if applicable), AA items

Rated by: Content experts (Special educators may review nonacademic items)

Forms: D.2, D.3 (Appendix D)

The first criterion requires the content experts to determine if the component(s) (i.e., extended standard [if applicable] and assessment item) is academic. Extended standards and assessment items that are not academic are not included in any further analyses. In order to be rated nonacademic, content experts must agree (either by identical, independent ratings or by consensus after different ratings) that the item was indeed nonacademic.

To make these decisions, reviewers are asked whether the item can be logically defined by a national standard for that content area. National standards are defined according to the national content organizations (National Council of Teachers of English, National Council of Teachers of Math, National Research Council). A description of these standards is provided in Appendix A. If the standard or assessment item can be labeled according to a strand within the national standards, the reviewer codes it as academic and lists the primary and secondary national standard link.

Some skills may be foundational skills or those skills which are an assumed competence across all grade levels specific to an academic context such as turning the pages of a book. While these skills are not academic skills (i.e., cannot be defined by a national strand), they may be appropriate for some students with significant cognitive disabilities.

Special educators review the extended standards and AA items/tasks that were rated by content experts as nonacademic to identify those standards or items that may be foundational skills. Extended standards and AA items that are rated nonacademic are excluded from any further analyses, although descriptive summaries of the classification of nonacademic items (i.e., foundational) are provided to the state for formative purposes.

Results Reported:

(1) The number and percentage of extended standards and AA items rated as nonacademic, academic, or foundational skills.
(2) The number and percentage of extended standards and AA items identified according to each strand within the national standards.
(3) List of the extended standards and AA items/tasks that were rated as not academic.

Example of Reporting Results

Below is a table reporting the number and percentage of AA items/tasks that were rated as non-academic. The exact items rated as non-academic should be reported to the state. If a sample of student evidence has been coded (e.g., portfolios), confidence intervals should be placed around the percentages (as shown in the table below).

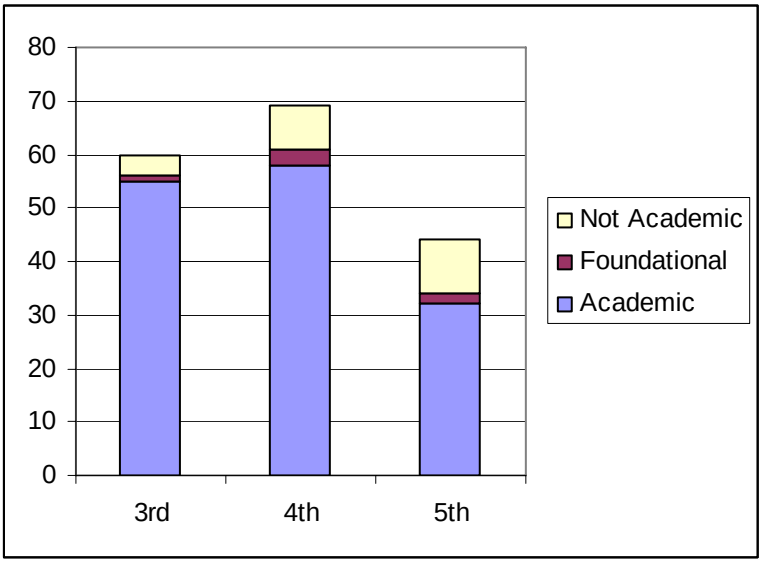
Example of Reporting Statistics for Criterion 1

Table for Academic ratings of AA items, elementary grades math

	3rd		4th		5th	
	N	*%*	*N*	*%*	*N*	*%*
Not Academic	4	6.7	8	11.6	10	22.7
Foundational	1	1.7	3	4.3	2	4.5
Academic	55	91.7	58	84.1	32	72.7
Academic CI (95%)						
Lower CI		85.0		76.9		62.5
Upper CI		95.8		89.4		81.1

Note. These results are based on a sample of portfolios

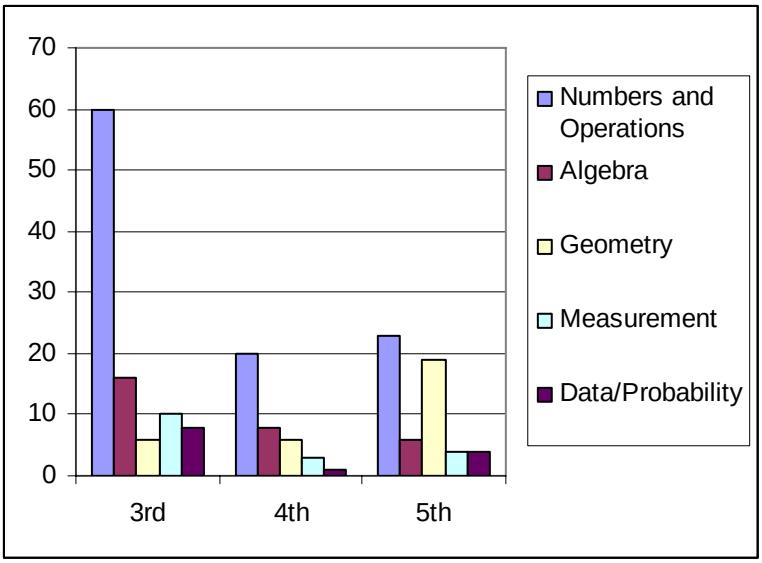
Figure for Academic ratings of AA items, elementary grades math



Next, the alignment of the extended standards and AA items/tasks to national standards, in this case the National Council of Teachers of Math, are reported. This information is reported for descriptive purposes only and is not used to evaluate the alignment of AAs to grade level standards. States may use this information to compare the distribution of ratings against a test blueprint.

Table for ratings of extended standards by national strand, elementary grades math

	3rd		4th		5th	
	N	*%*	*N*	*%*	*N*	*%*
Numbers and Operations	30	60.0	20	52.6	23	41.1
Algebra	8	16.0	8	21.1	6	10.7
Geometry	3	6.0	6	15.8	19	33.9
Measurement	5	10.0	3	7.9	4	7.1
Data/Probability	4	8.0	1	2.6	4	7.1



Evaluative Judgment:

(1) Most items/tasks (over 90%) should be rated academic.

(2) Items rated nonacademic should be foundational and provide access to the general curriculum.

Special considerations:

(1) Standards and items that are rated as nonacademic, including foundational skills, are eliminated from all further analysis.

(2) When statistics are based on a sample of student evidence or AA items, confidence intervals should be provided to the estimated percentages.

(3) A list of standards and/or assessment items that were rated as nonacademic should be provided to the state for their use in future assessment development and revision. Special education experts provide feedback to explain the reasons for the ratings.

CRITERION 2: The content is referenced to the student's assigned grade level (based on chronological age).

What is rated: Extended standards (if applicable), AA items

Rated by: Alignment leader

Forms: None; information taken directly from state's documents and used to develop alignment forms

Criterion 2 provides a description of the state's intended emphasis on grade level content standards. In other words, criterion 2 results reflect the state's purposeful choices in defining the prioritization of content standards and AA items. Identifying extended standards and AA items as "referenced" to grade level means that the components are organized or labeled by grade level and the term is not intended to imply alignment. The outcome of this step in the alignment is a reverse engineered test blueprint that includes the frequency distribution of AA items/extended standards by content standard and grade.

Results Reported: The number and percentage of extended standards and AA items referenced to grade level content standards, by grade or grade band.

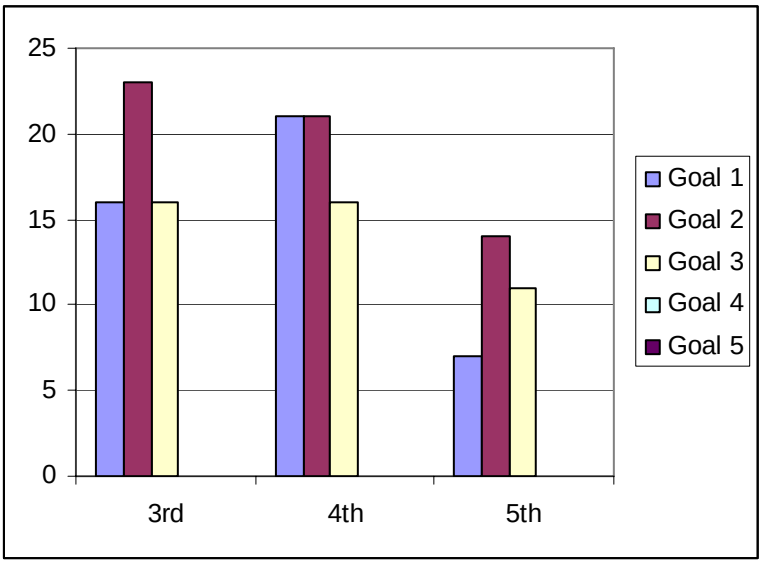
Example of Reporting Results

The following results indicate that the state intentionally omitted two ELA content standards and focused on the first three state ELA standards. Theoretical and practical rationale, as well as policies for omission of standards should be documented.

Table for number and percent of items referenced to strands within grade level content standards

	Content Goal (State's ELA Content Standards)	3rd		4th		5th	
		N	*%*	*N*	*%*	*N*	*%*
1	The learner will develop and apply enabling strategies and skills to read and write.	16	29.1	21	36.2	7	21.9
2	The learning will develop and apply strategies and skills to comprehend text that is read, heard, and viewed.	23	41.8	21	36.2	14	43.8
3	The learner will make connections through the use of oral language, written language, and media and technology.	16	29.1	16	27.6	11	34.4
4	The learner will apply strategies and skills to create oral, written and visual texts.	0	.0	0	.0	0	.0
5	The learner will apply grammar and language conventions to communicate effectively.	0	.0	0	.0	0	.0

Figure for number and percent of items referenced to strands within grade level content standards



Evaluative Judgment: When substantial gaps are noted in the content standards and grade levels to which the components are intentionally organized, narrative statements about those gaps are included in the report. Recommendations about the gaps may also be made and the rationale that the state provides for the gaps should be considered.

Special considerations: (1) Test blueprints or other documentation (e.g., item banks) may be source documents for this criterion.

(2) For AA-AAS that vary by student, the number and percentage of referenced standards, as reported by the teacher, are reported with a 95% confidence interval.

(3) Statistics will typically be reported at the strand level (coarse grain size), although the structure of some states' systems may lend themselves to finer grain size analysis.

(4) Statistics may be reported by grade band rather than grade level, depending upon the state's system.

(5) Theoretical and practical rationale, as well as policies for omission of standards should be documented.

(6) Where gaps in content coverage exist, narrative statements and recommendations are reported along with statistics.

CRITERION 3: The focus of achievement maintains fidelity with the content of the original grade level standards (content centrality) and when possible, the specified performance.

What is rated: Extended standards (if applicable), AA items

Rated by: Content experts (special education experts follow up on selected items)

Forms: D.2, D.3 (Appendix D)

Content and performance centrality, measures based on the Achieve alignment procedure, are evaluated for both extended standards and AA items. If the state's system does not include extended standards or only provides the intended link to the extended standards, content and performance centrality of the AA items are judged based on the degree of match with grade level content standards. Content experts rate content centrality on a three-point scale measuring the degree of "link" (no, far, near) between the focal and reference components (i.e., extended standards to grade level standards, AA items to extended standards).

Experts are trained using multiple examples to help create rules regarding the definitions of what constitutes each type of rating. For example, experts decided that since many grade level standards and extended standards addressed multiple content issues (e.g., identify and describe characters and their actions, problems/solution present, setting (time and place) and the sequence of events), a rule of 50% or more of the content had to be present in the linked item for a near link rating. If 49% or less was present, than a far link rating was appropriate. Finally, if 0% of the content was present, a no link rating was given.

Performance centrality concerns the level of expected performance of the standards. Ratings are made on a 3-point scale (none, some, all) based on the degree of match between the focal and reference components. For example, an extended standard of "identify" would have some of the same performance as "analyze and identify."

Distributions of ratings for the extended standards and AA items based on content and performance centrality are reported in tables. If the ratings for this criterion were based on a random sample of extended standards, portfolios, or performance items, confidence intervals should be reported for the "no link" and "none" percentages.

A list of extended standards and AA items that were rated "no link" or "none" should be provided to the state. Content experts review the "no link" and "none" items to determine whether the ratings were due to an overstretched skill, a mismatch to the standard, or a backmapped skill. (See the "Conceptual Foundation" section for definitions of these terms.) Items rated as "no link" (no content centrality) are omitted from further analysis.

Results Reported: (1) The distribution of ratings of extended standards based on content and performance centrality

(2) The distribution of ratings of AA items based on content and performance centrality

(3) The distribution of ratings of AA items in each category of age/grade appropriateness, by academic subject

(4) Reporting items that were rated no link and provide reason for no link (e.g., overstretch, mismatch, or backmapping)

Example of Reporting Results

Percent of items rated in content centrality categories by grade

Content Centrality	3rd	4th	5th
No Link	10.9	10.3	0.0
Far Link	14.5	22.4	15.6
Near Link	74.5	67.2	84.4
CI (95%) for No Link			
Lower CI	5.7	5.0	NA
Upper CI	16.7	14.7	NA
N	55	58	32

Percent of items rated in content centrality categories by grade

Performance Centrality	3rd	4th	5th
None	10.9	10.3	0.0
Some	20.0	22.4	15.6
All	69.1	67.2	84.4
CI (95%) for None			
Lower CI	5.7	5.0	NA
Upper CI	16.7	14.7	NA
N	55	58	32

Evaluative Judgment:

(1) Most items (over 90%) should be rated as having far or near links to the standards for content centrality. Recall that nonacademic items are not included in this rating and some nonacademic items are acceptable.

(2) Most items (over 90%) should be rated as having some or all of the performance level found in the standards. In referring items with no match to the performance level of state standards, recommend that assistive technology be considered to improve options for students to have the same *type* of performance, even if not at the same *level. Or,* states may consider whether to retain

certain items with no performance match specifically to be inclusive of students who lack symbolic communication skills.

Special considerations:

(1) AA item centrality ratings are made directly to grade level content standards if the state does not have extended standards

(2) If ratings were based on a random sample of items or evidence, confidence intervals should be reported for the "none" and "no link" items.

(3) Items rated with "no link" (no content centrality) are omitted from analysis in subsequent criteria, but are content analyzed to determine the type of problem that led to the rating.

(4) Provide a list of extended standards and AA items/tasks that were rated has having no content and no performance link.

CRITERION 4: The content differs from grade level in range, balance, and DOK, but matches high expectations set for students with significant cognitive disabilities.

What is rated: Extended standards (if applicable), AA items

Rated by: Content experts

Forms: D.1, D.2, D.3 (Appendix D)

Alignment indices for criterion 4 are based on Webb's alignment method (Webb, 1997). Outcomes from these analyses are interpreted both in terms of the relationship of the components (extended standards and AA items) to the full range of grade level content standards, and also to the range intended by the state (identified in Criterion 2).

Extended standards and AA items/tasks that were rated as having a *far* or *near* content centrality are considered to have "hit" the grade level content standard. These hits are used to calculate Webb's alignment statistics that describe categorical concurrence, depth of knowledge, range of knowledge, and balance of representation.

Categorical Concurrence

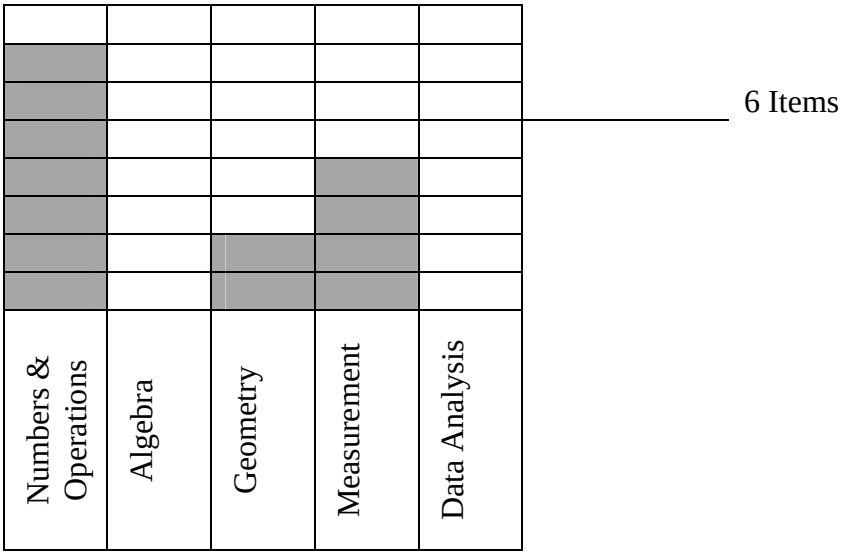
Categorical concurrence is the consistency of categories of content in the standards and assessments. The criterion of categorical concurrence between standards and assessment is met if the same or consistent categories of content appear in both the assessment and the standards. For example, if a content standard (or strand) is *numbers and operations* in mathematics, the evaluative decision is "Does the assessment have items that target *numbers and operations*?" It is possible for an assessment item to align to more than one content standard. For example, if an assessment item requires students to calculate surface area, which is aligned to the content

standard of *measurement*, to successfully answer the question the student needs to be able to multiply numbers, which is aligned to the content standard of *operations*. In this case the item is aligned to both content standards.

To produce an acceptable level of reliability for assessment scores, Webb recommends at least six items per content standard. In other words, there should be at least six assessment items related to the math strand of *numbers and operations*. Most states have multiple content standards or topics that are defined in their academic standards. If a state included five content standards under mathematics for 3rd graders (e.g., measurement, operations, etc.), there should be at least six items that align to each content standard. The more content standards expected by educational agencies, the more assessment items will be needed to align to those standards.

Six items per content standards is based on the number of items that produces a reasonable reliable subscale estimate for students' mastery of the content. Subkoviak (1988) developed a procedure that demonstrated that under certain condition six items would produce an agreement coefficient of at least .63. For alternate assessments, the number of items for each category should be tied to the purpose and scoring. For many of the alternate assessments, reliability is not estimated using measures of internal consistency (e.g., coefficient alpha). It is understood that steps towards allowing flexibility may all for additional sources of measurement error. However, it is possible that some of the resultant sacrifices in reliability may reduce construct irrelevance or construct underrepresention in an assessment program (AERA, APA, & NCME, 1999). The state may decide to exclude some standards and emphasis other standards because of the characteristics of the student population, a judgment that some standards are more important for the population of students, or the inability to assess some of the standards for the population of students. These decisions should be considered before making an evaluate judgment about an acceptable level of categorical concurrence.

In the illustration below, *numbers and operations* is the only math content standard that has six hits (the shaded areas indicate an item hit). These results would indicate a categorical concurrence of .20. In other words, only one of the five content standards has at least six hits.



Depth of Knowledge

Depth of knowledge (DOK*)* examines the consistency between the DOK of the standards and DOK of assessments (Webb, 1997). Important aspects of learning go beyond academic topics and include students' organization of knowledge, problem representations, use of strategies, and self-monitoring skills (Glaser, Linn, & Bohrnstedt, 1997). Completely aligned standards and assessments requires an assessment system designed to measure in some way the full range of cognitive complexity within each specified content standard. Rated on a 6-point scale (see Appendix A), DOK[1] provides a measure of performance complexity required to perform the skill listed in the standard or item. DOK ratings are guided by a list of verbs (e.g., identify, state) that reflect the response that would be required of the student. Experts consider the verb in conjunction with the content when determining DOK.

To examine the DOK, all item on the assessment and all academic content standards are rated for DOK. We expect assessments to have items that are below the expected DOK, but there should be items at or above the expected DOK. According to Webb, an acceptable level for the DOK is 50% or more of the assessment items are at or above the content standard DOK level. A weakly met criterion for DOK level would be between 40% and 50%. However, what is considered an acceptable level should depend on the purpose of the assessment (Webb, 2007).

If the purpose of the assessment is to place students on a range of proficiency levels, then it is reasonable to have items with a range of DOK levels in comparison to the corresponding objective. The domain of items may vary by complexity or DOK level. The alignment process usually assign just one DOK level per objective but it is possible to one objective to cover multiple levels of DOK; in other words, it is possible to have items corresponding to the same objective have different DOK levels. Another decision rule could be based on having items that are more representative of the range of DOK in objectives. For example, there may be 10% at the *attention* level, 20% at the *memorize/recall* level, 30% at the *performance* level, 20% at the *comprehension* level, 10% at the *comprehension* level and 10% at the *analysis/synthesis/evaluation* level. An acceptable percentage should be evaluated on the purpose of the alternate assessment and the intended distribution given by the state. At a minimum, there should be some items/tasks at the higher levels of DOK to insure that students are being provided with opportunities to demonstrate what they know and can do on challenging standards.

Expert ratings for this criterion require several steps:

1. Identify DOK for each grade level content standard
2. Identify primary and secondary matches for extended standards among the grade level content standards
3. Identify DOK for each extended standard
4. Identify primary and secondary matches for AA items among the corresponding content standards (or grade level standards, if the state does not have extended standards). Note: Items identified in Criterion 3 as having no content centrality are omitted from this step.
5. Identify DOK for each AA item

[1] There are many scales for determining DOK levels. The one provided in this manual is just one of many rating scales available.

Range-of-Knowledge Correspondence

While categorical concurrence is the most obvious alignment criteria, additional alignment dimensions are needed to fully capture the complex knowledge and skills that are often emphasized in academic standards. For example, all the assessment items could be aligned to only a few of the objectives within an academic content standard. Examining the range of objectives an assessment covers and the balance of assessment items across the objectives provides additional evidence about how well the assessment is capturing the breadth of the standards.

Range-of-knowledge correspondence criterion examines the alignment of assessment items to the multiple objectives within the content standards. Range-of-knowledge correspondence is used to judge whether a comparable span of knowledge expected of students by a standard is the same as, or corresponds to, the span of knowledge that students need in order to correctly answer assessment items. The range-of-knowledge numeric value is the percentage of content standards with at least 50% of the objectives having one or more hits. For example, if there are five objectives (e.g., length, area, volume, telling time, and mass) included in the content standard of measurement, a minimum expectation is at least one assessment item is related to at least three of the objectives. According to Webb (1997), 40-50% of the objectives for a standard could be considered weakly met.

The set of objectives under a standard represents some delineation of the content domain for a standard. It is assumed that these objectives partition the content addressed by the standards. Having one item per objective for at least half of the objective provides a decision rule that ensures the assessment is measuring some breadth in content knowledge and is at least sampling half of the important partitions of content identified by the objectives (Webb, 2007). For alternate assessments there is a trade-off in covering the standards and increasing the assessment items. Some standards may have numerous objectives. Most AAs have fewer items than the traditional multiple choice assessment. Any restriction on the number of items included on the test will place an upper limit on the number of objectives that can be assessed. When making an evaluative judgment about an acceptable range-of-knowledge level, the following need to be considered: (1) breadth of content coverage by a standard, (2) length of assessment, (3) suitability of the content to be assessed, and (4) differences in importance of the different objectives under a standard (Webb, 1997). Many of these considerations are policy decision made by the state and should be considered when determining acceptable levels of range-of-knowledge.

Balance of Representation

The *balance of representation* criterion is used to indicate the extent to which items are evenly distributed across the content standards and the objectives under the content standards. In our measurement content standard with five objectives, we would expect items would be evenly distributed across the five objectives. In practice educational agencies may place greater emphasis on specific objectives and content standards. In this case the assumption of an even distribution would be replaced with the expected proportion, or emphasis, as specified by the

educational agency. The formula used to compute the balance of representation index is the following

$$Balance = 1 - (\sum_{i=1}^{k} \left| \frac{1}{O} - \frac{I_k}{H} \right|)/2,$$

where O is the total number of objectives hit (i.e., item has been judged to be aligned) for the content standard, I_k is the number of items hit corresponding to objective k, and H is the total number of items hit for the content standard. The balance index can range from 0 (indicating unbalanced representation) to 1.0 (indicating balance representation) with values from .6 to .7 considered a weak acceptable balance and values .7 or greater considered acceptable.

There are many reasons theoretical and practical reasons that a state may emphasize some objectives over others. Major question for the alignment team is to determine how the assessment blueprint differentiates among objectives and whether or not large variations are appropriate.

Summary

Since the LAL method is intended for use with alternate assessments based on alternate achievement standards, expectations for criterion 4 are consistent with guidance about the assessment. The range and balance should match the state's priorities with consideration given to some coverage in all major strands of content. In the LAL method there is an assumption that the DOK between the AA and any extended standards should correspond; however, the DOK of the AA and extended standards may be skewed to lower levels than the state standards. A narrative summary that provides feedback to the state about the quality of its priorities and alignment of extended standards and AA items to the prioritized content is also included in this section.

Results Reported: (1) Distribution of expert ratings for items with primary matches to strands (presented along with intended distributions from Criterion 2)

(2) Categorical concurrence of the AA items

(3) DOK of the AA items

(4) Balance of representation of the AA items

(5) Range of knowledge of the AA items

Note: Statistics 2-5 should be evaluated on the state's intended priorities. Theoretical and practical reasons, as well as policy decisions about the reduction in scope and depth should be documented.

Example of Reporting Results

The following table reports the number of extended standards referenced to the grade level standard (intended link) and the number of extended standards that were rated by content experts as either having a *far* or *near link* to the grade level competency goals.

Number of Extended Standards to Intended and Expert Ratings Alignment to Grade Level Competency Goals

Competency Goals	3rd	
	Intended	**Expert**
1	4	2
2	3	3
3	5	5
4	4	2
5	3	2
Total	19	14

Categorical concurrence is the consistency of categories of content in both the content standards and the assessments. The criterion of categorical concurrence between standards and assessment is met if the same or consistent categories of content appear in both documents (Webb, 1999). In the following table, the percentage of standards with at least one item and six items are reported. The standards that were underrepresented are reported.

Categorical concurrence summary, grades 3-5

Grade	% of Standards w/ at least one item	Categories not represented*	% of standards w/ six or more items	Categories that are under-represented
3rd	60%	#4, 5	60%	#4, 5
4th	60%	#4, 5	60%	#4, 5
5th	60%	#4, 5	60%	#4, 5

Note: *These results are based on a sample of items and may not reflect the entire pool of AA items.

Depth of Knowledge *(DOK)* examines the consistency between the DOK of the standards and DOK of assessment items. Completely aligned standards and assessments requires an assessment system designed to measure in some way the full range of expected knowledge within each specified content standard. DOK statistics reported include (1) the distribution of DOK ratings by grade level and subject, and (2) the percent of AA items below, at, or above the standards to which they are being compared. The following table provides the percentage of 3rd, 4th, and 5th grade AA items at the DOK levels.

Percent of elementary math AA items rated at each DOK level

DOK Levels	3rd	4th	5th
Attention	7.3	6.9	.0
Memorize/Recall	70.9	65.5	59.4
Performance	7.3	19.0	12.5
Comprehension	12.7	6.9	28.1

Application	1.8	1.7	.0
Analysis/Synthesis/Evaluation	.0	.0	.0
Number of Items	55	58	32

A comparison of DOK ratings for AA items with the DOK of the standard identified as the primary match helps illustrate the quality of alignment based on DOK. Adding a column that combines the percent of items at or above the DOK of the corresponding standards allows judgments to be made about the quality of alignment according to Webb's (1997) criterion. While Webb suggests at least 50% of the items at or above the DOK of the standard, AA items should not use this benchmark. In fact, it should be expected that AAs should not meet this benchmark.

Percentage of AA items below, at, and above the grade level standards

Grade	% Below	% At	% Above	% At or Above
3rd	89.1	10.9	.0	10.9
4th	93.1	5.2	1.7	6.9
5th	75.0	25.0	.0	25.0
6th	94.6	5.4	.0	5.4
7th	78.4	21.6	.0	21.6
8th	80.0	10.0	10.0	20.0
10th	65.7	25.4	9.0	34.3

Note. Table would reflect relationship with extended standards if they were included in the state's system

Balance of representation is examined by reviewing the emphasis the assessment gives to different objectives within a content standard. The content standards and assessments give comparable emphasis to what students are expected to know, what they should be able to do, and in what contexts they are expected to demonstrate their proficiency. The balance of representation criterion is used to indicate the extent to which items are evenly distributed across content standards. The formula used to compute the balance of representation index is

$$Balance = 1 - (\sum_{i=1}^{k} \left| \frac{1}{O} - \frac{I_k}{H} \right|)/2,$$

where O is the total number of objectives hit for the standard, I_k is the number of items hit corresponding to objective k, and H is the total number of items hit for the content standard. Index values close to zero would indicate unbalance item representation across the content standards and values close to 1.0 indicate balance representation. Index values between .6 and .7 indicate balance of representation criterion has only been weakly met and values greater than .7 indicate that the criterion has been met (Webb, 1999).

An example of the balance index is illustrated below. For the content standards of reading, a state has 4 objectives with at least one item that is judged to be aligned (hit the objective) to the objective. There are 13 items distributed across the 4 objectives. In this example, the balance index is equal to .63, which is considered to be weakly balanced standard.

Objectives	Number of Items (I_k)	$\lvert 1/4 - I_k /13 \rvert$
Word Study	8	.37
Narrative Text	1	.17
Informational Text	3	.02
Comprehension	1	.17
	$\Sigma \lvert 1/4 - I_k /13 \rvert =$	.73
Balance Index =	$1 - (\Sigma \lvert 1/4 - I_k /13 \rvert)/2 =$	.63

The ***range-of-knowledge correspondence*** criterion examines the alignment of assessment items to the multiple objectives within the content standards. The following table reports the number of ELA extended standards and ELA-AA items per content standard. At least 50% of the content objectives under each content standard have at least one extended standard or AA item except for the Research strand, resulting in a 75% range of knowledge.

Number of ELA Extended Standards and ELA-AA items aligned with specific Content Standards

ELA Standard	Curriculum Standard	Extended Standard	AA Items
		N	*N*
Reading	1.1 The student will integrate various cues and strategies to comprehend what he or she reads.	14	82
	1.2 Analysis of Texts-The student will use knowledge of the purposes, structures, and elements of writing to analyze and interpret various types of texts.	7	26
	1.3 Word Study and Analysis: The student will use knowledge of graphophonics and word analysis to determine the meaning of unfamiliar words and to read texts with understanding.	9	15
Writing	2. 1 The Writing Process-The student will apply a process approach to writing.	3	12
	2.2 Writing Purposes: The student will write for a variety of purposes.	1	6
	2.3 Responding to Texts-The student will respond to texts written by others.	2	0
	2.4 Legibility-The student will create legible texts.	0	0
Communication	3.1 Communication: Speaking-The student will use speaking skills to participate in large and small groups in both formal and informal situations.	6	10
	3.2 Communication: Listening-The student will use listening skills to comprehend and analyze information he or she receives in both formal and informal situations.	4	1
	3.3 Communication: Viewing-The student will comprehend and analyze information he or she receives	1	3

ELA Standard	Curriculum Standard	Extended Standard	AA Items
		N	*N*
	from nonprint sources.		
Research	4.1 Selecting a Research Topic-The student will select a topic for exploration.	0	0
	4.2 Gathering Information and Refining a Topic-The student will gather information from a variety of sources.	0	0
	4.3 Preparing and Presenting Information- The student will use a variety of strategies to prepare and present selected information.	0	0

Note. Range of Knowledge correspondence is the percent of content standards with at least 50% of the objectives with one hit.

Evaluative Judgment:

(1) Alternate assessments based on alternate achievement standards are expected to have a reduction in scope and complexity and most will not meet Webb's criteria for acceptable values. The purpose of AA and the intended reduction in scope and complexity should mediate the expected relationship between AAs and standards.
(2) Items should correspond to all depth of knowledge levels, with most items corresponding to the lower depth of knowledge levels.

Special considerations:

(1) When AA-AAS have common items/tasks, the alignment statistics indicate the agreement between the grade-level standards (or extended standards) and AA-AAS. When AA-AAS vary by student, the statistics reflect the alignment of the AA system to the standards.
(2) As a general rule, more items will improve the degree of alignment. In some cases, increasing the number of items may not be feasible or recommended.

CRITERION 5: There is some differentiation in content across grade levels or grade bands.

What is rated: Extended standards (if applicable) and AA items

Rated by: Content experts (content change); Special Education expert (grade appropriateness)

Forms: Differentiation of Content across Grades/Grade Bands (Appendix E)

Other sources of information:

- Background documents on AA (description of assessment development, technical manual, vertical alignment document)

Usually student proceed thought the grade levels with an expectation that academic content will require more reasoning and analysis and less recall and recognition. Webb (2007) instructs reviewers to think about what a typical student should be expected to know and do in assigning DOK levels to the content objectives. Currently, there are no fixed guidelines for general education as to what constitutes an acceptable progression in content complexity from grade to grade.

Some states' AA systems (portfolio or performance) include the same items across multiple grade bands. While it is possible that the same item could be aligned with a content standard at more than one grade level, it is also important that students have the ability to demonstrate growth on the assessment across years. This criterion evaluates the extent of differentiation content across multiple grades. Grade appropriateness of AA item/tasks is also examined.

Webb (2005) describes five types of vertical relationships: (a) *broader*—higher-grade standards reflect broader application of target skill or knowledge; (b) *deeper*—higher-grade standard reflect deeper mastery of the target skill or knowledge; (c) *prerequisite*--lower-grade standards reflects a different by prerequisite skill for mastery of the higher grade standard; (d) *new*—the higher-grade is a new skill or knowledge unrelated to skills or knowledge covered at prior grades; and (e) *identical*—higher-grade standard appear identical to one of the lower-grade standards. The LAL provides a description of the type of relationship standards across grade levels and AA items across grade levels. Differentiation is shown by the first four types of item relationship, but not through the use of identical items.

Several methods are used to examine differentiation across grade levels (or grade bands). First, content standards coverage and depth of knowledge level at each grade level are compared. Next, content experts describe the vertical relationship between the extended standards and the AAs. And finally, special education experts rate each the materials used within each item (performance format) or work sample (portfolio format) for grade appropriateness of the task. Items are classified as being adapted from grade level content, inappropriate for teens, inappropriate even for elementary grade students, or not grade specific (appropriate for all ages).

Results Reported:

(1) The percentage of AA items and extended standards within a content standard and DOK level.
(2) The number and percentage of items that are age inappropriate. A list of items should be provided.
(3) Holistic rating by content experts describing the vertical relationship between grade level standards (e.g., presence of new and different versus identical items).

Example of Reporting Results

Percentage of ELA-AA Items by Grade Level and Content Strands

	Elementary	Middle	High
Reading	40.7	61.1	57.5
Writing	11.6	8.3	7.5
Speaking	23.3	8.3	25.0
Listening	20.9	19.4	6.3
Viewing/Visual	2.3	0.0	0.0
Research	0.0	0.0	0.0

Age Appropriateness of AA Items/Task and Portfolio Evidence

Rating	ELA		Math	
	N	*%*	*N*	*%*
Adapted from grade level content	19	19.0	29	25.2
Not grade specific (appropriate for all ages)	33	33.0	28	24.3
Inappropriate for teens	37	37.0	43	37.4
Inappropriate for elementary age	11	11.0	15	13.0

Evaluative Judgment:

(1) There should be changes in content standards across the grade levels.
(2) All ratings of vertical relationships are acceptable except for *identical* (i.e., higher-grade standard appear identical to one of the lower-grade standards).
(3) All items should be age appropriate.

Special considerations:

(1) While there are not guidelines for how the content changes across grade levels, states should provide description of the vertical relationship and a rationale.

CRITERION 6: The expected achievement for students is for the students to show learning of grade referenced academic content.

What is rated: Scoring procedures (or criteria) and performance level descriptors for alternate assessment

Rated by: Special education experts

Forms: Appendix F

Other sources of information:

- State's instructions for scoring of individual test items (what receives credit)
- State's rubric/document for determining overall proficiency level on AA-AAS

Since inferences from scores on alternate assessments are to be made about what students know or can do in an academic domain, the achievement standards should consider those indicators which provide information about student performance rather than system or teacher performance. The strongest inference can be made that the student learned the content if: (a) there is evidence the student did not already have the skill (e.g., through use of pretest, baseline or previous year's learning), (b) the skill is performed without teacher prompting, and (c) the skill is performed across materials/lessons to show mastery of the concept versus rote memory of one specific response. The inference is weakened if the student's score is augmented by program level criteria. In contrast, these program level criteria are essential to the question of instructional alignment (Criterion 8). Evaluation of this criterion is done through special education review of state documents related to alternate achievement standards and application of a rubric found in Appendix F.

Results Reported: A narrative summary about findings from the Degree of Inference about student learning is provided.

Example of Report

A review of the criteria for scoring AAs suggests that student scores reflect a high inference about student learning in the academic domain. Students earning higher scores are expected to have a high degree of accuracy (e.g., 90% accuracy) and higher degree of level of independence (e.g., are not told how to respond). AA items/tasks with higher levels of complexity (proximity to grade level standards) resulted in an increase in student scores. Credit for student self assessment (e.g., think aloud, self correction, demonstration of process, and problem solving) was also considered in the scoring criteria. Additional credit was given for conceptual generalization in which students responded to AA items/tasks across more than one task format.

Evaluative Judgment:

(1) Scoring criteria should be based on what the student knows and can do in the academic domain.

(2) While the purpose of some AAs is the improvement of instructional programs for students with significant cognitive disabilities, program improvement criteria should not be part of the student scores.

Special considerations:

(1) If the purpose of AAs is to measure progress, baseline or pretest should be new learning.
(2) Rationale and policy for inclusion of some scoring criteria should be reported.

CRITERION 7: The potential barriers to demonstrating what students know and can do are minimized in the assessment.

What is rated: AA items, AA administration manual

Rated by: Special education experts

Forms: Minimizing Barriers for Students Checklist (Appendix G)
Symbolic Access Rating, Form D.3
Codes for Nonacademic AA Items, Form D.2, D.3

Criterion 7 provides information about accessibility of the alternate assessment to the wide range of students with significant cognitive disabilities. There are three sources of information for this criterion.

First, assessment materials are reviewed to determine options for allowable accommodations (i.e., changes in the assessment administration that do not change the construct being measured) and modifications (i.e., changes that do alter the construct being measured) that allow students with a wide range of communication modes and sensory abilities to demonstrate learning. Experts also determine whether flexibility is built into the assessment items/tasks (an approach closer to universal design than delineated accommodations).

Evaluation of the assessment as a whole is gathered by special education experts' reviews of the AA administration manual and assessment items/tasks using the Minimizing Barriers for Students Checklist. For students with a range of physical, sensory, and communication characteristics, experts indicate whether the type of student could demonstrate knowledge and skills on the assessment (1) as designed, with flexibility built into the tasks/items; (2) with accommodations; (3) with modifications; or (4) not at all. Global judgments are also made about (1) the accessibility of the assessment for students without clear, intentional communication, and (2) the extent to which accommodations, modifications, and supports are clearly defined. Ratings on the Minimizing Barriers Checklist are made by two raters; where discrepancies exist they are resolved by a third rater. Ratings on the Minimizing Barriers for Students Checklist are summarized in narrative form to identify potential barriers to participation.

The second form of information for criterion 7 comes from special education experts' ratings of each AA item to determine whether or not symbolic communication is required to answer the item. While most of the AA items/tasks are expected at the symbolic level, some items/tasks should be rates presymbolic and early symbolic levels.

Finally, items that were identified in criterion 1 as nonacademic are reviewed by special education experts to identify the lowest level of symbolic communication a student could use and still be able to perform the task.

Results Reported:

(1) Narrative summarizing accessibility of assessments to students with varying communication and sensory characteristics (based on Minimizing Barriers for Students Checklist)
(2) The number and percent of AA items within each grade and subject that can only be answered with symbolic communication; number and percent that can be answered through nonsymbolic communication
(3) Frequency distribution of symbolic communication ratings (3 point scale) for nonacademic items

Example of Reporting Results

Policy and procedures developed by the state has minimized barriers for students. Teachers were allowed to design tasks to meet the individual student needs. Provisions for students with multiple characteristics (e.g., visual and hearing impairments, nonverbal, etc.) were allowed and clearly documented in the administration manual. An examination of AA items/tasks indicated that students at different levels of symbolic communication had access to the general curriculum. The results of the number and percentage of ELA and Math AA items by the symbolic level are reported in the following table. An overwhelming majority of the items were symbolic, 84.8% for ELA and 80.3% for Math. Although skewed toward the symbolic level, it should be noted that this assessments included items for students at all symbolic levels and thus provided multiple levels of access.

Symbolic Level of AA Items/Task

	Awareness/Presymbolic		Early Symbolic		Symbolic	
	N	*%*	*N*	*%*	*N*	*%*
ELA	130	11.8	38	3.4	934	84.8
Math	122	12.8	66	6.9	768	80.3

Evaluative Judgment:

(1) All students, regardless of disability, should have access to the general curriculum. Provisions for the inclusion of students with different characteristics should be documented.
(2) Most of the items should be at the highest symbolic levels, but some items should be at the lower levels.

Special considerations:

(1) Materials needed to complete the ratings for criterion 7 vary considerably depending upon the state's system of documentation related to the AA-AAS. The needed documents can be identified through the review of publicly available materials and the interview with the state's key informants or liaison for the study.
(2) While it is recommended to provide a state a holistic view of the assessment for barriers, the Minimizing Barriers for Students checklist can be used at the item level to provide more fine grain analysis of the accessibility of each item.

CRITERION 8: The instructional program promotes learning in the general curriculum.

What is rated: Professional development materials

Rated by: Special education experts (Content experts rate CIS strands during first step of their coding responsibilities)

Forms: Professional Development Checklist (Appendix H)
Program Quality Indicators Checklist (Appendix I)

Other sources of information: Curriculum Indicators Survey (CIS, excerpt in Appendix B)

Evidence of general curriculum access in the instructional program comes from three sources:

- Professional development materials are reviewed by special education experts to determine the extent to which examples for teaching grade level content across subjects and grade ranges are provided.
- The Program Quality Indicators Checklist is applied to professional development materials and the alternate assessment administration materials to look for evidence of best practice in the instructional programs of students with significant cognitive disabilities.
- A sample of teachers from the state complete the Curriculum Indicators Survey (CIS). Part of the survey assesses teacher background information and evidence of best practices in instructional programming. The survey also measures the enacted curriculum in English language arts, math, and science for one of the teacher's target students during the current school year.

Results Reported:

(1) Narrative summary of findings from Professional Development Checklist
(2) Narrative summary of findings from Program Quality Indicators Checklist

(3) CIS: Frequency distribution of teachers' self-reported use of best practices in instruction.
(4) CIS: Percent of items within each cell of a content standard by DOK table
(5) CIS: Discrepancy between content by DOK configurations reported on CIS and other elements of the system (where strand matches are possible; varies by state)

Example of Reporting Results

Sample results from Professional Development Checklist

Sample 1:	The professional development manual differentiated access at three levels- one called access, one below grade level, and one at grade level. The focus of this alignment study was on alternate achievement, so the activities suggested for access and below grade level were evaluated further. These teaching activities did include examples that could be accessed by students at all symbolic levels.
Sample 2:	The professional development materials, currently in revision, do not yet give teaching examples of how a state standard is addressed with increased expectations across grade bands. For example, teachers may need examples of how the skills expected for a student listening to a story in the elementary grades may differ from the skills expected of middle school student.

While most results of the CIS are reported in an appendix to the full alignment report, instructional best practice results are extracted and reported here as well.

Measures of the enacted curriculum for a sample of target students include (1) a summary of the allocation of instructional emphasis by content strand and Depth of Knowledge, and (2) discrepancies between the instructional emphasis and the priorities reflected in the AA. Examples are provided in the following two tables.

CIS: Percent of Instructional Time Spent per Strand, at each Level of DOK

	Attention	Memorize/ Recall	Perform	Comprehend	Apply	Analyze, Synthesize, Evaluate
Numbers & Operations	26	5	16	2	2	0
Algebra	6	2	1	1	1	0
Geometry	4	2	0	0	2	0
Measurement	16	0	4	0	0	0
Probability	4	0	4	0	0	0

Discrepancy between proportional AA math coverage and teacher-reported math instruction, by strand and level of cognitive demand (CIS – AA)

	Attention	Memorize/ Recall	Perform	Compre-hend	Apply	Analyze, synthesize, evaluate
Numbers & Operations	.26	-.15	.08	-.01	-.03	-.06
Algebra	.06	.02	.01	.01	.01	-
Geometry	.03	-.16	-.06	-	.01	-.01
Measurement	.16	-.12	0	-.03	-.01	-
Probability	.04	-.02	.02	-.02	-	-.05

Note. Dash (-) indicates no coverage on CIS or AA

Evaluative Judgment:

(1) Professional development should include examples with a clear link to the major academic strands that model strong alignment to grade level standards, and promote active student learning.
(2) The promotion of overall program quality for students with significant cognitive disabilities is clear in the professional development materials.

Special considerations:

(1) CIS topics are standardized and do not always reflect the unique curricula in each state. Reporting results at the strand level allows for comparisons with the state's curriculum.
(2) CIS results provide a snapshot of teachers' self-reported instructional practices and the enacted academic curriculum for a sample of students. However, there are limits to generalizability depending on sample size and response rate.

Validity of AA Interpretation and Use

The *Standards* (American Educational Research Association, American Psychological Association, and National Council for Measurement in Education, 1999) is the authoritative source of information about validity. According to the *Standards* and others (e.g., Cronbach, 1989), validity is a unitary concept based on various kinds of evidence that support the intended interpretation and use of test scores. The strongest case for validity can be made when evidence is obtained regarding (1) the assessment content and specification from which it was derived, (2) the nature of the characteristics being measured, (3) the relationship of the assessment results to other significant measures, and (4) the consequences of the uses and interpretations of the results (Linn & Gronlund, 2000). The LAL alignment method provides evidence that can be used in the validity evaluation of alternate assessment outcomes.

When validity rests in part on the appropriateness of test content, procedures for specifying and generating test content should be described and justified in reference to the domain it is intended to represent (Standard 1.6). The definition of the domain and the test specification should be stated clearly and the relation of the items to the dimensions of the domain they are intended to represent (Standard 3.2). LAL criterion 2 examines the intended alignment of AA to the grade-level content standards and the rationale for the inclusion and exclusion of content standards.

Logical and empirical evidence are important to document the extent to which AAs reflect the process or skills that are specified by the domain definition (AERA, APA, & NCME, 1999). LAL criterion 3 examines the fidelity of the content and performance centrality. The degree of content centrality examines the item match to content of the related standard. The degree of performance centrality examines the match performance expectation of the item to the related performance expectation of the related standard.

Evidence of the extent to which the test samples the range of knowledge and elicits the processes reflected in the target domain should be provided (Standard 13.3). The analyses should make explicit those aspects of the target domain that the test represents as well as those aspects that it fails to represent (AERA, APA, & NCME, 1999). LAL criterion 4 provides a set of statistics, which are based on the work of Norman Webb, that describe how the test samples the grade-level content standards. LAL criterion 5 provides evidence of how the standards and assessments change across the grade levels.

The *Standards* require that steps are taken to ensure that the test score inferences accurately reflect the intended construct rather than any disabilities and their associated characteristics extraneous to the intent of the measurement (Standard 10.1). LAL criterion 6 evaluates the alignment of the achievement standards to grade level content standards (intended domain). LAL criterion 7 examines the potential barriers that may interfere with a student demonstrating what they know and can do.

An absence of bias and procedural fairness are essential for an assessment to have high level of validity in measuring the knowledge, skill, and understanding that it is intended to measure (Linn & Gronlund, 2000). LAL criterion 8 examines the instructional programs and professional development activities to evaluate if the students had an equal opportunity to show what they

know and can do. Furthermore, criterion 8 provides evidence that teachers have been trained on how to provide students with an opportunity to learn the academic content.

Steps to Conduct the LAL Alignment Study

We have found the following to be the most efficient sequence to follow in conducting the alignment studies.

1. Documents and Interviews

Data are collected using document analysis and interviews with those most familiar with the alternate assessment. Initially, state data should be collected from documents found in the public domain and those provided by the state as well as interviews. Documents include but are not limited to:

a. Documentation of any sequential development of alternate assessment (i.e., what procedures were used to develop the assessment)
b. Alternate assessment **administration** manual
c. **Participation guidelines** for the alternate assessment
d. State **grade level content standards** for ELA/reading and math
e. Any **transformation or prioritizing of the grade level content standards** or curriculum frameworks for use by teachers of students who participate in the alternate assessment
f. **Test/item/task specifications** or blueprint for the alternate assessment
g. Alternate assessment **technical manual** or any technical information about alternate achievement standards, performance descriptors, validity and reliability studies, alignment studies
h. Examples of **professional development for teachers** about implementing the alternate assessment
i. Any relevant policies about **instruction and assessment** for students with disabilities
j. Information about scoring the alternate assessment including the **scoring rubric and performance level descriptors** and examples of how the scores are reported to the public
k. The **most current alternate assessment** for grades 3 through 8, and 10.

While the use of some documents is self evident, others are included in the process as a way to understand the assessment system and values of the state regarding content, instruction, and assessment of students with significant cognitive disabilities. The test blueprint and extended standards provide the alignment team information on prioritized content areas of the state. The alternate assessment, performance descriptors, and scoring rubric provide information about the alternate achievement standards.

After the documents have been reviewed, interviews with those most familiar with the state's alternate assessment are used to clarify information in the documents, gather additional confidential documents and establish rules for the alignment process. Decisions about alignment criteria, level of specificity within the standards (grain level) to align, and procedures for

administering the Curriculum Indicators Survey (e.g., sample size, format, timing) need to be agreed upon. Interviews with key informants (state Department of Education representatives, contracted test developer, etc.) are conducted during a day-long pre alignment study site visit, after documents are collected and analyzed. Interview questions are generated during the document analysis process, and are primarily intended to help clarify/explain the documents, alternate assessment process (including identifying what the state is using if anything for extended standards and how AA items are defined by the state), and related policies within the context of the state.

2. Database and Form Creation

Once the documents have been reviewed, databases can be created for data entry. These databases have typically been created in Excel for ease of management and transference to a statistical package (i.e., SPSS) for analyses. Each database can be manipulated to become the coding form used by the expert. As standards and items are entered into the database, additional columns are created to numerically capture the necessary information (e.g., academic content, DOK, content and performance centrality) from the experts (see Appendix D). The team leader or team may have to operationalize the level of specificity of the coding for all the included documents or materials. Decisions will need to be made if, for example, the state's extended standards have sublevels that address different content. Coding to the extended standard or the sublevels will provide the state with different alignment information. Another example of this type of decision is the definition of an "item" when the state uses a portfolio format. When teachers provide evidence for student performance of an item, it is possible that while the item itself may be closely linked to the content standard, the evidence provided is not. It is important that the alignment study capture the level of specificity that is demonstrated within the items or standards.

While the database may contain information that the experts will not need on the coding forms (i.e., tracking codes, codes needed from other experts), there are several things that help expedite the coding process. They are listed below:

a. It is important that column headers should be repeated across all pages of the coding forms.
b. The pages should include the form title and page number.
c. Unique identifiers for the items (e.g., distinctive codes, names, etc.) should be used and listed on the forms.
d. It is also important to organize the data in a coder friendly format (e.g., in the same sequence as the document) and to make sure the items and standards are entered on the form in an accurate and reliable fashion.
e. Any link (i.e., between the grade level and extended standard or grade level/extended standard and AA item) provided by the teacher or state should be listed on the form prior to the coding process.
f. A pilot test by the alignment team of the forms will help ensure a smooth data collection process.

3. Sampling

When teachers create the AA tasks or evidence (e.g., portfolios and checklist), the alignment leaders will need to select a sample of AA assessments. The number of AA tasks will depend on the total number of AAs and the degree of sampling error that is acceptable. Since the statistics are reported by grade and academic content levels, a stratified sampling method should be used to insure an acceptable level of sampling error within each stratum (e.g., 3rd grade mathematics).

A sampling plan is also developed for the administration of the *Curriculum Indicators Survey*. Random selection of teachers who teach students who participate in the alternate assessment system is recommended. However, the state may want to purposefully select the teachers based on their content and instructional knowledge. The number of teachers in the sample will depend on the total number of teachers in the system and the degree of sampling error that is acceptable to the alignment leader and the state. It may also be necessary to oversample the teachers who are recruited (e.g., not a captive audience) as response rates need to be maximized for generalization purposes.

4. Evidence of Quality of Coding

Raters. The accuracy of the alignment statistics is dependent on the work of the alignment team. An alignment team consists of at least two academic content experts, two experts in curriculum for students with significant cognitive disabilities, and one alignment leader for each subject area across all the grade levels. A description of the qualifications of the alignment team should be included in the alignment report. One way to document qualifications is through a demographic information form filled out at the beginning of the alignment study (see Appendix J). It is suggested that raters have no direct interest in the outcomes of the alignment study (AERA et al., 1999). Every effort should be made to reduce the appearance of a conflict of interest.

Training. Since some of the content experts may not be familiar with alternate assessments, the first part of training explains the purpose and structure of the alternate assessments as well as the characteristics of the students who participate in these assessments. Many of the recommendations for coding are based on the work of Kimberly Neuendorf (2002). The alignment leader provides experts with a codebook (see Appendix K for an example) and coding forms (see Appendix D). We suggest that the experts are trained on a single coding form and complete all the coding on the form before continuing to the next form. Training should be conducted for each coding form.

At the beginning of the coding process, the raters should work together and determine if they can agree on the ratings of the elements (e.g., DOK). The alignment leader should mediate and help lead the raters to consensus and capture decision rules in the codebook. Experts are free to include or refine the examples in the codebook or coding sheets during the alignment process. Any refinements should be captured and discussed by the alignment content or special education experts for clarification purposes. After the experts have reached consensus working together, they will code approximately five elements independently then check for agreement. Disagreements are discussed and consensus reached with all decision rules included in the codebook. The alignment leader continues to have the raters code the same elements

independently until 100% agreement is reached. The remainder of the coding is done independently, with approximately 15% to 20% overlap for examination of reliability of ratings. The alignment leaders should periodically check the agreement between the raters through the entire coding process. Retraining may be needed if the leaders find low agreement and some elements may need recoding if raters were using different decision rules. Reliability measures (e.g., percent agreement, Scott's *pi*, Pearson's *r*, etc.) for *each* element coded should be included in the report.

Training for content and special education experts will be different. As each group rates for different criterion measures, unique training must be provided to each type of expert. The codebook (see Appendix J for an example) helps outline the training needs of each group and provides a sequence in which the training and coding is conducted. While both groups can be convened at the same time, it is important that the team leader for each group provides the necessary support to keep the coding process running smoothly (e.g., no down time or confusion about next steps).

5. Coding for Content Experts

Most of the questions under the first two alignment components (grade or extended standards and alternate assessments) are investigated using content analysis and coding. A training codebook with examples and errors/nonexamples should be created to be used during training. It is, however, a dynamic document that should be reviewed and revised as need to accurately capture the information the state and assessment system offer. If, for example, a state uses a portfolio system, the codebook should be used to reflect the components of a portfolio format rather than a performance based format. The codebook will describe the procedures for the alignment study including any rules that are developed during the process. For example, if the content standards include multiple levels of DOK, a decision must be made about which level to code. It is critical that these rules are agreed upon and understood by all reviewers so that the coding is consistent across content areas.

In conjunction with the codebook, the content experts are given copies of all codes to be used during the alignment process (see Appendix A). For example, experts are given national standards for their respective area. We found that while the national standards of science and math tended to be straightforward, ELA presented some difficulty as to what stretched the content standards beyond what was intended in the general curriculum. For example, the content standard of listening can be interpreted to include all ELA items and instruction. To resolve the issue, the researchers asked two experts in ELA to work with us to create definitions for each ELA national content standard.

The following summarizes a suggested sequence of coding for content experts. It should be noted that due to the idiosyncratic nature of state AA systems, this sequence may need to be altered to capture additional data or to make the coding sequence more efficient for the raters.

a. <u>Grade Level Standards:</u> Content experts should code the grade level standards and objectives for DOK and primary link of the standard to the corresponding national standards. Training for accuracy and reliability of DOK coding is necessary as it important that all content experts code DOK for performance

(cognitive demand) in relationship to the content. For example, while "identify" is listed on the reference guide as a DOK of 2, the context of which it is used may not be a DOK of 2. “Identify the steps necessary to solve the equation” would be a DOK of 6 (analysis, synthesis, & evaluation), “identify the story elements from "White Fang" would be a DOK of 4 (comprehension), and “identify the picture/text vocabulary words” would be a DOK of 2 (recall).

b. Grade Level Strands: Content experts should code the link between the strands of the state content standards and the topic level of the CIS.

c. Extended Standards (if applicable): Experts should determine if the extended standards are academic. Extended standards that are not academic are not included in any further analyses. To make these decisions, reviewers are asked whether the item can be logically defined by a national standard for that content area.

d. Extended Standards (if applicable): The primary and secondary national standard links should be listed for academic items.

e. Extended Standards (if applicable): Rating of the content and performance centrality should be completed between the extended standard and grade level standard. Any standard that is coded as having no content link will be excluded from further analyses.

f. Extended Standards (if applicable): Academic extended standards that have a content link to the grade level standards should be coded for DOK.

g. Extended Standards (if applicable): Once the experts finish coding all the extended standards, a review of the standards should be done to capture information about changes in academic content across grades (differentiation of extended standards between lower and upper grades) and any change in additional content and/or emphasis of strands or domains across grades or grade bands.

h. Alternate Assessment Items: Content experts should first determine if the AA items are academic. AA items that are not academic are not included in any further analyses. Information regarding if the non academic items are foundational skills should be included.

i. Alternate assessment Items: The primary and secondary national standard links should be listed for academic items.

j. Alternate Assessment Items: Rating of the content and performance centrality should be completed between the alternate assessment items and the extended standard/grade level standard (depending upon which is identified by the state). Any item that is coded as having no content link will be excluded from any further analyses.

k. Alternate Assessment Items: Academic extended standards that have a content link to the grade level standards should be coded for DOK.

l. Alternate Assessment Items: Once the experts finish coding all the AA items, a review of the items should be done to capture information about changes in academic content across grades (differentiation of AA items between lower and upper grades) and any change in additional content and/or emphasis of strands or domains across grades or grade bands.

6. Coding for Special Education Experts

The codebook should include information to also support the special education experts in the coding of their material. As special educators have insight into the characteristics of the population as well as best instructional practice, their role in this process is unique.

The following summarizes a suggested sequence of coding for special education experts. It should be noted that due to the idiosyncratic nature of state AA systems, this sequence may need to be altered to capture additional data.

a. Extended Standards (if applicable): For all extended standards identified by the content experts as academic, special education experts will code if the extended standard requires symbolic communication or not and is foundational or not. For extended standards identified as non academic, special education experts will code the specific symbolic level of those items. Some standards may address foundational skills or may assume competence across all grade levels specific to an academic context such as turning the pages of a book. While these skills are not academic skills (i.e., can not be defined by a national strand), they do provide the state with more information about these items or standards.
b. Alternate Assessment Items: The experts rate the age/grade appropriateness of each item using the coding guidelines.
c. Alternate Assessment Items: For all items identified by the content experts as academic, special education experts will code if the item requires symbolic communication or not and is foundational or not. For items identified as non academic, special education experts will code the specific symbolic level of those items. Some skills may be foundational skills or may assume competence across all grade levels specific to an academic context such as turning the pages of a book. While these skills are not academic skills (i.e., can not be defined by a national strand), they do provide the state with more information about these items or standards.
d. Alternate Assessment Items: Using the *Minimizing Barriers for Students* checklist, experts will code an overall rating for the assessment regarding any source of challenge present in the AA.
e. Professional Development Materials: Experts will use the coding form in Appendix H to determine if examples of teaching grade level content across content areas are provided to special education teachers. Experts will also indicate if there is evidence in the professional development materials that quality indicators for programs have been considered (see Program Quality Indicators Checklist in Appendix K).
f. Alternate Achievement Standards: Using the *Degree of Inference about Student Learning* checklist discussed previously, special education experts use information provided in the administration manual and scoring rubric to ascertain the degree to which the alternate achievement standards align to the academic content standards.

7. Data Analysis

The statistics for each criterion, both descriptive statistics and alignment indices, are reported previously in the *Measurement of the Criteria* section. Any statistical program can be used to analyze the data. Webb offers a webpage or CD to help analyze the data and calculate the alignment indices that are based on Webb's model.

8. Data Interpretation

The most difficult step in preparing the report is the interpretation of the statistics and making an evaluative judgment. There are few benchmarks for establishing acceptable levels of alignment for AA-AAS, especially for elements of the LAL method that have not been applied or adapted from existing models (e.g., Webb). Following is a list of data interpretation issues to consider, organized by criterion.

Criterion 1: Academic

- How close to 100% are academic tasks? Are some areas of content closer to 100% than others?
- What percentage of the tasks are foundational skills? Are these clearer responses that will be used across grades in academic learning? If so, note this to state as valued skills to keep for some students to show partial achievement or early learning.
- If not academic, why not? It is important to give states feedback on if the skills were foundational skills or those tasks that are included to allow the participation of students without a consistent response.

Criterion 2: Referenced by Grade Level

- If the state has developed extended standards or prioritizing standards, are those referenced to grade level standards? Are their gaps or under-representative academic strands? Are there rationales for under-representing or over-representing some of the academic strands?
- Are the AA items/tasks referenced to grade level standards? Are the AA items/tasks underrepresented or overrepresented when compared to the emphasis in the grade level standards? Are there rationales for under-representing or over-representing of grade level standards?
- Are the AA items/tasks referenced to extended standards?
- Is the theoretical and practical rationale as well as the policies for the reduction of scope and depth of content standards documented?

Criterion 3: Content and Performance Centrality

- It is important to remind the state that any item included here has passed the "Is it academic?" screening. Any content areas or grade levels where content or performance is especially low should be noted. A list of the AA items with "no link" should be included here. States should be provided information as to why the items may not have linked such as a mismatch of standards, an overstretching of the standard, or a backfitting of a functional skill.

Criterion 4: The Content Differs in Range, Balance, and DOK

- What is the categorical concurrence? What strands are not included in the extended standards and AA? Does this agree with the documented rationale for the reduction of scope and depth?
- What is the distribution across the levels of DOK for the extended standards and AA items? Are there extended standards and AA items at all DOK levels? What percentage of extended standards and AA items are below, at, or above the content standards?
- Does the balance of representation indicate equal emphasis found in the standards and in the AA? Does the balance of representation indicate equal emphasis found in the test blueprint and in the AA?
- Does the AA align to multiple objectives nested within the academic standards?

Criterion 5: Differentiation across Grade Levels

- Are there differences in content and performance expectations across the grade levels? Or could a student be proficient across years with the same small set of skills being demonstrated every year?
- What is the vertical relationship of the AA content and performance across the grade levels?
- Are the AA items/task age and grade appropriate?

Criterion 6: Expected Achievement of Students is Grade Referenced Academic Content

- Has the state mixed quality indicators into the student score?
- What inferences can be made about student learning?
- Do the achievement standards align to grade level content standards?

Criterion 7: Barriers to Performance

- What type of students would have difficulty showing what they know in the assessment? This is most often a concern in a performance based assessment unless there are clear guidelines for modifications and supports. In portfolio assessments, teachers usually adapt tasks for students' mode of responding.

Criterion 8: Instructional Program Promotes Learning in the General Curriculum

- Does the range and balance of the content of instruction indicated by the teachers on the CIS match the range and balance of the AA? This information can provide implications for professional development.
- What information is missing in the professional development materials?
- Using the Program Quality Indicator Checklist, what is considered and encouraged by the student? Are these values reflected in the professional development materials?

9. Development of the Report

The following outline is a recommendation on organizing the alignment report. It is recommended that each content area be reported separately.

1. Executive Summary
    a. Short summary of each content area by criteria
    b. Recommendations
2. Table of Content
3. Introduction
    a. Description of AA system
    b. Description of alignment criteria
4. Raters
    a. Description of raters
    b. Interrater agreement indices
5. Findings by content area
    a. Criterion 1- The content is academic and includes the major domains/strands of the content area as reflected in state and national standards (e.g., reading, math, science).
    b. Criterion 2 - The content is referenced to the student's assigned grade level (based on chronological age).
    c. Criterion 3 - The focus of achievement maintains fidelity with the content of the original grade level standards (content centrality) and when possible, the specified performance.
    d. Criterion 4 - The content differs from grade level in range, balance, and DOK, but matches high expectations set for students with significant cognitive disabilities.
    e. Criterion 5 - There is some differentiation in content across grade levels or grade bands.
    f. Criterion 6 - The expected achievement for students is for the students to show learning of grade referenced academic content.
    g. Criterion 7 - The potential barriers to demonstrating what students know and can do are minimized in the assessment.
    h. Criterion 8 - The instructional program promotes learning in the general curriculum.
6. Summary
7. Recommendations
8. References
9. Appendices

An example of a report is located in Appendix L.

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Appendix A

Code for Depth of Knowledge (DOK) Scale

Codes	Depth of Knowledge (DOK)
1	*Attention* (touch, look, vocalize, respond, attend)
2	*Memorize/recall* (list, describe (facts), identify, state, define, label, recognize, record, match, recall, relate)
3	*Performance* (perform, demonstrate, follow, count, locate, read)
4	*Comprehension* (explain, conclude, group/categorize, restate, review, translate, describe (concepts), paraphrase, infer, summarize, illustrate)
5	*Application* (compute, organize, collect, apply, classify, construct, solve, use, order, develop, generate, interact with text, implement)
6	*Analysis, Synthesis, Evaluation* (pattern, analyze, compare, contrast, compose, predict, extend, plan, judge, evaluate, interpret, cause/effect, investigate, examine, distinguish, differentiate, generate)
X	*Can't score/too vague*

Codes for Age Appropriateness

Code	
1	Adapted from grade level content (e.g., Roll of Thunder, Hear My Cry)
2	Not grade specific; neutral; themes are appropriate for all ages (e.g., pets)
3	Inappropriate for teens (e.g., circus)
4	Inappropriate even for elementary age (e.g., Barney)

Content Centrality

Code		
0	No Link	The item does not measure the standard. Further coding for reason of no link: (a) *mismatch*-an error in identifying the correct standards, (b) *overstretch*-the item has lost the intention meaning of the standard, (c) *backmapping*-fitting a functional activity to academic standards, (d) *standard specificity*- standard is too broad to adequately align the item.
1	Far Link	The item measures has some of the original content standard
2	Near Link	The standard is specific and the item clearly measures the content

Performance Centrality

Code	
None-0	The performance of the AA item/task IS NOT identical to the performance of the content standard
Some-1	The performance of the AA PARTIALLY MATCHES the performance of the content standard (may occur when two different performances are asked in the content standard).
All-2	The performance of the AA IS identical to the performance of the content standard

National Standards Codes

CODES	NATIONAL STANDARDS
ELA (adapted from NCTE)	
E1	Reading
E2	Writing
E3	Speaking
E4	Listening
E5	Viewing or Visually Representing
E6	Research

CODES	NATIONAL STANDARDS
Math (adopted from NCTM content standards)	
M1	Numbers and Operations
M2	Algebra
M3	Geometry
M4	Measurement
M5	Data Analysis and Probability

CODES	NATIONAL STANDARDS
Science (adopted from National Science Education Standards)	
S1	*Science as Inquiry*: abilities necessary to do scientific inquiry and understanding about scientific inquiry
S2	*Physical Science*: properties, position, motion of objects and materials; light; heat; electricity; magnetism; motion; force; transfer of energy
S3	*Life Science*: characteristics, life cycles of organisms and environments; structure and function of living systems; reproduction and heredity; behavior; populations and ecosystems; diversity and adaptations of organisms
S4	*Earth and Space Science*: properties of earth materials; objects in the sky; changes in earth and sky; earth's history; earth in the solar system
S5	*Science and Technology*: understanding of science and technology; natural vs. man made objects; abilities of technology
S6	*Science in Personal and Social Perspectives*: personal health; characteristics and changes in population; types of resources, changes in environments; science and technology in society; natural hazards; risks and benefits of science
S7	*History and Nature of Science*: science as a human endeavor; nature of science; history of science

Definitions for National Standards in ELA

Reading	Decoding text including deciphering symbols (letter, pictures, Braille)
Writing	Generating information—make a useful mark, composing to a scribe, or creating a printed product (symbols that represent text (e.g., picture symbols) to share with another person—like a book made of pictures made by student
Speaking and nonverbal communication	Generating non written communication
Listening	More than response to sound; intentional response within context
Viewing and Visually representing	Purposeful focus on (or creation of) non textual information and a response to what is seen
Research	Obtaining new information

Definitions of Symbolic Communication Levels

Awareness: Has no clear response and no objective in communication; **Pre-symbolic**: Communicates with gestures, purposeful moving to object, sounds
Concrete Symbolic: Beginning to use pictures or other symbols to communicate within a limited vocabulary
Abstract Symbolic: Speaks or has vocabulary of signs, pictures to communicate. Recognizes some sight words, numbers, etc.

Codes for Symbolic and Nonsymbolic Communication

Codes	*Definitions*
S	Symbolic: Item/task is answered through symbolic communication (pictures, symbols, signs, speech)
N	Nonsymbolic: Item/task is answered through nonsymbolic communication (gesture, purposeful moving toward object, sounds)

Appendix B

Curriculum Indicators Survey
Excerpt of Part 1 Survey

CURRICULUM INDICATORS SURVEY

Measuring the Curriculum for Students with Significant Disabilities

This survey is designed to gather information about what your students are taught, how you teach, and what resources you use for instruction. While the curriculum for your students is naturally very individualized and includes a wide range of topics, this survey is only concerned with Reading/English Language Arts (ELA), mathematics, and science.

Part I of the survey asks a series of questions about your classroom, instructional and assessment practices, resources, professional background, and teaching influences. You should respond to this part of the survey with your entire class in mind. If you do not teach in a self-contained setting (e.g., your students are in inclusive settings or are homebound), respond with your entire case load in mind. This part of the survey will take approximately 15 minutes to complete.

In Part II of the survey, you will be asked a series of questions about what is being taught to <u>one identified student</u> in your classroom during this academic year. There is a Part II for Reading/ELA, a Part II for math, and a Part II for science. More instructions about how to complete the Part II surveys are provided at the beginning of those sections.

Teacher name: _____ Date: _____

School: _____ District: _____

Demographics

Please indicate your gender.	Male	Female			
How many years of teaching experience do you have?	0-3	4-10	11-20	21-30	31 or more
How many years have you been teaching ELA/Reading?	0-3	4-10	11-20	21-30	31 or more
How many years have you been teaching math?	0-3	4-10	11-20	21-30	31 or more
How many years have you been teaching science?	0-3	4-10	11-20	21-30	31 or more
How many years have you been teaching students with significant disabilities?	0-3	4-10	11-20	21-30	31 or more
What is the highest degree you hold?	Bachelor	Masters	6 Year Degree	PhD or EdD	Other
Do you hold any teaching license with a concentration in ELA or reading?	yes	no			
Do you hold any teaching license with a concentration in math?	yes	no			
Do you hold any teaching license with a concentration in science?	yes	no			
What certifications do you possess? (circle all that apply)	Special Education	Elementary Education	Middle	Secondary	National Board
What is your current teaching position? (Write in title):					

Professional Development

During the past 12 months, how much time have you spent engaged in each of the following professional development activities? (Professional development includes workshops, inservices, college courses, summer institutes, etc.) Circle the best answer.

Instructional strategies in teaching ELA/Reading	none	1-5 hours	6-10 hours	11-15 hours	> 15 hours
ELA/Reading content standards	none	1-5 hours	6-10 hours	11-15 hours	> 15 hours
Instructional strategies in teaching math	none	1-5 hours	6-10 hours	11-15 hours	> 15 hours
Math content standards	none	1-5 hours	6-10 hours	11-15 hours	> 15 hours
Instructional strategies in teaching science	none	1-5 hours	6-10 hours	11-15 hours	> 15 hours
Science content standards	none	1-5 hours	6-10 hours	11-15 hours	> 15 hours

EXCERPT OF PART 3: ENGLISH LANGUAGE ARTS (ELA) SV

Part 3 of the CIS addresses the amount of instructional time spent on the identified English language arts topics and your expectation for what the **target student** (identified in Part 2) should know and be able to do related to the ELA topic by the end of the current school year.

FIRST, please skim each topic (e.g., "LANGUAGE") and indicate whether you have taught or are teaching to the target student something within that topic or whether this topic is not part of the curriculum for the target student this year. If nothing in the category is being taught to the target student this year, select "NO" for the whole topic and skip to the next section.

Item	**MEDIA**	NO	**Intensity of Coverage** Indicate here if planned for later this year						**Highest Performance Expectation**						**Grade Level**
			0	1	2	3	4	P	A	MR	P	C	APP	ASE	
D1	Analysis of Media (text/film/play/website comparison)														

Skip to next section if "no" for all items in the section

For the topics you teach or plan to teach to the target student this year, do the following:

- Indicate the amount of coverage you have provided on the item since the beginning of the school year, using the scale from 0 to 4 and the codes listed in the left-hand box on the cheat sheet. If you have not yet covered the topic but plan to later in the year, select "P." Instruction can include direct instruction through independent practice delivered by any staff member, peer, or volunteer.
- Indicate the highest expectation for performance you have for the student on that item. Use the verbs in the middle box on the cheat sheet to identify the label that best matches the highest performance expectation.
- Indicate the grade level or grade band from which materials, activities, and/or contexts were adapted. Write in the precise grade level where possible. If materials were taken from multiple grade levels, write in the letter code that matches the grade band from which materials were adapted. If there is no grade level or band associated with the materials, code it as "N." Use the codes in the righthand box on the cheat sheet to identify the best label.

Item	**LANGUAGE**	NO	**Intensity of Coverage** Indicate here if planned for later this year						**Highest Performance Expectation**						**Grade Level**
			0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A1	Discussion (discussion rules, group interactions)							P				C			**B**
A2	Questioning, Listening, and Contributing (class discussion contributions, gathering information)					3					P				**3**
A3	Oral Presentation (presentation elements and techniques, presentation preparation)														

Intensity of Coverage
0= *No coverage* (Not an expectation for this topic this school year) **1**= *Slight coverage* (1-10 lessons over the course of the school year) **2**=*Moderate coverage* (11-20 lessons over the course of the school year) **3**= *Sustained coverage* (21 or more lessons over the course of the school year) **4**= *Intensive, systematic coverage* (daily/nearly daily instruction throughout the school year) **P** = *No coverage yet, but planned for later this school year*

Highest Cognitive Demand/Performance Expectation (of the student this year)
A: *Attention* (touch, look, vocalize, respond, attend, recognize) **MR**: *Memorize/recall* (list, describe, identify, state, define, label) **P**: *Performance* (demonstrate, follow, choose, count, locate) **C**: *Comprehension* (explain, conclude, group, restate, review, translate) **APP**: *Application* (compute, organize, collect, apply, classify, construct, solve, use) **ASE**: *Analysis, Synthesis, Evaluation* (pattern, analyze, compare, contrast, compose, predict, extend, plan, judge, evaluate)

Grade Level
Write in precise grade level OR use codes for grade bands: **A**: pK-2 **B**: 3-5 **C**: 6-8 **D**: 9-12 **V**: Vocational **N**: No grade

Teacher: _____ Student's grade: _____ Date: _____

→ ***BEGIN SURVEY HERE***

Item	**LANGUAGE**	NO	**Intensity of Coverage** Indicate here if planned for later this year					↓	**Highest Performance Expectation**						**Grade Level**
A1	Discussion (discussion rules, group interactions)		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A2	Questioning, Listening, and Contributing (class discussion contributions, gathering information)		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A3	Oral Presentation (presentation elements and techniques, presentation preparation)		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A4	Vocabulary and Concept Development (antonyms, synonyms, compound words, prefixes, suffixes, dictionary use, use in context)		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A5	Structure and Origins of Modern English (grammar, mechanics, parts of speech)		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A6	Formal and Informal English (standard vs. conversational language)		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
	READING AND LITERATURE	NO													
B1	Beginning Reading (letters, handling of a book, phonemic awareness, letter/sound combinations, decode words)		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
B2	Understanding a Text (predictions, retell stories, cause/effect, story elements, imagery, symbolism)		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
B3	Making Connections (compare authors, illustrators, settings)		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
B4	Genre (forms of literature- poetry, prose, fiction, nonfiction, drama)		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
B5	Theme (lessons of folktales, fables, myths, theme identification)		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
B6	Fiction (plot, character, setting identification of stories)		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
B7	Nonfiction (meaning, prediction, and fact identification of informational material)		0	1	2	3	4	P	A	MR	P	C	APP	ASE	

Excerpt of Part 5: Science Long Version

Teacher: _____ Student: _____ Date: _____

→ ***BEGIN SURVEY HERE***

Item	Earth and Space Science	NO	Intensity of Coverage (Indicate here if planned for later this year ↓)						Highest Performance Expectation						Grade Level
A1	Methods and equipment used to study Earth's system		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A2	The earth's surface is composed of land, water and living things		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A3	Air (as a gas)		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A4	Repeating patterns of Earth (e.g., seasons, day/night)		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A5	Weather/seasonal changes		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A6	Catastrophic weather conditions effects on humans		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A7	Factors contributing to weather outcomes		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A8	Types of precipitation		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A9	Weather vs. climate		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A10	Sun as heat/light source		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A11	Relationship between solar energy and the earth		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A12	Minerals		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A13	Types/origin of rocks		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A14	Properties/formation of soil		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A15	Physical features/land forms of the earth		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A16	Layers of the earth		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A17	Rock cycle		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A18	Seismic data		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A19	Plate tectonics		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A20	Crustal plate movement		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A21	Changes in Earth's interior		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A22	Water movement		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A23	Effect of water cycle on climate		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A24	Heat transfer		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A25	Global atmospheric patterns and their effect on temperature		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A26	Sources of energy		0	1	2	3	4	P	A	MR	P	C	APP	ASE	
A27	Impact on global atmospheric processes by transfer of energy		0	1	2	3	4	P	A	MR	P	C	APP	ASE	

Appendix C

Summary of Alignment Criteria

Criterion	How criterion will be measured	Who will measure criterion
1- The content is academic and includes the major domains/strands of the content area as reflected in state and national standards (e.g., reading, math, science).	A) % of academic using national definitions B) % of foundational skills using our definition	A)Content Experts B) Spec Ed Experts
2- The content is referenced to the student's assigned grade level (based on chronological age).	A) Report state use with AA and EXS (yes/no) B) Is yes, report % by the strand intended by state C) Qualitative statement about the omitted strands (if any) including our recommendations about gaps	Alignment Team
3- The focus of achievement maintains fidelity with the content of the original grade level standards (content centrality) and when possible, the specified performance (category of knowledge).	A) Report % of EXS to state standards and % of AA to EXS or state standards B) Summarize intended vs actual C) Describe zero ratings of content centrality rated as either an overstretched skill, a mismatch to the standard, or a back fitted skill D) Report age/grade appropriateness of tasks	A-C) Content Experts D) Spec Ed Experts
4- The content differs from grade level in range, balance, and DOK, but matches high expectations set for students with significant cognitive disabilities.	A) Report DOK, Range, and Balance with intended priorities of state using only those items with content centrality B) Provide information about the states identified	A) Content Experts B) Alignment Team

	priorities, if they were good priorities (revisit criterion 2), and if AA and EXS matched the priorities	
5- There is some differentiation in CONTENT across grade levels or grade bands.	A) Describe how content changes across grades (e.g., room for growth) using checklist	Content Experts
6- The expected achievement for students is for students to show learning of grade referenced academic content.	A) Describe alignment of alternate achievement standards/scoring rubric to academic content using checklist B) Report the inferences can be made about student learning v. teacher/program performance	Special Ed Experts
7- The potential barriers to demonstrating what students know and can do are minimized in the assessment.	A) Report information on accommodations, supports, adaptations provided during testing (sensory/physical) B) AA accessible or not for different disability groups	Special Ed Experts
8- The instructional program promotes learning in the general curriculum.	A) Review prof development materials and report -if states provide examples of teaching grade level content across content areas -quality indicators for programs considered B) Report findings from the Curriculum Indicators Survey (CIS) completed by teachers about classroom instructional content and practices	A) Spec Ed Experts B) Alignment Team

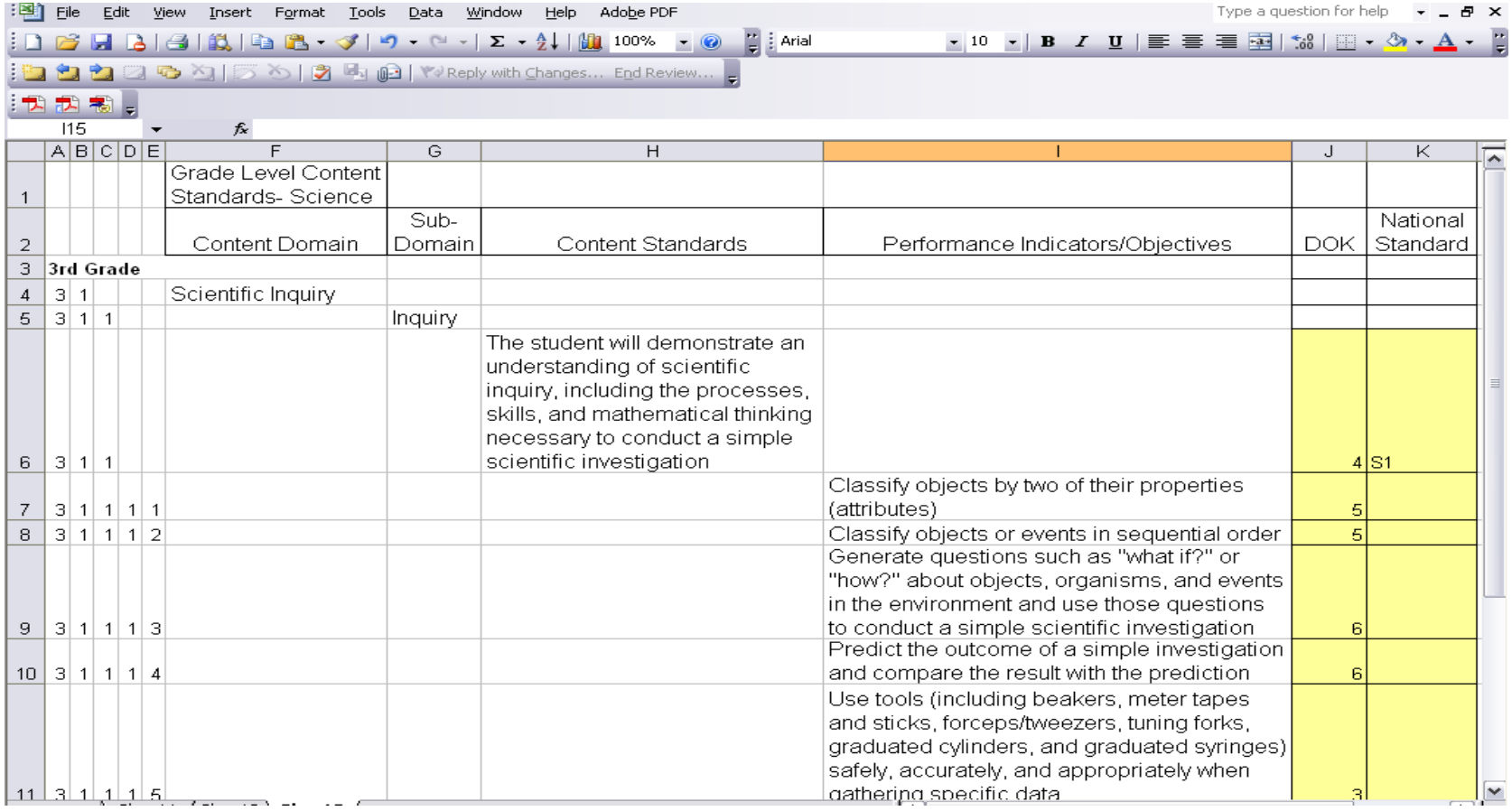
Appendix D

Examples of Coding Forms

Designing Coding Forms

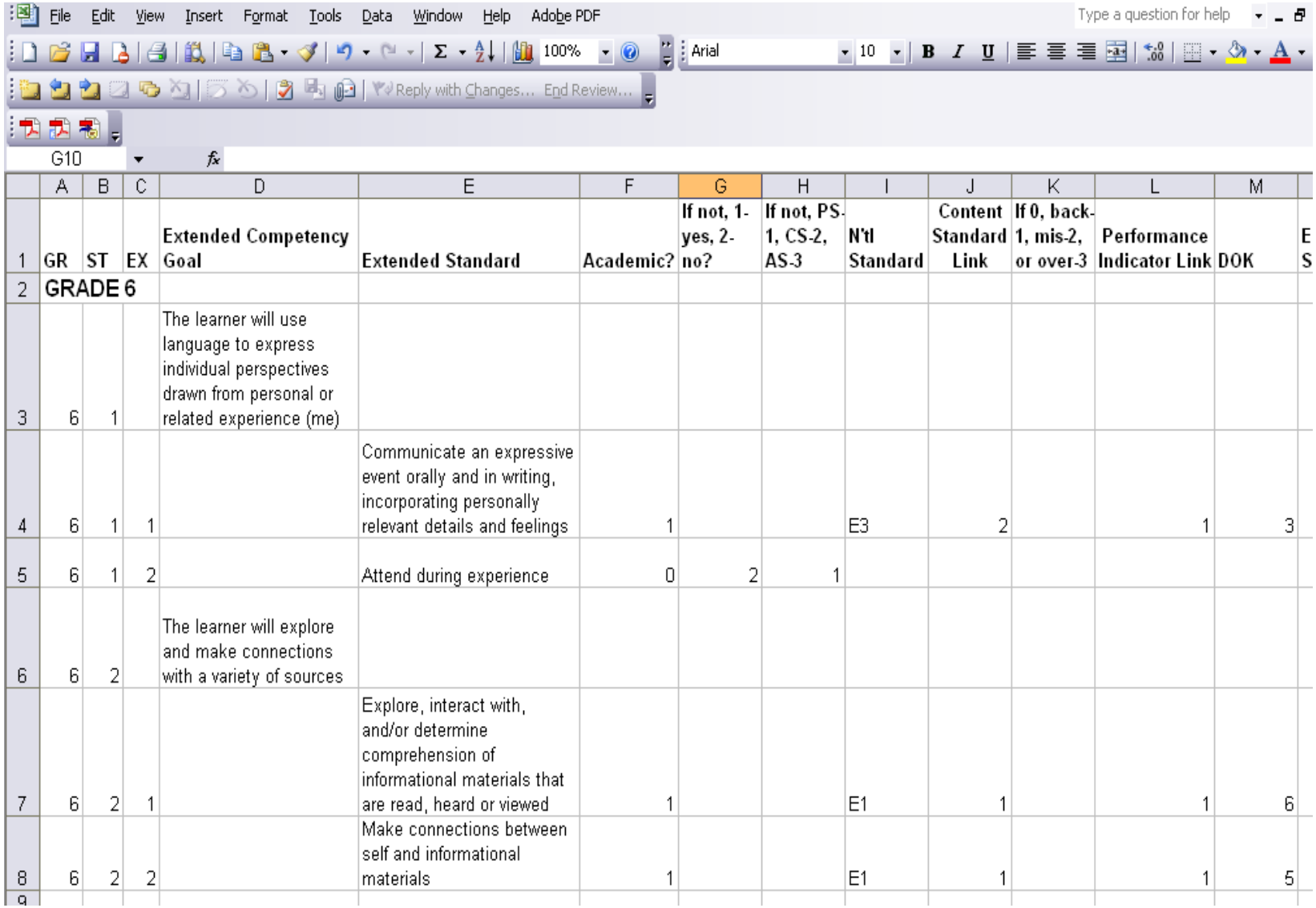
Three forms are needed for the experts--grade level academic standards, extended standards (if applicable), and AA forms. Example of the forms can be found in the illustrations below. The columns in the forms will need to be changed depending on the format of the grade level standards, extended standards, and AA items/task.

D.1: Grade level form



	A	B	C	D	E	F	G	H	I	J	K
1						Grade Level Content Standards- Science					
2						Content Domain	Sub-Domain	Content Standards	Performance Indicators/Objectives	DOK	National Standard
3	**3rd Grade**										
4	3	1				Scientific Inquiry					
5	3	1	1				Inquiry				
6	3	1	1					The student will demonstrate an understanding of scientific inquiry, including the processes, skills, and mathematical thinking necessary to conduct a simple scientific investigation		4	S1
7	3	1	1	1	1				Classify objects by two of their properties (attributes)	5	
8	3	1	1	1	2				Classify objects or events in sequential order	5	
9	3	1	1	1	3				Generate questions such as "what if?" or "how?" about objects, organisms, and events in the environment and use those questions to conduct a simple scientific investigation	6	
10	3	1	1	1	4				Predict the outcome of a simple investigation and compare the result with the prediction	6	
11	3	1	1	1	5				Use tools (including beakers, meter tapes and sticks, forceps/tweezers, tuning forks, graduated cylinders, and graduated syringes) safely, accurately, and appropriately when gathering specific data	3	

D.2: Extended Standard Form



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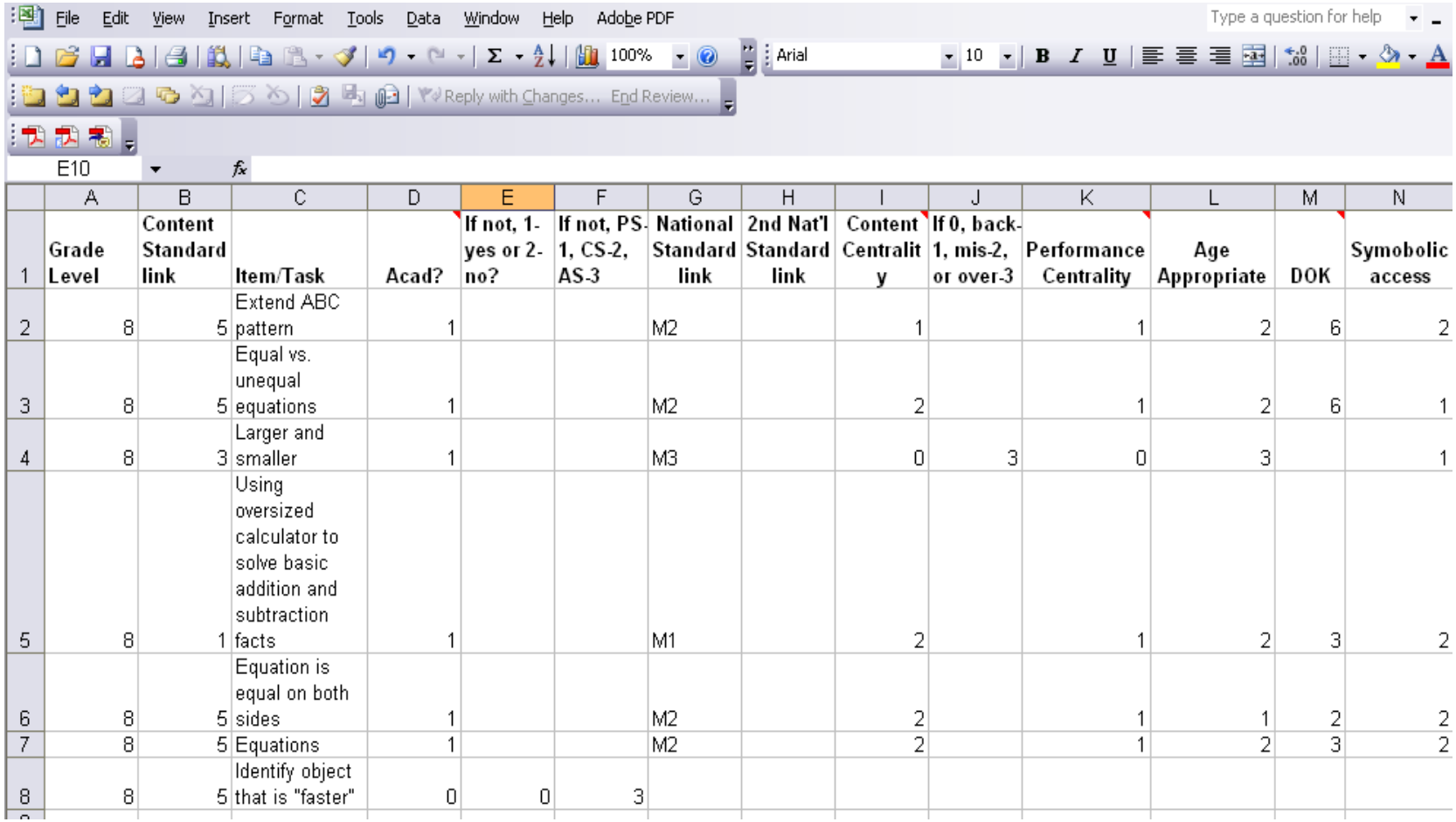
G10

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	GR	ST	EX	Extended Competency Goal	Extended Standard	Academic?	If not, 1-yes, 2-no?	If not, PS-1, CS-2, AS-3	N'tl Standard	Content Standard Link	If 0, back-1, mis-2, or over-3	Performance Indicator Link	DOK
2	GRADE 6												
3	6	1		The learner will use language to express individual perspectives drawn from personal or related experience (me)									
4	6	1	1		Communicate an expressive event orally and in writing, incorporating personally relevant details and feelings	1			E3	2		1	3
5	6	1	2		Attend during experience	0	2	1					
6	6	2		The learner will explore and make connections with a variety of sources									
7	6	2	1		Explore, interact with, and/or determine comprehension of informational materials that are read, heard or viewed	1			E1	1		1	6
8	6	2	2		Make connections between self and informational materials	1			E1	1		1	5
9													

D.3: Alternate Assessment Items Form



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Reply with Changes... End Review...

E10

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Grade Level	Content Standard link	Item/Task	Acad?	If not, 1-yes or 2-no?	If not, PS-1, CS-2, AS-3	National Standard link	2nd Nat'l Standard link	Content Centrality	If 0, back-1, mis-2, or over-3	Performance Centrality	Age Appropriate	DOK	Symobolic access
2	8	5	Extend ABC pattern	1			M2		1		1	2	6	2
3	8	5	Equal vs. unequal equations	1			M2		2		1	2	6	1
4	8	3	Larger and smaller	1			M3		0	3	0	3		1
5	8	1	Using oversized calculator to solve basic addition and subtraction facts	1			M1		2		1	2	3	2
6	8	5	Equation is equal on both sides	1			M2		2		1	1	2	2
7	8	5	Equations	1			M2		2		1	2	3	2
8	8	5	Identify object that is "faster"	0	0	3								

Appendix E

Differentiation of Content across Grades/Grade Bands

Please provide a holistic judgment about the differences found across the grade levels or grade bands. First circle if you are rating extended standards or AA items. Using the following definitions (Webb, 2005), please indicate the degree to which the change is evident. When there is some level of differentiation, provide at least one example. Use the notes of interest column to capture anything of importance (e.g., seeing the evidence of vertical differentiation occurring in one strand rather than across strands). Remember that only those extended standards and AA items which were rated as academic and having at least some content centrality should be included in the current analysis.

(a) *broader*—higher-grade standards or items reflect broader application of target skill or knowledge;
(b) *deeper*—higher-grade standards or items reflect deeper mastery of the target skill or knowledge;
(c) *prerequisite*--lower-grade standards or items reflects a different by prerequisite skill for mastery of the higher grade standard;
(d) *new*—the higher-grade has a new skill or knowledge unrelated to skills or knowledge covered at prior grades; and
(e) *identical*—higher-grade standards or items appear identical to one of the lower-grade standards.

CONTENT AREA:_____ Extended Standards/AA items

VERTICAL RELATIONSHIPS	RATINGS PER GRADE LEVEL/ GRADE BAND				EXAMPLES	NOTES OF INTEREST
	@75% (clear)	@50% (partial)	@25% (limited)	@0% (no)		
BROADER						
DEEPER						
PREREQUISITE						
NEW						
IDENTICAL						

Appendix F

Degree of Inference about Student Learning (based on scoring for each AA item or found in the standards setting information)

Criterion	**High Student Inference** Can clearly infer student showed learning	**Low Student Inference** Student performance mixed with educator performance	**No Student Inference** Can clearly infer student did not have to show any learning/ Teacher or program performance rated ("Raggedy Andy" would pass)	**Rationale for Rating (provide where evidence found)**
Level of accuracy	High level of accuracy (If one response; response is correct. If multiple responses, above 90% correct)	Lower level of accuracy or accuracy intermixed with teacher assistance to extent difficult to determine what student did.	Does not have to get items correct to receive credit.	
Level of independence	Only independent response receives credit (Students may receive a verbal question/ direction to respond but not told what response to make)	Credit given for responses in which student performs either without guidance after told or shown the exact response to make (verbal, model prompts, scaffolding) or are done after shown/ told exact response to make and also given some guidance to make the response (partial physical)	Credit given for responses made with hand over hand assistance	
New learning (important to AA because alternate achievement is not as clear as grade level)	Baseline or pretest provides support that this is new learning OR One time performance but clear differentiation of AA items by grade level (criteria 5)	One time performance AND grade level differentiation of AA items was not clear (criteria 5)	No baseline, pretest, and weak differentiation across grade level AA items suggest student could achieve proficiency by making same response year after year (criteria 5).	

Criterion	**High Student Inference** Can clearly infer student showed learning	**Low Student Inference** Student performance mixed with educator performance	**No Student Inference** Can clearly infer student did not have to show any learning/ Teacher or program performance rated ("Raggedy Andy" would pass)	**Rationale for Rating (provide where evidence found)**
Generalization across people and settings (Note: this is less important than conceptual generalization)	Tasks are demonstrated across people or settings for full credit	At least some tasks are demonstrated across more than one person or setting	Task is only demonstrated with one person in one setting	
Generalization across materials and activities (conceptual generalization)	Tasks are demonstrated across materials and activities or all standards have more than one task	At least some tasks are demonstrated across materials or activities; or there is more than one task for some standards	Task is only demonstrated with one specific material and activity; there is only one task per standard	
Standard Setting	Standard set for proficiency is based on independent student performance and high level of accuracy	Standard set for proficiency will require student show some independent responding and respond correctly above chance level	Standard set for proficiency is so low students could meet it with either chance responding or prompting that gives student the answer	
Program Quality Indicators	If program quality indicators are used, they are not factored into student score	If program quality indicators are used, they have minimal impact on student score (e.g., small portion of rubric)	Student score is heavily influenced by program quality indicators in rubric	

Appendix G
Minimizing Barriers for Students Checklist

Instructions: Using the assessment as a whole (including assessment materials and administration manual), consider whether a student with each of the characteristics listed in the first column would be able to complete the assessment with the level of independence and accuracy expected by the state. Indicate in the other columns whether the student would be able to show what s/he knows on the assessment, based on the kinds of supports provided.

Definitions:

No provision: This type of student would not be able to demonstrate knowledge/skill on the assessment; needed supports are nonexistent or insufficient to help this type of student demonstrate learning.

→ ***If you answer "yes" to "no provision" in the first column for a type of student, skip to the next row.***

Flexibility built into tasks: This type of student would be able to demonstrate knowledge/skill because of flexibility in administration. Flexibility is built into the items (e.g., teacher choice/design in portfolio, scaffolding in scripted performance events).

Accommodations: This type of student would be able to demonstrate knowledge/skill because of allowable accommodations. Accommodations are not built into items/tasks, but are described in the test administration materials and may be applied to this type of student. Accommodations do not change the construct being measured.

Modifications: This type of student would be able to demonstrate knowledge/skill because of modifications in assessment materials, administration procedures, etc. Modifications are not built into items/tasks, but are described in the test administration materials and may be applied to this type of student. Modifications do change the construct being measured.

Minimizing Barriers for Students Checklist

Subject: ELA Math Science Rater ID: _____

Type of student	**No provision** for students with these characteristics	Can do alternate assessment as designed, with **flexibility built into tasks**	Can do with **accommodations** available/ stated (no change in construct measured)	Can do with **modifications** or supports stated (may alter construct being measured)
Visual impairment/ legally blind	Y	Y N	Y N	Y N
Hearing impaired	Y	Y N	Y N	Y N
Deaf/ blind	Y	Y N	Y N	Y N
Nonverbal; responds using printed words	Y	Y N	Y N	Y N
Nonverbal; responds using pictures	Y	Y N	Y N	Y N
Nonverbal; responds using manual signs	Y	Y N	Y N	Y N
Nonverbal; responds using eye gaze	Y	Y N	Y N	Y N
Verbal but no use of hands	Y	Y N	Y N	Y N
Communicates with objects or by indicating yes/no	Y	Y N	Y N	Y N

Does the assessment include any way of capturing responses or any responses for students who do not yet have clear, intentional communication even at the nonsymbolic level?	Yes	No
Are the accommodations, modifications, and supports that can be used clearly defined to the extent that standardized administration of the assessment is possible?	Yes	No

Comments

Appendix H
University of North Carolina at Charlotte National Alternate Assessment Center
Alignment of Professional Development Resources for ELA, Math, and Science

Please indicate if the following are reflected in the *teacher training materials*.

Criteria	Indicators	Yes	No
1. The content is academic and includes the major domains/strands of the content area as reflected in state and national standards.			
	1.1 Are teachers trained to review grade level content standards?		
	1.2 Are teachers trained to use extended or adapted grade level content standards? (if applicable)		
2. The content is referenced to the student's assigned grade level.			
	2.1 Are teachers trained to use the students' grade or grade band to determine what to teach?		
3. The focus of achievement maintains fidelity with the content of the original grade level standards (content centrality) and when possible, the specified performance (category of knowledge).			
	3.1 Are teachers being trained to align content for instruction with state standards?		
4. The content differs from grade level in range, balance, and DOK, but matches high expectations set for students with significant cognitive disabilities.			
	Are teachers trained in alternate achievement including:		
	4.1 the academic priorities set by the state for this		

Criteria	Indicators	Yes	No
	population?		
	4.2 delivering instruction at varying levels of depth of knowledge?		
5. There is some differentiation in content across grade levels or grade bands.			
	5.1 Are teachers given guidance to plan for increasing expectations across the grades or grade bands?		
6. The expected achievement for students is for the students to show learning of grade referenced academic content.			
	Are teachers trained to promote active student learning of academic content including:		
	6.1 how to target independent responses?		
	6.2 how to decrease student prompting (i.e. increase independent responses)?		
	6.3 how to teach generalization (e.g. concept generalization)?		
	6.4 how to promote student mastery of skills?		
7. The potential barriers to demonstrating what students know and can do are minimized in the assessment.			
	Are teachers trained how to adapt content for		
	7.1 students with sensory impairments?		
	7.2 students with physical impairments?		
	7.3 students with different symbolic levels of communication?		
8. The instructional program promotes learning in the general curriculum.			
	8.1 Are teachers trained in the use of best instructional and assessment practices? (See Program Quality Indicator Checklist).		

Appendix I

PROGRAM QUALITY INDICATORS CHECKLIST (find evidence in scoring rubric, professional development materials, the administration manual of the alternate assessment, or other [specify below])

Does the alternate assessment and professional development promote:	**Yes/No**	**Location of evidence?**
1. opportunities for instruction in general education classrooms for students with significant cognitive disabilities?		
2. opportunities for instruction with typical peers for students with significant cognitive disabilities?		
3. opportunities for students with significant cognitive disabilities to make choices, problem solve, self-advocate, self-evaluate?		
4. the provision of assistive technology for students who need it?		
5. the access and use of typical classroom resources within instruction (e.g., science kits, grade level books, textbooks)?		
6. literacy being promoted across the content areas for students with significant cognitive disabilities (e.g., the pairing of text with picture symbols and objects)?		
7. the meaningful linking of academic skills in functional contexts?		

Appendix J
Alignment Expert Rater
Demographic Information

Name: _____ Subject: ELA math science special education

1. What is your current professional role or job title? _____
2. How many years of experience do you have in p-12 education? _____
3. How many years of experience do you have in your area of content expertise (ELA, math, or special education)? _____
4. Please list the types of degrees you hold, and in what areas.

   Bachelors: _____

   Master's: _____

   Other advanced degree: _____

5. Please list all certifications you hold in your content area:

6. Are you certified in your content area by the National Board of Professional Teaching Standards?

   YES NO

7. Please check all of the following statements that apply to you:

   _____ I conduct/have conducted professional development for teachers in my content area
   _____ I have/had a leadership role in curriculum planning in my school or district
   _____ I have taught future teachers in a higher education setting

8. If there is other information that would help us understand your expertise in your content area, please describe it here (like experience as an assessment item writer or review, range finder, etc.)

Appendix K

Example of Codebook for Alignment

See all code sheets (i.e., National standards and definitions, DOK, Content and Performance centrality, symbol levels, contexts, and age appropriate codes)

Rule	Example	Error/Non Example	Who
1. Code all grade level content standards and performance indicators/objectives for DOK. If the standards or PI have multiple depths, indicate the highest knowledge level. (Use DOK sheet and codes.)	Compare and contrast the basic needs of plants and animals = **6 (analysis, evaluation, synthesis)**	ERROR: Compare and contrast the basic needs of plants and animals = **3 (performance)** *MUST ANALYZE AND EVALUATE INFORMATION WHICH IS A LEVEL 6.*	Content expert
2a. Code all grade level content standards for alignment with national standards. (Use national standards sheet and codes.)	Understand the place-value structure of the base-ten number system and be able to represent and compare whole numbers and decimals = **M1**	ERROR: Understand the place-value structure of the base-ten number system and be able to represent and compare whole numbers and decimals. = **M4**	Content expert
2b. Code all CIS topics for alignment to grade level content strands. (Use strand codes.)	CIS: Measurement GLCS: Spatial Sense, measurement, and geometry = **SS1**	ERROR: CIS: Measurement GLCS: Patterns, relationships, and functions = **P1**	Content expert
3a. Review the extended standards. Code each extended standard as academic or not. (If coded as not academic, ask partner expert to code extended standard also.)	Count one to one correspondence = **1 (academic)**	NON EX: Increase attending behavior= **0** *NOT AN ACADEMIC STANDARD.*	Content expert
3b. For all NOT ACADEMIC standards, code if a foundational skill or not. All NOT ACADEMIC standards should not be coded by content expert any further.	Turn the page of a book = **1- Foundational Skill**	NON EX: Make choices = **0- No Foundational Skill**	Spec Ed expert
3c. For all NOT ACADEMIC standards, code the symbolic level of each item (PS, ES, S).	Turn the page of a book = **Presymbolic**	ERROR: Transition between activities**= Symbolic** *STUDENTS AT A PRESYMBOLIC LEVEL COULD PARTICIPATE IN TASK*	Spec Ed expert
4. Code the primary and secondary national standard	Identify man made versus naturally	ERROR: Describe the appropriate	Content expert

link to the extended standard. (Use national standards sheet and codes.)	made items. = **S5 & S6**	habitat for an animal. = **S7** *WRONG CODE: SHOULD BE LIFE SCIENCE S3*	
5a. Code the content standard link to each extended standard. If content standard not given by state or too vague, code it as an X.	GLS: Read and write amounts of money using the dollar sign ($) and decimal notation (.). EXS: Identify the dollar amount in written form = **2 (near link)** GLS: Apply strategies and skills to create oral, written, and visual texts EXS: Compose visual representations = **1 (far link)**	NON EX: GLS: Demonstrate the ability to respond to texts both orally and in writing. EXS: Hold a book while a story is being read = **0 (no link)** *HOLDING A BOOK DOES NOT EQUATE TO RESPONDING TO TEXT.*	Content expert
5b. Code any extended standard that was rated as "0/no link" for content centrality for either backmapping, standard mismatch, or standard overstretch. All standards that are coded as "0/no link" should not be coded any further.	*GLS: Apply strategies to read and write EXS: Communicate with peers = **backmapping** *GLS: Compute with rational numbers EXS: Change in one quantity relates to change in second quantity = **mismatch** GLS: Apply strategies to comprehend text *EXS: Choose text for exploration = **overstretch**		Content expert
6. Code the performance link of the extended standard to the content standard. If content standard not given by state or too vague, code it as an X.	GLS: *Read and write* whole numbers. EXS: *Identify* numerals up to 10 = **1 (some)**	NON EX: GLS: *Read and solve* simple addition/subtraction word problems EXS: *Identify* the + and – signs in problems **= 0 (no)**	Content expert

		THE PERFORMANCE FOR THE EXTENDED STANDARD IS CLEARLY DIFFERENT THAN THE PERFORMANCE EXPECTED IN THE CONTENT STANDARD.	
7. Code the DOK for extended standard. (Use DOK coding sheet.)	Count one to one correspondence = **3 (performance)**	ERROR: Identify the character in the story = **4 (comprehend)** *WRONG CODE: THIS IS SIMPLY RECALL AND SHOULD BE CODED A 2.*	Content expert
8. ONCE ALL EXTENDED STANDARDS ARE CODED, rate the overall progression of standards (e.g., emphasis across grade levels, any content changes).			Content expert
9a. Review the alternate assessment items. Code each item as academic or not. (If coded as not academic, ask partner expert to code item also.)	Count one to one correspondence = **1 (academic)**	NON EX: Push wheelchair down hallway = **0** *NOT AN ACADEMIC SKILL.*	Content expert
9b. For all NOT ACADEMIC items, code if a foundational skill or not. All NOT ACADEMIC skills should not be coded by content expert any further.	Turn the page of a book = **1- foundational skill**	NON EX: Identify colors = **0- no foundational skill**	Spec Ed expert
9c. For all NOT ACADEMIC items, code the symbolic level of each item (PS, ES, S).	Turn the page of a book = **presymbolic**	ERROR: Walk in a straight line **= symbolic** *STUDENTS AT A PRESYMBOLIC LEVEL COULD PARTICIPATE IN TASK*	Spec Ed expert
10. Code the primary and secondary (if necessary) national standard link to the AA item. (Use national standards sheet and codes.)	Count one to one correspondence = **M1**	ERROR: Matching text to pictures= **E2** *WRONG CODE: SHOULD BE LIFE SCIENCE E1*	Content expert
11a. Code the overall content link of the alternate assessment items to the grade level or	EXS: Identify common sight words (ext. standard) AA: Identify the	NON EX: EXS: Count items up to 5 AA: Make choice out of three items for snack	Content expert

extended standard.	name of another student out of a choice of 3 **= 2 (near link)** EXS: Observe and investigate patterns of weather over time using tools AA: Identify use of weather instruments = **1 (far link)**	–**= 0 (no link)** *CHOOSING A SNACK ITEM FROM MULTIPLE CHOICES IS NOT THE SAME CONTENT AS COUNTING.*	
11b. Code any alternate assessment item that was rated as "0/no link" for content centrality for either backmapping, standard mismatch, or standard overstretch.	* EXS: Demonstrate knowledge of microorganisms in human disease AA item: Follow steps of washing hands = **backmapping** * EXS: explore, observe, and investigate how living things are connected AA item: Indicate correct weather symbol =**mismatch** * EXS: Awareness of differences in ecosystems AA item: Identify deserts as dry and oceans as wet = **overstretch**		Content expert
12. Code the overall performance link of the alternate assessment items to the grade level or extended standards.	EXS: *Compare* different types of sounds based on characteristics such as pitch and volume AA: *Identify and compare* loud and soft sounds = **1 (some)**	NON EX: EXS: *Describe* how clouds form. AA: *Make* a cumulus cloud using cotton balls. = **0 (no)** *MAKING AN ITEM IS A DIFFERENT PERFORMANCE THAN DESCRIBING AN ITEM.*	Content expert
13. Code age appropriateness of each alternate assessment item. (1=adapted from grade level, 2= grade neutral, 3= inappropriate for teens, 4=inappropriate for school age)	Identify story characters about a book about planting a garden **= 2 (grade neutral)**	ERROR: Participate in group songs such as "If You're Happy and You Know It" **= 2 (grade neutral)** *SONG IS A PRESCHOOL /EARLY ELEMENTARY SONG AND IS NOT*	Spec Ed expert

		APPROPRITATE FOR MIDDLE /HIGH SCHOOL	
14. Code the DOK for the alternate assessment items. (Use DOK coding sheet.)	Touch picture when requested that is found in the story. = **1 (attention)** Identify fact or fiction (e.g., pretend) when read a story or sentence or shown a picture. = **5 (application)**	ERROR: Touch picture when requested that is found in the story. = **2 (memorize/recall)** *TOUCHING A PICTURE IS SIMPLYY AN ATTENTION ITEM* Identify fact or fiction (e.g., pretend) when read a story or sentence or shown a picture. = **2 (memorize/recall)** *THE CONTENT OF THE ITEM REQURIES A HIGHER DEGREE OF DOK*	Content expert
15. Code the symbolic accessibility of each alternate assessment item.	Add two written numbers using manipulatives or pictures, or objects **= 2= symbolic**	ERROR: Rote count to 5 **= 1 = non symbolic** *STUDENTS DO NOT NEED SYMBOLIC COMMUNICATION SKILLS TO ROTE COUNT*	Spec Ed expert
16. ONCE ALL AA ITEMS ARE CODED, rate the overall progression of items (e.g., emphasis across grade levels, any content changes).			Content expert
17. Code the overall accessibility of AA items (e.g., accommodations, supports, adaptations for sensory or physical impairments) using Minimizing Barriers checklist.			Spec Ed expert
18. Code the link between academic content and alternate achievement standards (use AAS checklist and related materials			Spec Ed expert
19. Code the professional development material (use Professional Development Resource checklist and Quality Indicator Checklist).			Spec Ed expert

Appendix L

State D Alternate Assessment Alignment Report

Links for Academic Learning

Report to the State Department of Education

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EXECUTIVE SUMMARY

This report details findings from an investigation of the alignment of State D's alternate assessments based on alternate achievement standards in Reading and Mathematics to grade level content standards. The criteria used in this alignment study are being evaluated as part of the UNC Charlotte partnership in the *National Alternate Assessment Center* (NAAC). This report is organized by the eight criteria developed by a collaboration of content experts, special educators, and measurement experts at UNC Charlotte (Browder, Wakeman, Flowers, Rickleman, Pugalee, & Karvonen, 2006). While some of the alignment criteria are similar to other alignment methods (e.g., Webb, Surveys of Enacted Curriculum, and Achieve), additional criteria (criteria 5-8) were designed specifically as value indicators for students with significant cognitive disabilities (see Table 1).

A total of 225 reading and 231 math portfolios were evaluated in this alignment study. A stratified random sampling method (stratified on grade level) was used to select the portfolios. Portfolios from grades 3 to 8 and 10 were included in this study.

Alignment Results by Criterion

Criterion 1: *The content is academic and includes the major domains/strands of the content area as reflected in state and national standards (e.g., reading, math, science).*

> Outcome: Almost all of the reading and math Mastery Objectives (MOs) were rated academic, 99% (n=2220) and 94% (n=2179) respectively. Most of the reading MOs were aligned to the national standard of reading (85%) while some of the MOs were aligned to viewing/visual (10%) and listening (5%). Math MOs were aligned to all five components of the National Council of Teachers of Mathematics.

Criterion 2: *The content is referenced to the student's assigned grade level (based on chronological age).*

> Outcome: In reading, approximately 82% (n=1817) of the MOs reviewed were referenced to a grade level standard. Some of the MOs that were designed by the examiners teams (e.g., teachers; n=44, 2.0%) were not referenced to a grade level standard. Three hundred and fifty four MOs (15.7%) were referenced to off-grade standards (K-2) which were referenced to the standards of phonics and phonemic awareness. Some of the MOs (n=21, .9%) were not found in the database provided. In math, almost all of the MOs (97%, n=2121) were referenced to a grade level standard. A problematic area appears when the examiners team designs the MO and do not reference to the grade level.

Criteria 3: *The focus of achievement maintains fidelity with the content of the original grade level standards (content centrality) and when possible, the specified performance.*

> Outcome: Almost all of the reading MOs (99%) were rated as far or near for content centrality. The few MOs rated having no content centrality were due to mismatch to the appropriate standard. For reading performance centrality, most MOs were rated partial or full (92%). In math, most of the MOs were rated as far in content centrality (92%) and

partial in performance centrality (92%). Approximately 5% of the math MOs were rated non-scoreable due to a lack of information or detail. Only the MOs that were rated as academic and were referenced to grade level content standards were evaluated for content and performance centrality. Additionally, most of the student products and artifacts in reading (90%) and math (92%) were rated as being linked to the MO. Some the student products and artifacts (8%) could not be rated due to lack of information or detail.

Criterion 4: *The content differs from grade level in range, balance, and DOK, but matches high expectations set for students with significant cognitive disabilities.*

Outcome: For reading, all the reading standards had multiple MOs that were linked to the standard, between 44 to 210 MOs per standard. All of the standards had at least six MOs, which satisfies Webb's categorical concurrence criteria. Most of the reading MOs were rated at the depth of knowledge level of memorize/recall (73%), but there were MOs rated at the highest level of depth of knowledge. As expected with alternate assessments, most MOs were below grade level standards depth of knowledge. The balance of representation suggested that the reading MOs were not evenly distributed across the standards. There was a greater emphasis on *General Reading Processes* than the other two categories, which was the intent of the state. The range-of-knowledge indicated that some grade level topics (nested under the standard) are under-represented (fluency, comprehension of literature, comprehension of information text) in some of the grades. Again, the state designed the alternate assessment based on alternate achievement standards to under-represent these objectives.

For math, MOs were aligned to all grade level standards except for 3rd and 10th grades, which had no items aligned to *Knowledge of Statistics* and *Data Analysis and Probability* respectively. MOs are distributed across all levels of depth of knowledge except the lowest level (i.e., attention). The performance and analysis/synthesis/evaluation levels had the largest percentage of MOs. This distribution of MOs across the levels of depth of knowledge is typically not found for most alternate assessments. The balance of representation results, which ranged from .36 to .61, indicate that the MOs were not evenly distributed across all of the standards. The range of knowledge results indicated that a few of the standards did not have MOs for at least 50% of the objectives.

Criterion 5: *There is some differentiation in achievement across grade levels or grade bands*.

Outcome: Overall the reading has good differentiation across grade levels and could serve as a model for other states on how to achieve this criterion. Some improvement may be considered for General Reading Comprehension. In contrast, mathematics needs some improvement for most strands. While there is some limited differentiation, overall most items were redundant from lower to upper grades.

Criterion 6: *The expected achievement for students is for the students to show learning of grade referenced academic content.*

Outcome: In this system it can be inferred that the student performed a new response at a high level of accuracy and this score was in no way augmented with program factors. In contrast, the score may reflect a low level of actual learning when more intrusive prompting was used and no inference can be made with full physical guidance.

Criterion 7: *The potential barriers to demonstrating what students know and can do are minimized in the assessment.*

Outcome: Because flexibility is built into the tasks teachers select, this alternate assessment minimizes barriers for the broadest range of heterogeneity within the population. A review of 4883 MOs indicated that 92% of the MOs were accessible at an abstract level of symbolic communication while the remaining MOs were accessible to students at a concrete level of symbolic communication.

Criterion 8: *The instructional program promotes learning in the general curriculum.*

Outcome: The Handbook is well developed and covers the grade level domains that are included in alternate assessment. It is recommended that that additional information on how to fade prompts and promote independent student responding be included in the handbook. Also, some additional information on the use of assistive technology may also be useful.

Some counties within the state have exemplary professional development materials that could serve as a national model. In contrast, other counties seem to have minimal resources. Sharing resources across counties may be beneficial.

A review of the administration handbook and professional development materials indicated that program quality indicators (e.g., instruction with typical peers, making choices, provisions of assistive technology) were addressed in the materials. The handbook, however, did not mention the opportunity for instruction in general education classroom for students with significant cognitive disabilities.

Overall Analysis of Alignment

Overall the alternate assessment demonstrated good access to the general curriculum. Almost all of the MOs were academic and demonstrated a far or near content centrality link to the grade level content standards. For reading, the MOs were reduced in depth of knowledge from the grade level depth of knowledge and the MOs did not have the same content coverage that was found in the grade level standards. For math, the MOs had very similar depth of knowledge levels that are found in the grade level content standards, which is unusual for

alternate assessments. The math MOs content coverage did not have the same emphasis that is found in the grade level content standards. There is clear differentiation across the reading grade levels but the number of repeating math MOs across the grade levels should be reviewed.

Flexibility is built into the examiners team selection of MOs, which minimizes barriers for students with significant cognitive disabilities. MOs at all levels of symbolic communication were found allowing access for all students regardless of their symbolic communication levels. The alternate assessment was well developed and covered the grade level standards. The quality of the professional development materials varied across the different counties but some counties had outstanding resources that might be shared statewide.

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ALTERNATE ASSESSMENT ALIGNMENT
REPORT TO THE STATE D STATE DEPARTMENT OF EDUCATION

This alignment study was conducted on the basis of information obtained on the 2007 State D Alternate Assessment. Portfolios were randomly selected from all 3rd to 10th participants. The criteria in this alignment study are being evaluated as part of the UNC Charlotte partnership in the *National Alternate Assessment Center* (NAAC). This report is organized by the eight criteria developed by a collaboration of content experts, special educators, and measurement experts at UNC Charlotte (Browder, Wakeman, Flowers, Rickleman, Pugalee, & Karvonen, 2006). While some of the alignment criteria are similar to other alignment methods (e.g., Webb, Surveys of Enacted Curriculum, and Achieve), additional criteria (criteria 5-8) were designed specifically as value indicators for students with significant cognitive disabilities (see Table 1).

All reviewers were instructed on the purpose of alternate assessments and reviewed all the testing materials and academic content standards provided by the state of State D. The Reading and Mathematics content reviewers rated the alignment of Mastery Objectives (i.e., AA tasks developed by the state) to grade level content standards as a team until there was consensus. After both the content experts reached consensus, they rated subsequent items independently. Independent ratings of some common Mastery Objectives (MOs) were used to evaluate inter-rater agreement. Only MOs that were included in the portfolios were rated and not the entire bank of MOs. Special education experts rated the student work or artifacts, professional development materials, and the age appropriateness and symbolic levels of the standards and MOs.

DESCRIPTION OF STATE D STANDARDS AND ALTERNATE ASSESSMENT

State D's alternate assessment based on alternate achievement standards assesses student mastery of reading and math objectives from the State D Content Standards. Student test examiner teams, which consist of teachers, related service providers, instructional assistants, and others, construct a portfolio of evidence that demonstrates that the student attained the target Mastery Objectives that were written to align with the selected reading and mathematics content standard objectives. While there are pools of Mastery Objectives for each grade level, examiner teams are allowed to design unique Mastery Objectives for students.

Early in the school year the examiner team uses the alternate assessment results from the prior year (or conducts a pre-assessment) to determine the student's current reading and mathematics skill. The student's upcoming instructional and assessment program is based on the results of this review. The team selects the reading and math content standard objectives that the student is expected to attain with at least 80% accuracy. The academic objectives should include objectives that the student has not achieved. The team then collaborates to develop one Mastery Objective (or assessment task) for each selected objective.

Evidence of student mastery can be obtained at any time during the test window (i.e., beginning of September to mid-March). The portfolio is a collection of student work and other artifacts that demonstrate mastery.

Test examiners select at least one indicator and two objectives from each of the content standards (i.e., the highest levels of content definition with each subject area). Indicators are attached to standards and are defined by discrete behaviors. Objectives are expected performance measures of indicators. One artifact is submitted for each objective selected. Each student who participates in the alternate assessment is assessed on 10 Reading and 10 Mathematics Mastery Objectives.

EXPERT REVIEWERS

The alignment team consisted of two English Language Arts (ELA) experts, two Mathematics experts, five experts in the education of students with significant cognitive disabilities, and two measurement experts. Content experts had a range of experience in their content area of 9 to 31 years and special education experts had a range of 7-30 years. The level of education ranged from a bachelor's degree (1 content expert) to a doctoral degree or individuals participating in a PhD program (1 content expert, 5 special education experts, 2 measurement experts). All experts had participated in conducting professional development related to their content area. Four experts had a licensure in curriculum and instruction. Five experts taught higher education classes. Finally, six of the experts had been item writers for their state's general and special education assessments.

At the beginning of each alignment activity, the team worked together to come to a consensus on the alignment of educational components. When experts disagreed, decision rules were made to ensure consistency. Then the reviewers independently rated a subset of MOs and standards and agreement between raters was examined. When the raters agreed 90%, each rater was given specific tasks. Reliability was checked periodically throughout the tasks to ensure consistent ratings.

CRITERIA FOR ALIGNING ALTERNATE ASSESSMENTS TO GRADE LEVEL ACADEMIC CONTENT

Non-regulatory guidance has specified that alternate assessments "should be clearly related to grade-level content, although it may be restricted in scope or complexity or take the form of introductory or prerequisite skills" (U.S. Department of Education, 2005, p.26). As stated in this regulation, there should be a clear *link* to the content standards for the grade in which the student is enrolled. While this gives states flexibility to determining the scope and breadth of content of alternate assessments, it does not exempt states from designing assessments that measure an academic domain with interpretable results and accurately reflecting what the student knows and can do within that academic domain. For this reason, the authors believe that the investigation of alignment between academic content, academic performance, alternate assessments, and instructional practices and resources should be as strenuous as those used for the assessment of students in the general population. In contrast, it is also expected there would be some differences in the depth, breadth or complexity of content addressed when the achievement target is an alternative to grade level achievement. Because of the unique characteristics and needs of students with significant cognitive disabilities (e.g., testing formats and instructional practices), additional alignment criteria also need to be considered for alternate assessments.

In our conceptual framework, we propose eight criteria for linking to grade-level academic content standards (see Table 1). To be linked to grade level standards, 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. Functional activities and materials may be used to promote understanding, but the target skills for student achievement are academically-focused. Some prioritization of the content will occur in setting this expectation, but it 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. The alternate expectation for achievement may 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 cognitive demand, to achieve within their level of symbolic communication, and to show growth across grade levels or grade bands.

Table 1: Criteria for Instruction and Assessment that Links to Grade Level Content

9. The content is academic and includes the major domains/strands of the content area as reflected in state and national standards (e.g., reading, math, science).
10. The content is referenced to the student's assigned grade level (based on chronological age).
11. The focus of achievement maintains fidelity with the content of the original grade level standards (content centrality) and when possible, the specified performance.
12. The content differs from grade level in range, balance, and DOK, but matches high expectations set for students with significant cognitive disabilities.
13. There is some differentiation in content across grade levels or grade bands.
14. The expected achievement for students is for the students to show learning of grade referenced academic content.
15. The potential barriers to demonstrating what students know and can do are minimized in the assessment.
16. The instructional program promotes learning in the general curriculum.

The following sections report the results of the pilot alignment method organized around the eight criteria, as applied to State D's alternate assessment system.

ALIGNMENT RESULTS

A total of 225 Reading and 231 Mathematics portfolios were evaluated. The number of portfolios by grade level included in the alignment study is reported in Table 2. Results are reported at the system level (aggregated across grade level) and for each grade level.

Table 2: Number of Portfolios Included in Alignment Study

Grade	Reading	Math
3rd	24	25
4th	28	28
5th	36	36
6th	18	18
7th	34	33
8th	52	54
10th	33	35

Only the MOs selected by examiner teams were rated, not the entire bank of MOs. Each MO was rated each time it appeared in a portfolio, which resulted in some MOs being rated multiple times. Most of the MOs in this study were designed by the state but some of the MOs were designed by the examiner teams.

Interrater Reliability and Accuracy of Data Entry

Interrater reliability was examined by having all ratings coded independently by two experts. The agreement for content experts were: (a) 89% exact agreement for reading with 5% portfolios independently coded, (b) 95% exact agreement for math with 8% of the portfolios, and (c) 89% exact agreement for science with 4% of the portfolios. The grade level standards were also coded with overall reliability at 98% for Reading and 94% for Math. Approximately 20% of the data were double entered and examined for data entry errors. There was a 97% accuracy rate obtained.

Criterion 1: The content is academic and includes the major domains/strands of the content areas as reflected in national standards as defined by the National Council of Teachers of English (NCTE) and National Council of Teachers of Mathematics (NCTM).

Criterion 1 requires content experts to determine if the MOs are academic. MOs that are not academic are not included in any further analyses. In order to be rated nonacademic, content experts must agree (either by identical, independent ratings or by consensus after different ratings) that the MO was indeed nonacademic. To make these decisions, reviewers are asked whether the item/standard/descriptor can be logically defined by a national standard for that content area. National standards are defined according to the national content organizations (National Council of Teachers of English and National Council of Teachers of Math). If the standard or assessment item can be labeled according to a strand/component within the national standards, the reviewer codes it as academic.

Some skills may be *foundational skills* or those skills which are an assumed competence across all grade levels specific to an academic context such as turning the pages of a book. While these skills are not academic skills (i.e., cannot be defined by a national strand), they may be appropriate for some students with significant cognitive disabilities. Special educators review the items/standards/descriptors that were rated by content experts as nonacademic to identify those components that may be foundational skills.

Furthermore, nonacademic MOs are coded for symbolic level of communication. A student at the awareness/presymbolic level communicates through gestures and objects (e.g., holding up a cup when thirsty). In the concrete symbolic level, the student uses some symbols to communicate (e.g., provides teacher with a picture of a cup when thirsty). At the abstract symbolic level, the student communicates with multiple symbols (e.g., concrete and abstract picture symbols) or words (e.g. provides teacher with written word "cup" when thirsty).

Reading Results

A total of 2250 Reading Mastery Objectives (MOs) across 225 Reading portfolios were rated by content experts. Some of the MOs were rated multiple times. The number of unique MOs rated was 680. The MOs and the number of times each MO was included in the portfolios are reported in Appendix A. The most frequently occurring non-academic MOs were designed by examiner teams (n=115) and not the MOs designed by the state.

Almost all of the reading MOs (n=2220, 98.7%) were rated academic. A total of 26 MOs reviewed (1.2%) were rated nonacademic and 4 (.2%) MOs did not provide enough specific information to be rated. After deleting duplication MOs found across portfolios, a total of 11 unique MOs were rated nonacademic. MOs rated nonacademic or non-scoreable are reported in Table 3. Of the MOs rated nonacademic, 22 (85%) were rated as foundational and 26 (100%) were rated pre-symbolic.

Table 3: Non-Academic and Non-Scoreable Reading Mastery Objectives

MO #		Foundational	Symbolic Level
Non-Academic			
4038/4374*	Given a grade level book, student will hold the book in the proper manner and turn the pages one at a time.	(see note)	Presymbolic
4039/4447	Given a grade level book, student will orient it for reading.	Foundational	Presymbolic
4041/4397/4416/4433/4450/4464	Given a grade level book and the direction "Show me the title of the book", student will identify the title.	Foundational	Presymbolic
4042 Teacher Design MO	Given a grade level text, student will track text from left to right.	Foundational	Presymbolic

Note. * There are two skills in the same item. Holding the book is non-foundational but turning the page is foundational.

The six interrelated national ELA standards used in this alignment procedure are (1) Reading, (2) Writing, (3) Speaking, (4) Listening, (5) Viewing, and Visually Representing, and (6) Research. Most of the MOs were aligned to reading (84.9%), followed by viewing/visual (9.7%), and listening (4.9%).

Table 4: Alignment of Reading Mastery Objectives to NCTE Standards

	Primary		Secondary	
Components	*N*	*%*	*N*	*%*
Reading	1883	84.9	72	22.0
Writing	5	.2	13	4.0
Speaking	5	.2	40	12.2
Listening	109	4.9	16	4.9
Viewing/Visual	215	9.7	186	56.9
Research	2	.1	0	0

Mathematics Results

A total of 2308 Mathematics Mastery Objectives (MOs) across 231 Mathematics portfolios were rated by content experts. As with the Reading, some of the MOs were rated multiple times (i.e., rated each time found in a portfolio). The MOs and the number of times each MO was included in the portfolios are reported in Appendix B.

Almost all of the Mastery Objectives (MOs) (n=2179, 94.4%) were rated academic. A total of 129 MOs (5.6%) were rated nonacademic. After deleting duplication MOs found across

portfolios, a total of 36 specific MOs were consistently rated nonacademic. A list of nonacademic MOs is reported in Table 5. Of the teacher selected MOs rated nonacademic, none were identified as foundational. The number of non-academic MOs at each symbolic level was 26 (20.5%) at the presymbolic, 61 (48.0%) at concrete symbolic, and 40 (31.5%) at the abstract symbolic. Two of the nonacademic MOs were inadvertently excluded from coding for symbolic level.

Table 5: Mathematics MOs Rated Non-Academic

MO #		Foundational	Symbolic Level
2119/2326/2502/2683/2851/4072/4227	Given liquids/objects with different temperatures, student will identify the item which is hotter and which is colder.	Non-Foundational	Presymbolic /concrete
2126/2330/2510/2686/2865/4063/4223	Given pictures/ a list of events, Student will use the pictures/list to identify morning, afternoon, and night/before and after	Non-Foundational	Abstract
2130/2326/2505/2673/2859/4056/4228	Given a chart labeled with January and July and objects/pictures associated with cold and warm weather, student will identify cold weather and warm weather pictures/objects.	Non-Foundational	Presymbolic /concrete
2309/2669/2847/4039	Given the location of objects (on, above, next to, etc.), student will locate object.	Non-Foundational	Presymbolic /concrete
2310/2668/2846/4040	Given the location of objects (on, above, next to, etc.), student will place object in indicated position.	Non-Foundational	Presymbolic /concrete
2667/2845/4038/4054	Given the location of objects (on, above, next to, etc.), student will identify the position of the object.	Non-Foundational	Abstract
4042	Given the location of objects (on, above, next to, etc.), student will demonstrate a slide, flip, and turn.	Non-Foundational	Abstract

The five components of Mathematics are (1) Numbers and Operations, (2) Algebra, (3) Geometry, (4) Measurement, and (5) Data Analysis and Probability. The alignment of the Mathematics MOs to the NCTM standards can be found in Table 6. The MOs appeared fairly evenly distributed across all the components of Mathematics.

Table 6: Alignment of Math Measurement Guidelines and AA Items to NCTM National Standards

	Primary		Secondary	
Components	*N*	*%*	*N*	*%*
Numbers and Operations	497	22.90	4	80.00
Algebra	420	19.35	1	20.00
Geometry	436	20.09		
Measurement	358	16.50		

Data/Probability	458	21.11
Math Process (across standards)	1	0.05

Summary and Recommendations

Almost all of the reading and mathematics MOs were rated academic. As expected, the reading MOs were aligned to the NCTE strand of reading. Mathematics MOs were distributed across all the components of mathematics. It is interesting to note that teachers in the sample selected academic MOs 99% of the time in reading (Appendix A) and 95% of the time in math (Appendix B).

Criterion 2: The content is referenced to the student's assigned grade level (based on chronological age).

The first criterion focused on the broad question of "Are the Mastery Objectives academic?" In this second step, the focus is on the alignment with the state's own standards to ask the question, "Has the state referenced the MOs to grade level content standards?" Criterion 2 examines the **intended** alignment of the Mastery Objectives to grade level standards. Criterion 3 will evaluate the degree of the MOs alignment to grade level content standards.

Reading Results

Approximately 82% (*n*=1817) of the MOs reviewed were referenced to a grade level standard. Some of the MOs that were designed by the assessment teams (*n*=44, 2.0%) were not referenced to a grade level standard. Three hundred and fifty four MOs (15.7%) were referenced to off-grade standards (i.e., K-2), which measured phonics and phonemic awareness. Some of the MOs (*n*=21, .9%) were not found in the database provided. The following table displays the intended alignment of the MOs to the grade level standards. For grades 3rd through 8th, the three reading standards and no other standards are intended to be assessed.

Table 7: Number and Percentage of Mastery Objectives Referenced to Content Standards

	3rd		4th		5th		6th		7th		8th	
ELA Standard	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Below Grade Level	48	20.0	43	15.4	62	17.2	20	11.1	41	12.1	87	16.7
1. General Reading Processes	80	33.3	120	42.9	147	40.8	95	52.8	152	44.7	210	40.4
2. Comprehension of Informational Text	49	20.4	52	18.6	72	20.0	10	5.6	73	21.5	103	19.8
3. Comprehension of Literary Text	48	20.0	44	15.7	75	20.8	52	28.9	69	20.3	103	19.8
4. Writing	0	0	0	0	0	0	0	0	0	0	0	0
5. Controlling Language	0	0	0	0	0	0	0	0	0	0	0	0
6. Listening	0	0	0	0	0	0	0	0	0	0	0	0
7. Speaking	0	0	0	0	0	0	0	0	0	0	0	0
Not Referenced	10	4.2	5	1.8	4	1.1	3	1.7	5	1.5	17	3.3
MOs Not Found	5	2.1	16	5.7	0	0	0	0	0	0	0	0

	10th	
ELA Standard	*N*	*%*
Below Grade Level	53	16.1
Reading, Reviewing and Responding to Texts	277	83.9
Evaluating the Content, Organization, and Language Use of Texts	0	0.0

Math Results

In math, almost all of the MOs (97%, *n*=2121) were referenced to a grade level standard. Some of the MOs (*n*=34, 1.5%) were not referenced to a grade level standard. These non-referenced MOs had been designed by the examiners team. Some of the MOs (*n*=26, 1.1%) were not found in the database provided. The following table displays the intended alignment of the MOs to the grade level standards.

Table 8: Number and Percentage of Mastery Objectives Referenced to Content Standards

	3rd		4th		5th		6th		7th		8th	
Math Standard	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Previous Grade							1	0.6				
Knowledge of Algebra, Patterns, and Functions	50	20.2	57	20.4	71	19.2	36	20.0	64	18.8	106	19.6
Knowledge of Geometry	50	20.2	56	20.0	69	18.6	37	20.6	52	15.3	107	19.3
Knowledge of Measurement	97	39.1	54	19.3	74	20.0	38	21.1	66	19.4	104	19.3
Knowledge of Statistics	0	0.0	56	20.0	74	20.0	35	19.4	64	18.8	105	19.4
Knowledge of Probability	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Knowledge of Number Relationships	50	20.2	54	19.3	76	20.5	33	18.3	65	19.1	105	19.4
Processes of Mathematics	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Grade Level Link Not Able to Find	1	.4	3	1.1	1	.3	0	0.0	16	4.7	13	2.4
MO Not Found in Database	0	0.0	0	0.0	5	1.4	0	0.0	13	3.8	0	0.0

	10th	
Math Standard	*N*	*%*
Previous Grade	3	0.9
Functions and Algebra	244	69.7
Geometry, Measurement, & Reading	98	28.0
MO Not Found in Database	8	2.3

Summary

Most of the MOs were referenced to content standards. In reading, while most of the MOs were aligned to reading grade level standards, approximately 16% (n=354) were aligned to off-grade standards. A problematic area is when the examiners team designs the MO instead of selecting from the pool of MOs. Many of the examiners team designed MOs were not referenced to grade level standards.

Criterion 3: The focus of achievement maintains fidelity with the content of the original grade level standards (content centrality) and when possible, the specified performance

Content experts rate content centrality on a three-point scale measuring the degree of alignment (none, far, near) between the grade level content standards and the MOs. Performance centrality concerns the level of expected performance of the standards. Ratings are made on a 3-point scale (none, some, all) based on the degree of match between the MOs and the grade level content standard. For example, an alternate content standard of "identify" would have some of the same performance as "analyze and identify." Content experts reviewed the MOs rated none for content centrality and determine whether the ratings were due to an overstretched skill, a mismatch to the standard, or a backfitting skill. Items that are rated as nonacademic are excluded from this analysis.

Reading

The results of the rating of content centrality for reading MOs are reported in Table 9. Most of the reading MOs were rated as far (26%, *n*=166) or near (68%, *n*=1487) for content centrality. For those items that were rated none on content centrality, the reason for the lack of content centrality was a simple mismatched to the appropriate grade level standard (*n*=157, 98.7%). Four MOs were inadvertently not rated by the experts. A list of the MOs rated none in content centrality is reported in Appendix C. For performance centrality, most MOs were rated partial or full (92%).

Table 9: Reading Content Centrality and Performance Centrality

	Content Centrality			Performance Centrality	
	N	*%*		*N*	*%*
None	166	7.5	None	164	7.4
Far	567	25.5	Partial	1199	53.9
Near	1487	66.9	Full	857	38.5
Non-Scoreable	4	.2	Non-Scoreable	4	.2

Mathematics

The following table displays the summary of mathematics content centrality and performance centrality. Most of the math MOs were rated as far in content centrality (91.5%) and partial in performance centrality (91.8%). For the MOs that were rated "none" in content centrality, 90% just had a mismatch in the standard (*n*=57) and five MOs were overstretching. Approximately 5% of the MOs did not provide enough detail to evaluate the content and performance centrality. A list of the MOs rated as having no content centrality is located in Appendix D.

Table 10: Mathematics Content Centrality and Performance Centrality

	Content Centrality			Performance Centrality	
	N	%		*N*	%
None	67	3.1	None	63	2.9
Far	1993	91.5	Partial	1997	91.8
Near	1	.0	Full	1	.0
Non-Scoreable	118	5.4	Non-Scoreable	115	5.3

Student Products and Artifacts

Special educators reviewed the student products and artifacts included in the portfolios to assess the link of the artifact to the MO. Because multiple student products were provided for a single MO, the raters indicted if *all*, *some*, or *none* of the products were aligned.

Reading Results

Special educators reviewed 2449 reading student work products and artifacts provided in the portfolio to evaluate the link to the MOs. Only .5% (*n*=13) of the student products reviewed were rated as not linked to MOs. Most of the products and artifacts were rated *all* linked to the MO (*n*=2136, 87.2%) with a small number (*n*=69, 2.8%) rated as *some* of the evidence links. About 10% (*n*=231) of the student products did not provide enough information to be evaluated (e.g., datasheets may have included information not specific enough to rate or may not have been able to view digital data).

Math Results

Special educators reviewed 2434 math student work products and artifacts included in the portfolio to evaluate the link to the MOs. Very few student work products were rated as having no link to the MO (*n*=6, .2%), with most of the student work products rated as having a link (*n*=2164, 88.9%). There were some student work products that were rated as having some of the evidence linked (*n*=74, 3%) and approximately 8% (*n*=190) of the student work products did not have enough detail to rate (e.g., datasheets may have included information not specific enough to rate or may not have been able to view digital data).

Summary

Almost all of the reading MOs (99%) were rated as far or near for content centrality. The few MOs rated having no content centrality were due to mismatch to the appropriate standard. For reading performance centrality, most MOs were rated partial or full (92%). In math, most of the MOs were rated as far in content centrality (91.5%) and partial in performance centrality (91.8%). Approximately 5% of the math MOs were rated non-scoreable due to a lack of information or detail. Additionally, most of the student products and artifacts in reading (90%) and math (92%) were rated as being linked to the MO.

Criterion 4: The content differs from grade level in range, balance, and DOK, but matches high expectations set for students with significant cognitive disabilities

Alignment indices for criterion 4 are based on Webb's alignment method (Webb, 1997). The following analyses include only MOs that were rated academic and had a content centrality rating of near or far. Four alignment indices are calculated: (a) categorical concurrence, (b) depth of knowledge, (c) range-of-knowledge, and (d) balance of representation. Below is a short description.

Categorical concurrence is the consistency of categories of content in the standards and assessments. The criterion of categorical concurrence between standards and assessment is met if the same or consistent categories of content appear in both the assessment and the standards. For example, if a content standard (or stand) is *measurement* in mathematics, the evaluative decision is "Does the assessment have items that target *measurement*?" It is possible for an assessment item to align to more than one content standard. For example, if an assessment item requires students to calculate surface area, which is aligned to the content standard of *measurement*, to successfully answer the question the student needs to be able to multiply numbers, which is aligned to the content standard of *operations*. In this case the item is aligned to both content standards.

Depth of knowledge (DOK*)* examines the consistency between the cognitive demands of the standards and cognitive demands of assessments (Webb, 1997). Important aspects of learning go beyond academic topics and include students' organization of knowledge, problem representations, use of strategies, and self-monitoring skills (Glaser, Linn, & Bohrnstedt, 1997). Completely aligned standards and assessments requires an assessment system designed to measure in some way the full range of cognitive complexity within each specified content standard. Rated on a 6-point scale (see Appendix A), DOK[2] provides a measure of performance complexity required to perform the skill listed in the standard or item. DOK ratings are guided by a list of verbs (e.g., identify, state) that reflect the response that would be required of the student. Experts consider the verb in conjunction with the content when determining DOK.

Range-of-knowledge correspondence criterion examines the alignment of assessment items to the multiple objectives within the content standards. Range-of-knowledge correspondence is used to judge whether a comparable span of knowledge expected of students by a standard is the same as, or corresponds to, the span of knowledge that students need in order to correctly answer assessment items. The range-of-knowledge numeric value is the percentage of content standards with at least 50% of the objectives having one or more hits. For example, if there are five objectives (e.g., length, area, volume, telling time, and mass) included in the content standard of measurement, a minimum expectation is at least one assessment item is related to at least three of the objectives. According to Webb (1997), 40-50% of the objectives for a standard could be considered weakly met.

[2] There are many scales for determining DOK levels. The one provided in this manual is just one of many rating scales available.

The *balance of representation* criterion is used to indicate the extent to which items are evenly distributed across the content standards and the objectives under the content standards. In our measurement content standard with five objectives, we would expect items would be evenly distributed across the five objectives. In practice educational agencies may place greater emphasis on specific objectives and content standards. In this case the assumption of an even distribution would be replaced with the expected proportion, or emphasis, as specified by the educational agency. The formula used to compute the balance of representation index is the following

$$Balance = 1 - (\sum_{i=1}^{k} \left| \frac{1}{O} - \frac{I_k}{H} \right|)/2,$$

where O is the total number of objectives hit (i.e., item has been judged to be aligned) for the content standard, I_k is the number of items hit corresponding to objective k, and H is the total number of items hit for the content standard. The balance index can range from 0 (indicating unbalanced representation) to 1.0 (indicating balance representation) with values from .6 to .7 considered a weak acceptable balance and values .7 or greater considered acceptable.

Reading Results

A list of the grade level content standards and the number of reading MOs aligned to each standard is presented in Appendix E.

Categorical Concurrence

The AA-AAS was designed to assess the reading standards (three of the seven ELA standards). The number of Reading MOs aligned to grade level content standards is reported in Table 11. All of the categories had at least six MOs, which satisfies Webb's criteria. It should be noted that students do not take all MOs but are only administered 10 MOs. While the alternate assessment allows access to all standards, teachers are instructed to select six MOs in the *General Reading Processes* and only two MOs in *Comprehension of Informational Text* and two MOs in *Comprehension of Literary Text.*

Table 11: Reading MOs Aligned to Grade Level Content Standards

	3rd		4th		5th		6th		7th		8th	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
General Reading Processes	80	45.2	120	55.6	147	50	95	60.5	152	51.7	210	50.5
Comprehension of Informational Text	49	27.7	52	24.1	72	24.5	10	6.4	73	24.8	103	24.8
Comprehension of Literary Text	48	27.1	44	20.4	75	25.5	52	33.1	69	23.5	103	24.8

Note. All 10th grade MOs are General Reading Processes

Depth of Knowledge

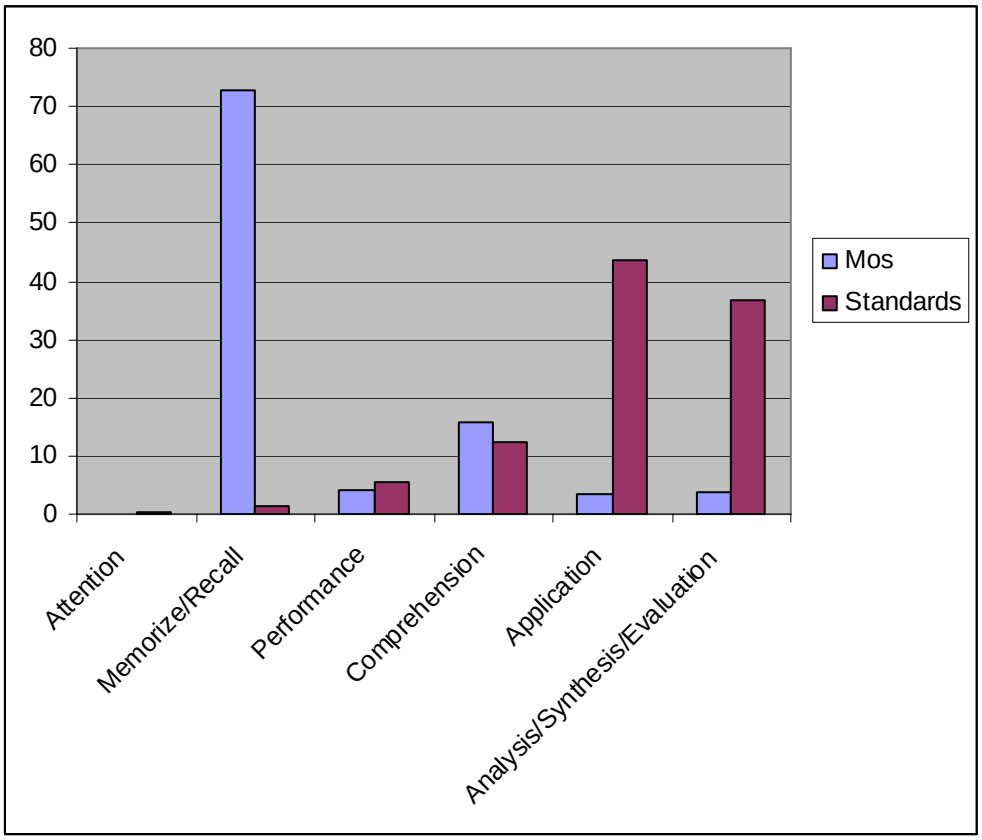
The level of depth of knowledge required to respond to reading MOs and the grade level content standards are reported in Table 11. Most of the MOs were rated at the memorize/recall level (73%), but there were MOs at the higher depth of knowledge levels. The grade level standards were rated mostly at the higher depth of knowledge levels (i.e., comprehension, application, and analysis).

Table 12: Reading MO Depth of Knowledge

	MOs		Grade Level	
	N	*%*	*N*	*%*
Attention	0	0	7	.5
Memorize/Recall	1617	72.8	19	1.5
Performance	93	4.2	70	5.4
Comprehension	348	15.7	159	12.2
Application	78	3.5	10	43.7
Analysis/Synthesis/Evaluation	84	3.8	35.7	36.8

Figure one illustrates the percentage of MOs and grade level standards at the depth of knowledge levels.

Figure 1: Percentage of Reading MOs and Content Standards at Depth of Knowledge Levels



The following table displays the level of depth of knowledge required to respond to reading MOs and grade-level standards by grade.

Table 13: Reading MO Depth of Knowledge by Grade

	MOs		Grade Level	
	N	*%*	*N*	*%*
3rd				
Attention			2	.9
Memorize/Recall	181	75.7	3	1.3
Performance	7	2.9	19	8.3
Comprehension	40	16.7	41	17.8
Application	5	2.1	21.6	49.1
Analysis/Synthesis/Evaluation	6	2.5	95.4	22.6
4th				
Attention			1	.4
Memorize/Recall	195	69.9	3	1.3
Performance	9	3.2	13	5.5

Comprehension	52	18.6	38	16.0
Application	13	4.7	115	48.5
Analysis/Synthesis/Evaluation	10	3.6	53	22.4
			223	94.1
5th				
Attention			1	.5
Memorize/Recall	252	71.8	3	1.4
Performance	14	4.0	14	6.5
Comprehension	56	16.0	30	14.0
Application	14	4.0	106	49.5
Analysis/Synthesis/Evaluation	15	4.3	60	28.0
6th				
Attention			3	1.4
Memorize/Recall	130	73.4	3	1.4
Performance	5	2.8	9	4.2
Comprehension	32	18.1	31	14.5
Application	3	1.7	92	43.0
Analysis/Synthesis/Evaluation	7	4.0	76	35.5
7th				
Attention				
Memorize/Recall	248	73.2	3	1.6
Performance	13	3.8	7	3.6
Comprehension	54	15.9	11	5.7
Application	9	2.7	67	34.7
Analysis/Synthesis/Evaluation	15	4.4	105	54.4
8th				
Attention				
Memorize/Recall	378	73.1	4	2.1
Performance	28	5.4	8	4.1
Comprehension	77	14.9	8	4.1
Application	14	2.7	64	32.8
Analysis/Synthesis/Evaluation	19	3.7	111	56.9
10th				
Attention				
Memorize/Recall	233	73.0		
Performance	17	5.3		
Comprehension	37	11.6		
Application	20	6.3	12	35.3
Analysis/Synthesis/Evaluation	12	3.8	22	64.7

The following table reports the number of MOs below, at, or above the grade level content standards. As expected with alternate assessments, most of the MOs are below grade levels standards.

Table 14: Percentage of MOs Below, At, or Above Grade Level Content Standards DOK Level

Grade	Below	At	Above
All	93.5	.3	6.2
3rd	94.9	0	5.1
4th	91.2	.5	8.3
5th	92.8	.7	6.5
6th	93.6	0	6.4
7th	92.2	.7	7.1
8th	94.0	.2	5.8
10th	95.5	0	4.5

Balance of Representation. The balance of the MOs across the grade level content standards was examined. The balance indices across the grades are reported in Table 15. Webb indicates that values above .70 are acceptable. The MOs in the randomly selected portfolios emphasized the standard *General Reading Process* over the other two standards, *Comprehension of Informational Text* and *Comprehension of Literary Text*. The emphasis in *General Reading Process* was the intent of the state.

Table 15: Balance of Representation

Grade	Reading
3rd	.50
4th	.42
5th	.54
6th	.46
7th	.52
8th	.55
10th	.38

Range of Knowledge. The range of knowledge refers to the breadth or span of knowledge required by the MOs matched to grade level content standards. Grades 5, 7, and 10 had 100% range of knowledge indicating that at least 50% of the objectives had at least one MO. Grades 3, 4, and 8 each had one standard that did not have at least 50% of the objectives with an MO. Appendix E reports the distribution of MOs at the objective level.

Table 16: Range of Knowledge for Reading across All Grades

Grade	Reading	Under-Represented Objectives
3rd	83	Fluency
4th	83	Comprehension of Literacy Text

5th	100	
6th	83	Comprehension of Informational Text
7th	100	
8th	83	Fluency
10th	100	

Math Results

A list of the grade level content standards and the number of math MOs aligned to each standard is presented in Appendix F.

Categorical Concurrence. The number of Mathematics MOs aligned to grade level content standards is reported in Table 17. All math standards had at least six MOs for each standard except 3rd and 10th grades, which had no MOs aligned to *Knowledge of Statistics* and *Data Analysis and Probability* respectively. The lack of MOs aligned to these math standards was intended by the state.

Table 17: Mathematics MOs Aligned to Grade Level Content Standards

	3rd		4th		5th		6th		7th		8th	
	N	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*	*N*	*%*
Knowledge of Algebra, Patterns, and Functions	50	20.2	57	20.6	71	19.5	36	20.1	64	20.6	106	20.1
Knowledge of Geometry	50	20.2	56	20.2	69	19.0	37	20.7	52	16.7	107	20.3
Knowledge of Measurement	97	39.3	54	19.5	74	20.3	38	21.2	66	21.2	104	19.7
Knowledge of Statistics	0	0	56	20.2	74	20.3	35	19.6	64	20.6	105	19.9
Knowledge of Number Relationships &Computation /Arithmetic	50	20.2	54	19.5	76	20.9	33	18.4	65	20.9	105	19.9

	10th	
	N	*%*
Functions and Algebra	244	71.3
Geometry, Measurement, And Reasoning	98	28.7
Data Analysis And Probability	0	0.0

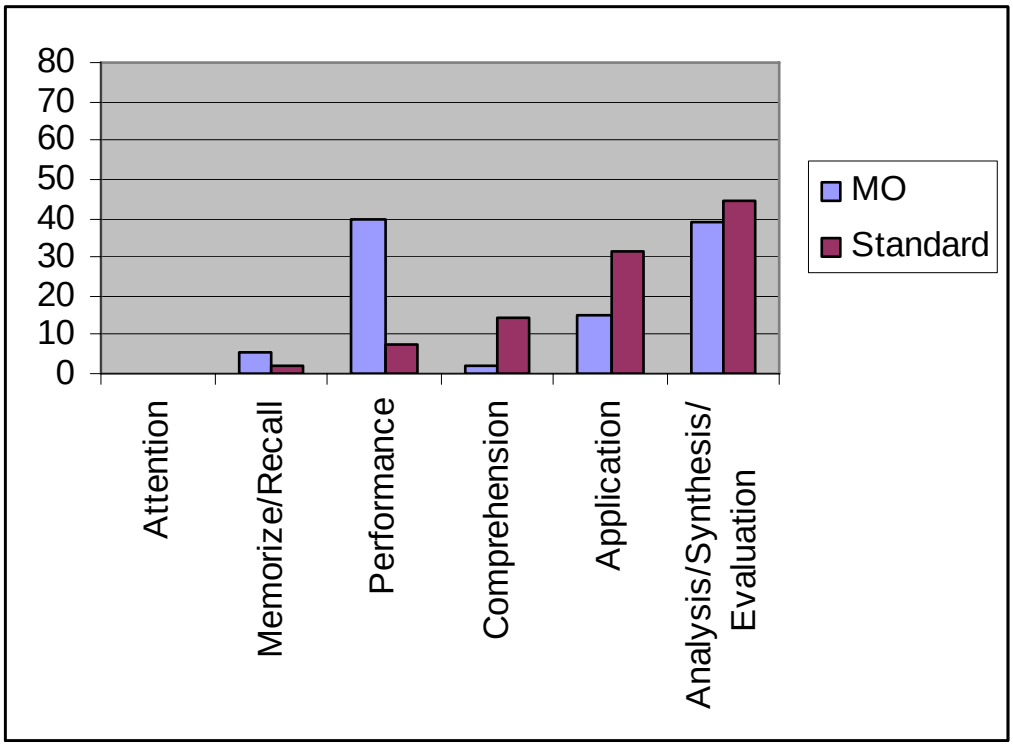
Depth of knowledge. The following table displays the level of depth of knowledge required to respond to reading MOs and grade level objectives. MOs are distributed across all levels of depth of knowledge except the lowest level (i.e., attention). The performance and analysis/synthesis/evaluation levels have the largest percentage of MOs. These results are typically not seen for alternate assessments based on alternate achievement standards. Typically there are many more items at the lower depth of knowledge levels.

Table 18: Mathematics MO Depth of Knowledge

	MOs		Grade Level	
	N	*%*	*N*	*%*
Attention	0	0	0	0
Memorize/Recall	119	5.5	17	2.3
Performance	864	39.7	55	7.6
Comprehension	42	1.9	105	14.4
Application	325	14.9	227	31.2
Analysis/Synthesis/Evaluation	827	38.9	32	44.4

Figure 2 illustrates the percentage of MOs and grade level content standards at each depth of knowledge level.

Figure 2: Percentage of Math MOs and Grade Level Standards at Depth of Knowledge Levels



The following table displays the depth of knowledge level reported to respond to reading MOs and grade-level objectives by grade. For all grades items are distributed across all depth of knowledge levels except for the lowest level.

Table 19: Mathematics MO Depth of Knowledge by Grade

	MOs		Grade Level	
	N	*%*	*N*	*%*
3rd				
Attention	–	–	–	–
Memorize/Recall	15	6.4	4	3.4
Performance	100	42.9	18	15.1
Comprehension	4	1.7	13	10.9
Application	25	10.7	33	27.7
Analysis/Synthesis/Evaluation	89	38.2	51	42.9
4th				
Attention	–	–	–	–
Memorize/Recall	14	5.3	8	6.7
Performance	114	43.5	8	6.7
Comprehension	3	1.1	19	16.0
Application	37	14.1	36	30.3
Analysis/Synthesis/Evaluation	94	35.9	48	40.3
5th				
Attention	–	–	–	–
Memorize/Recall	27	7.8	1	.8
Performance	131	38.0	11	9.2
Comprehension	7	2.0	16	13.3
Application	52	15.1	42	35.0
Analysis/Synthesis/Evaluation	128	37.1	50	41.7
6th				
Attention	–	–	–	–
Memorize/Recall	7	4.0	–	–
Performance	72	41.1	9	7.8
Comprehension	6	3.4	24	20.9
Application	26	14.9	31	27.0
Analysis/Synthesis/Evaluation	64	36.6	51	44.3
7th				
Attention	–	–	–	–
Memorize/Recall	12	3.8	3	2.6
Performance	142	44.5	4	3.5
Comprehension	6	1.9	21	18.4
Application	40	12.5	39	34.2
Analysis/Synthesis/Evaluation	119	37.3	47	41.2

8th				
Attention	–	–	–	–
Memorize/Recall	23	4.4	1	.9
Performance	190	36.5	4	3.6
Comprehension	8	1.5	12	10.9
Application	101	19.4	37	33.6
Analysis/Synthesis/Evaluation	198	38.0	56	50.9
10th				
Attention	–	–	–	–
Memorize/Recall	21	6.5	–	–
Performance	115	35.6	–	–
Comprehension	8	2.5	1	3.3
Application	44	13.6	9	30.0
Analysis/Synthesis/Evaluation	135	41.8	20	66.7

The following table reports the percentage of MOs below, at, or above the grade level content standard's depth of knowledge level. While most of the MOs are below the standards depth of knowledge, in almost every grade approximately 50% of the items are at or above the content standards depth of knowledge level.

Table 20: Percentage of MOs Below, At, or Above Grade Level Content Standards DOK Level

Grade	Below	At	Above
All	53.5	17.9	28.7
3rd	47.4	20.1	32.5
4th	58.0	11.2	30.8
5th	58.6	2.0	39.4
6th	50.0	20.7	29.3
7th	57.2	13.7	29.1
8th	49.9	30.8	19.3
10th	52.5	21.7	25.8

Balance of Representation. The balance of representation indices across the grades are reported in Table 21. Webb indicates that values above .70 are acceptable. The results suggest that the MOs are not evenly distributed across the standards. An examination of the number of MOs across the grade level standards will provide information about the standards that have the greatest and least emphasis.

Table 21: Math Balance of Representation Indices

Grade	Mathematics
3rd	.37
4th	.36
5th	.41
6th	.36

7th	.42
8th	.44
10th	.61

Range-of-Knowledge. The range-of-knowledge values for math across all grades are reported in the table below. Third grade MOs were not aligned to at least 50% of the objectives in three of the nine standards.

Table 22: Range of Knowledge for Math across All Grades

Grade	Mathematics	Under-Represented
3rd	57%	Knowledge of statistics; Knowledge of probability; Processes of mathematics
4th	78%	Knowledge of probability; Processes of mathematics
5th	78%	Knowledge of probability; Processes of mathematics
6th	78%	Knowledge of probability; Processes of mathematics
7th	78%	Knowledge of probability; Processes of mathematics
8th	78%	Knowledge of probability; Processes of mathematics
10th	100%	

Summary

For reading, all the reading standards had multiple MOs that were aligned, between 44 to 210 MOs per standard. All of the standards had at least six MOs, which satisfies Webb's categorical concurrence criteria. Most of the reading MOs were rated at the depth of knowledge level of memorize/recall (73%), but there were MOs rated at the highest levels of depth of knowledge. As expected for alternate assessments, most MOs were below grade level standards depth of knowledge. The balance of representation suggested that the reading MOs were not evenly distributed across the standards, which was the intent of the state. There was a greater emphasis on *General Reading Processes* than the other two categories. The range-of-knowledge indices suggested that most the grade level topics (83% to 100%) had at least 50% of the indicators (nested within the topic) with at least one aligned MO. A few of the grade level topics were under-represented (fluency, comprehension of literature, comprehension of information text) in some of the grades.

For math, MOs were aligned to all grade level standards except for 3rd and 10th grades, which had no items aligned to *Knowledge of Statistics* and *Data Analysis and Probability* respectively. MOs are distributed across all levels of depth of knowledge except the lowest level (i.e., attention). The performance and analysis/synthesis/evaluation levels had the largest percentage of MOs. The balance of representation results, which ranged from .36 to .61, indicate that the MOs were not evenly distributed across all of the standards, which was the intent of the state. The range of knowledge results indicated that a few of the standards did not have MOs for 50% of the objectives.

Criterion 5: There is some differentiation in content across grade levels.

One way to examine the change in content across the grade levels demonstrated in the alternate assessment items is to use Webb's (2005) definitions for change across content. Those definitions are:

(a) *broader*—higher-grade standards or items reflect broader application of target skill or knowledge;
(b) *deeper*—higher-grade standards or items reflect deeper mastery of the target skill or knowledge;
(c) *prerequisite*--lower-grade standards or items reflects a different by prerequisite skill for mastery of the higher grade standard;
(d) *new*—the higher-grade has a new skill or knowledge unrelated to skills or knowledge covered at prior grades; and
(e) *identical*—higher-grade standards or items appear identical to one of the lower-grade standards.

Content experts were trained using these definitions and examples to review the AA items. Each strand within each content area was then rated using the definitions and a rating system (not evident-0%, limited- 25%, partial-50%, and clear- 75%) with experts noting information of particular interest and examples. Grade 10 was excluded from this analysis because of the significant change in grade level links (the content for this grade was linked to below grade level standards and would therefore be difficult to assess for any progression beyond grade 8).

A description of the reading differentiation across grade levels is reported in Table 23. The content experts reported that all strands of reading demonstrated some change (broader, deeper, new) across grade levels expect for *General Reading Comprehension*. Many of the MOs aligned to this strand repeated across grade levels.

A description of the math differentiation across grade levels is reported in Table 24. The content experts reported that there were some limited new, broader, and deeper MOs for all math strands across all grade levels. It is recommended that the state examine the number of repeating MOs across the strands of (a) patterns and function, (b) expression, equations, and inequalities, (c) plan and solid geometric figures, and (d) measurement.

Table 23: Reading Differentiation across Grade Levels

Strand	*Differentiation-Broader, deeper, new or used prerequisites at lower grades*	*Lack of Differentiation-identical items occur*	*Examples of redundant items for undifferentiated strands*	*Overall*
Phonemic Awareness	Would not be expected			Differentiation not expected
Phonics	Clearly deeper items; partial on use of prerequisite skills in lower grades; and some limited use of new skills in upper grades	Clear redundancy		Adequate; although some redundancy builds expectations across grade levels in other ways
Vocabulary	Clear on all criteria for differentiation	When occurs is linked to new content		Very strong differentiation
Fluency	Links to new grade level content	Redundancy but with links to grade level content		Adequate by linking to new grade level content
General Reading Comprehension	Very limited	Clear redundancy-most items are identical across grades		Needs improvement
Comprehension of Literacy Text	Clear for broader & deeper items; partial for new skills in upper grades & prerequisites in lower grades.	Only partial redundancy		Strong differentiation
Comprehension of Informational Text	Limited for new & prerequisite skills; partial for deeper; little/no broader skills	While clear redundancy, link to grade level text creates differentiation.		Adequate

Table 24: Math Differentiation across Grades

Strand	*Differentiation-Broader, deeper, new or used prerequisites at lower grades*	*Lack of Differentiation-identical items occur*	*Examples of redundant items for undifferentiated strands*	*Overall*
Patterns & Function	Limited*	Clear redundancy	Skip counting Given rules to add/ subtract	Needs Improvement
Expression, Equations, and Inequalities	Limited*	Clear redundancy	Number sentence with a missing no. using pictures/manipulatives and +/-, identify the missing number (grades 3-8).	Needs Improvement
Plane and Solid Geometric Figures	Limited*	Clear redundancy	Given geometric figures, identify sides and corners (grades 3-8), and given solid geometric figures, identify the names of figures (grades 3-5). Representation of geometric figures typically only had one skill which was identical across the grades (given the name or model of a geometric figure, sketch the figure).	Needs Improvement
Numeric and Graphic Representations	Limited*	Only partial redundancy		Adequate due to some differentiation and little redundancy
Measurement	Limited*	Clear redundancy	Given a calendar, identify the days of the week/months of the year, and given objects/lines, identify which is bigger or smaller.	Needs Improvement
Data Analysis	Limited*	Clear redundancy but		Adequate with

	written to use grade level content within graphs or plots.	some differentiation and uses grade level content.

*****All of these strands have some limited new, broader, or deeper items. The use of prerequisites at lower grades would also be an option, but was not found.

Summary

Overall the reading has good differentiation across grade levels and could serve as a model for other states on how to achieve this criterion. Some improvement may be considered for General Reading Comprehension. In contrast, mathematics needs some improvement for most strands. While there is some limited differentiation, overall most items were redundant from lower to upper grades. In conversations with state officials, they reported that the redundancy in math was intentionally created.

Recommendations:

1. Consider making some adjustment in General Reading Comprehension, but overall reading is well differentiated.
2. Add items in math strands that are new, broader, deeper, or build on prerequisites from earlier grades.

Criterion 6: The expected achievement for students is for the students to show learning of grade referenced academic content.

Overall, strong inferences could be made about student learning based on expectations for accuracy and new learning to occur. Nearly all teachers chose 80-100% accuracy as their standard for mastery. Given that many data sheets only had 5 responses, 80% accuracy reflected the student getting all but one response correct. Besides this high expectation for accuracy found, this system also requires a baseline assessment. When baseline information is missing the objective is deleted from the computation for proficiency. In nearly all portfolios, the student did not have the skills at baseline. By the posttest, many objectives were at mastery strong evidence of new learning. Also contributing to being able to make a high degree of inference about student learning was the overall accuracy required for proficiency which was 60%. Finally, a high degree of inference about student learning is supported by basing the score on student performance alone versus program variables. As stated, although alignment is scored, students do NOT receive any "extra credit" for well done portfolios. Instead, poorly aligned items or inadequate data are dropped from the computation of proficiency.

While the overall inferences that can be made about student learning were strong, consideration should be given to how this inference is weakened when more extensive prompting is used. On the positive side, the system promotes the use of the system of least prompts which is an evidence-based practice. In contrast, unlike the research on this prompting method, the system does not promote fading prompts. There is no incentive in the system for teachers to target student independence. Performing the skills with a gesture, verbal directive, model, or physical guidance can all be considered mastery. Also, the mastery criteria can allow up to 10 prompts. For example, performing the skill with 10 models could be the target for mastery. One positive feature is the "burden of proof" required before teachers use physical prompts. That is, they must document for 10 days the effort to use less intrusive prompts. There also is encouragement to use minimal physical assistance and to retain active student responding (e.g., guiding hand to a

scanner switch). In contrast in the portfolios that used physical prompting in the mastery objective, the reviewers could not determine what active response the student was making. It seemed feasible that a fully passive student (e.g., even asleep) could have received a correct score.

Other alternatives that can strengthen student inference include giving credit for more complex skills generalization across people and settings or conceptual generalization. There was some suggestion in the evidence that these criteria are considered (e.g., teachers are using different materials and activities at times within the evidence suggesting conceptual generalization). However, there was not enough evidence to rate these criteria. It should be noted that not all systems choose these methods to show student learning (optional criteria).

Summary

Overall, this system has been developed to allow for strong inferences about student learning of academic content based on levels of accuracy, the use of a baseline assessment, and the focus on student achievement. From the portfolios, the teachers seem to teach to mastery and expect high accuracy. In contrast, the inferences that can be made about student learning are less clear as teacher prompting becomes more extensive. We recommend providing more teacher training in methods to fade prompts and providing an incentive for teachers to target independent student performance for mastery.

Criterion 7: The potential barriers to demonstrating what students know and can do are minimized in the assessment.

Special education experts reviewed the alternate assessment and the accompanying administration manual to examine the extent to which a wide range of students to complete tasks within the assessment within the level of independence and accuracy expected by the state. Experts used four definitions to describe how students were able access the assessment items:

No provision: This type of student would not be able to demonstrate knowledge/skill on the assessment; needed supports are nonexistent or insufficient to help this type of student demonstrate learning.

Flexibility built into tasks: This type of student would be able to demonstrate knowledge/skill because of flexibility in administration. Flexibility is built into the items (e.g., teacher choice/design in portfolio, scaffolding in scripted performance events).

Accommodations: This type of student would be able to demonstrate knowledge/skill because of allowable accommodations. Accommodations are not built into items/tasks, but are described in the test administration materials and may be applied to this type of student. Accommodations do not change the construct being measured.

Modifications: This type of student would be able to demonstrate knowledge/skill because of modifications in assessment materials, administration procedures, etc. Modifications are not built into items/tasks, but are described in the test administration materials and may be applied to this type of student. Modifications do change the construct being measured.

Because flexibility is built into the tasks teachers select, this alternate assessment minimizing barriers for the broadest range of heterogeneity within the population. A review of 4883 MOs indicated that 91.5% of the MOs were accessible at an abstract level of symbolic communication while the remaining MOs were accessible to students at a concrete level of symbolic communication.

Criterion 8: The instructional program promotes learning in the general curriculum.

To evaluate criterion 8, special education experts reviewed the professional development materials, alternate assessment handbooks, and administration manuals. Because each local educational agency develops their own professional development material, a sample of 12 counties materials were collected and evaluated. A list of the counties is reported Table 25.

Table 25: Counties for State D's Professional Development Materials

County A	Less than 50K
County B	Less than 50K
County C	Less than 50K
County D	Less than 50K
County E	Less than 50K
County F	Less than 50K
County G*	More than 50K
County H	More than 50K
County I	More than 50K
County J	More than 50K
County K*	More than 50K
County L	Less than 50K

** Indicates highest rated counties with information submitted as professional development*

The Handbook. Domains of learning and content standards for each content area were found. There is also a well developed mastery objective bank available for teachers to select alternate assessment items. The manual also assists teachers with a vertical articulation for math across grades PK-3, assessment suggestions for products, and IEP development guidance. Although the Handbook does not fully cover all the domains of ELA, but it does reflect the same emphasis as the alternate assessment (i.e., reading). The content provided is linked to a grade level or band. There is information regarding the link or alignment of the mastery objective to a grade level standard. The handbook provides several examples of student work and prompt hierarchy procedures. While overall this is a strong alternate assessment handbook, information was not found on how to fade prompts or increase student independence in the performance of skills. Also, while assistive technology is discussed, it is not clear how barriers for students with sensory or motor impairments are eliminated. This would help to increase standardization of accommodations across the administration of the assessment.

Professional Development Materials. As the different counties across State D submitted different levels of information (i.e., some counties submitted only agendas from workshops or a list of workshops offered and some counties submitted the materials used in workshops), a summary of findings across counties is provided. Seven counties represented systems with less than 50,000 overall students. The remaining five counties represented systems with more than 50,000 overall students.

Five of the smaller counties sent minimal information that did not illuminate the content of the professional development held within the system. Of the remaining two counties, the content of the workshops were clearly linked to the domains of reading and math (e.g., one county's submission contained a workshop on data analysis and statistics which included strategies on how to teach students to collect their own data). Evidence of the instructional program promoting learning in the general curriculum was found for teaching with typical peers, assistive technology, typical classroom resources, the use of literacy across content areas, and the teaching of academic skills in a functional context.

Of the larger counties, two provided minimal information. Of the three remaining counties, experts identified strong professional development opportunities for teachers. Grade level content standards were fully embedded across materials including a modified pacing guide for elementary and middle school special education teachers for ELA and science. These materials provided clear content links to standards for teachers including information on standards based instruction, classroom activities, and assessment suggestions. One county provided teachers with a guideline for teaching standards with at least one activity that would teach each of the corresponding standards. A second county provided a curriculum frameworks guide to modified lessons that were written in great detail. Two of these counties provided examples of how to teach the grade level standards to students at all of the symbolic levels. Information about how to differentiate performance for students, however, was limited across all counties. Expectations to access grade level content were clear. For example, while one county addressed the common threads or priorities within the content areas for the students who participate in the alternate assessment, another county provided teachers with a stepwise process to access the grade level content standards and curriculum. All three of the larger counties provided specific examples for teachers of activities and materials linked to typical grade level content and materials (e.g., the use of a grade appropriate text, the inclusion of grade appropriate math content for middle school students such as slope). Examples of how to generalize learning across the content areas (e.g., the use of literacy skills in reading and science) and generalize the concept themselves were evident (e.g., finding the main character in three different stories). Experts found evidence related to the instruction program quality regarding teaching in inclusive contexts, self-determination opportunities for students, the use of assistive technology, the use of typical classroom resources, the use of literacy across content areas, and the embedding of academic skills in a functional context. Overall, the experts were particularly impressed with two of the larger counties that provided teachers with resource materials/lessons that were aligned to state standards and provided teachers with ideas and activities for teaching the content.

Summary and Recommendations

1. The Handbook is well developed, but needs additional information on how to fade prompts and promote independent student responding. Some additional information on the use of assistive technology may also be useful.

2. Some counties within the state have exemplary professional development materials that could serve as a national model. In contrast, other counties seem to have minimal resources. Sharing resources across counties would benefit these counties.

Program Quality Indicators

Special education experts reviewed the alternate assessment administration manual, all professional development submitted, and the mastery objectives for evidence of overall program quality indicators. The administration manual provided student opportunities for all program quality indicators expect for instruction in general education classrooms. The table below summarizes the findings.

Table 26: Program Quality Indicators

Does the alternate assessment and professional development promote:	
1. opportunities for instruction in general education classrooms for students with significant cognitive disabilities?	No- Experts could not find evidence of promoting inclusive opportunities in general education classes.
2. opportunities for instruction with typical peers for students with significant cognitive disabilities?	Yes- In the professional development materials from at least two counties, there was evidence that this practice was occurring.
3. opportunities for students with significant cognitive disabilities to make choices, problem solve, self-advocate, self-evaluate?	Yes- In the professional development materials from several counties, there was evidence that this practice was occurring.
4. the provision of assistive technology for students who need it?	Yes- This indicator was evident in the AA manual and in the professional development submitted from several counties.
5. the access and use of typical classroom resources within instruction (e.g., science kits, grade level books, textbooks)?	Yes- Experts were able to find evidence for this in all three resources reviewed.
6. literacy being promoted across the content	Yes- Again, experts were able to find

areas for students with significant cognitive disabilities (e.g., the pairing of text with picture symbols and objects)?	evidence of this indicator in all three resources reviewed.
7. the meaningful linking of academic skills in functional contexts?	Yes- Experts noted that while the AA manual and MO are very academic in nature, there is evidence that teachers are encouraged to embed skills in functional contexts. There was also evidence in at least one county's professional development about how to do this.

Overall Summary to the Eight Criteria

Overall the demonstrated good access to the general curriculum. Almost all of the MOs were academic and demonstrated a far or near content centrality link to the grade level content standards. For reading, the MOs were reduced in depth of knowledge from the grade level depth of knowledge and the MOs did not have the same content coverage that was found in the grade level standards. For math, the MOs had very similar depth of knowledge levels that are found in the grade level content standards, which is unusual for alternate assessments. The math MOs content coverage did not have the same emphasis that is found in the grade level content standards. There is clear differentiation across the reading grade levels but the number of repeating math MOs across the grade levels should be reviewed.

Flexibility is built into the examiners team selection of MOs, which minimizes barriers for students with significant cognitive disabilities. MOs at all levels of symbolic communication were found allowing access for all students regardless of their symbolic communication levels. The alternate assessment was well developed and covered the grade level standards. The quality of the professional development materials varied across the different counties but some counties had outstanding resources that might be shared statewide.

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Appendix A

Reading Mastery Objectives and Frequency of Use

MO #	*N*	MO #	*N*	MO #	*N*
Teacher selected	115	1115	5	1179	1
Not found in the bank	31	1116	1	1181	3
9998	19	1118	13	1184	3
1025	1	1119	1	1185	1
1026	1	1120	1	1186	4
1028	2	1121	1	1187	2
1029	3	1122	7	1188	1
1030	1	1123	3	1193	2
1031	5	1125	3	1203	1
1035	1	1127	2	1205	5
1041	1	1130	1	1206	1
1047	3	1131	5	1208	4
1049	5	1134	4	1209	2
1058	4	1135	6	1210	2
1060	1	1136	4	1211	2
1064	4	1142	5	1214	1
1066	1	1143	9	1215	2
1068	1	1147	2	1223	1
1085	8	1148	3	1225	1
1086	5	1149	2	1227	1
1087	7	1150	3	1232	1
1088	1	1152	1	1233	1
1091	1	1154	1	1234	1
1092	1	1156	2	1235	1
1093	2	1159	1	1237	4
1094	2	1163	1	1238	2
1098	9	1165	7	1239	1
1099	7	1167	4	1247	1
1100	1	1169	2	1249	1
1101	1	1170	5	1254	1
1102	1	1171	3	1256	1
1107	3	1172	1	1261	5
1108	1	1173	4	1262	3
1112	2	1176	2	1263	3
1113	2	1178	1	1265	2

(continues on next page)

Reading Mastery Objectives and Frequency of Use (cont.)

MO #	*N*	MO #	*N*	MO #	*N*
1266	1	1379	1	1453	1
1267	3	1380	2	1456	2
1271	9	1381	3	1458	9
1272	10	1383	2	1459	11
1273	3	1384	3	1460	1
1274	3	1386	2	1461	6
1278	3	1396	2	1463	4
1279	2	1402	1	1464	4
1283	1	1405	1	1466	1
1284	10	1406	1	1467	12
1287	8	1407	1	1470	2
1288	1	1409	3	1471	3
1289	10	1411	1	1472	1
1290	2	1412	1	1473	3
1292	6	1413	1	1475	5
1293	4	1415	4	1476	2
1294	1	1418	1	1477	5
1296	9	1419	2	1478	4
1300	8	1420	2	1479	1
1301	1	1425	3	1480	4
1302	3	1432	1	1482	7
1303	1	1433	3	1483	10
1337	5	1434	1	1484	1
1340	8	1435	4	1487	2
1341	6	1436	5	1490	1
1342	4	1437	3	1491	3
1345	1	1438	13	1492	1
1346	5	1439	1	1493	1
1347	7	1440	1	1494	3
1349	3	1441	11	1495	6
1351	2	1442	2	1498	2
1352	2	1445	3	1500	1
1354	1	1446	10	1501	3
1376	4	1447	3	1502	4
1378	4	1449	7	1503	1

Reading Mastery Objectives and Frequency of Use (cont.)

MO #	*N*	MO #	*N*	MO #	*N*
1507	1	1605	1	1662	1
1508	15	1607	2	1664	1
1509	4	1608	2	1665	4
1511	6	1609	3	1666	1
1512	1	1611	1	1668	1
1513	1	1612	1	1669	1
1514	2	1613	9	1670	1
1515	4	1614	2	1671	1
1517	3	1615	2	1674	3
1518	1	1617	1	1675	4
1519	2	1622	2	1686	3
1520	1	1624	1	1687	7
1521	2	1625	12	1689	1
1526	1	1626	1	1690	1
1528	12	1635	4	1692	2
1529	1	1636	1	1693	1
1530	2	1637	1	1694	1
1531	5	1638	4	1695	1
1532	2	1639	4	1697	1
1535	1	1640	1	1698	2
1536	1	1641	1	1699	2
1542	1	1642	2	1703	1
1544	1	1645	9	1709	2
1545	1	1646	3	1710	2
1547	1	1647	4	1711	6
1550	1	1649	1	1724	1
1553	1	1651	2	1725	2
1574	1	1652	3	1726	2
1575	1	1653	2	1728	2
1576	1	1655	4	1729	2
1579	3	1656	2	1731	2
1591	1	1657	2	1732	1
1601	1	1658	5	1733	1
1602	1	1659	3	1734	4
1603	1	1660	1	1737	1

Reading Mastery Objectives and Frequency of Use (cont.)

MO #	*N*	MO #	*N*	MO #	*N*
1747	1	1827	4	1892	1
1755	1	1828	2	1894	2
1757	1	1830	3	1895	2
1760	2	1831	4	1909	2
1762	2	1832	4	1910	3
1763	1	1833	2	1911	5
1764	1	1837	8	1913	1
1765	1	1838	6	1915	1
1770	1	1840	2	1916	1
1773	1	1841	2	1919	4
1778	1	1842	1	1920	3
1784	4	1844	2	1922	2
1786	1	1846	3	1923	1
1787	11	1847	2	1924	1
1788	2	1848	1	1926	2
1791	2	1849	14	1928	2
1798	1	1850	2	1931	3
1799	6	1851	1	1933	3
1800	1	1852	3	1938	1
1801	5	1853	4	1939	1
1804	13	1856	2	1942	2
1806	1	1857	4	1944	4
1809	1	1859	2	1945	1
1811	1	1860	6	1947	5
1814	6	1861	4	1948	1
1815	2	1864	2	1949	2
1816	7	1868	14	1950	2
1818	5	1870	2	1951	6
1819	1	1871	2	1952	16
1821	2	1876	1	1953	7
1822	2	1879	2	1954	13
1823	7	1886	3	1955	3
1824	4	1888	2	1956	2
1825	1	1889	3	1958	2
1826	2	1891	1	1959	11

Reading Mastery Objectives and Frequency of Use (cont.)

MO #	*N*	MO #	*N*	MO #	*N*
1960	5	2003	1	3960	8
1961	2	2004	6	3963	1
1962	2	2005	9	3967	2
1964	21	2006	1	3968	1
1965	1	2007	1	3969	1
1966	1	2009	1	3972	1
1969	17	2010	5	3973	1
1970	2	2011	1	3974	2
1971	4	2012	3	3975	3
1972	4	2014	1	3977	1
1973	1	2015	19	3978	1
1974	5	2016	4	3980	1
1976	5	2017	1	3983	4
1977	16	2018	4	3984	3
1978	1	2019	10	3991	4
1979	1	2020	1	3994	1
1980	11	2021	4	3999	1
1981	4	2022	1	4001	4
1982	2	2023	4	4004	1
1983	8	2024	4	4014	2
1984	2	2025	3	4015	1
1985	2	2026	1	4016	1
1986	3	2027	5	4018	1
1987	2	2028	1	4019	2
1988	2	2030	4	4020	1
1989	12	2033	2	4021	9
1990	1	2034	1	4022	4
1992	4	2035	6	4023	3
1994	12	2037	16	4024	2
1995	3	2038	1	4027	1
1997	2	2042	1	4028	2
1999	7	2047	1	4030	1
2000	2	3956	1	4031	1
2001	1	3958	2	4032	3
2002	1	3959	1	4033	3

Reading Mastery Objectives and Frequency of Use (cont.)

MO #	*N*	MO #	*N*	MO #	*N*
1960	5	2003	1	3960	8
1961	2	2004	6	3963	1
1962	2	2005	9	3967	2
1964	21	2006	1	3968	1
1965	1	2007	1	3969	1
1966	1	2009	1	3972	1
1969	17	2010	5	3973	1
1970	2	2011	1	3974	2
1971	4	2012	3	3975	3
1972	4	2014	1	3977	1
1973	1	2015	19	3978	1
1974	5	2016	4	3980	1
1976	5	2017	1	3983	4
1977	16	2018	4	3984	3
1978	1	2019	10	3991	4
1979	1	2020	1	3994	1
1980	11	2021	4	3999	1
1981	4	2022	1	4001	4
1982	2	2023	4	4004	1
1983	8	2024	4	4014	2
1984	2	2025	3	4015	1
1985	2	2026	1	4016	1
1986	3	2027	5	4018	1
1987	2	2028	1	4019	2
1988	2	2030	4	4020	1
1989	12	2033	2	4021	9
1990	1	2034	1	4022	4
1992	4	2035	6	4023	3
1994	12	2037	16	4024	2
1995	3	2038	1	4027	1
1997	2	2042	1	4028	2
1999	7	2047	1	4030	1
2000	2	3956	1	4031	1
2001	1	3958	2	4032	3
2002	1	3959	1	4033	3

Reading Mastery Objectives and Frequency of Use (cont.)

MO #	*N*	MO #	*N*	MO #	*N*
4034	6	4083	6	4136	1
4036	2	4084	2	4137	6
4037	1	4086	1	4138	2
4038	1	4087	1	4140	2
4039	2	4088	3	4141	7
4041	7	4089	2	4142	1
4042	1	4091	7	4143	5
4043	2	4092	1	4144	1
4044	3	4093	5	4344	3
4045	2	4094	3	4345	3
4046	1	4095	4	4346	5
4048	2	4096	3	4347	3
4049	1	4097	1	4348	13
4050	1	4102	1	4349	1
4051	3	4104	2	4350	2
4052	2	4105	1	4351	1
4053	2	4107	3	4352	3
4054	3	4110	1	4354	2
4055	11	4111	3	4355	1
4056	7	4113	5	4356	1
4057	7	4114	1	4358	3
4058	1	4115	1	4359	2
4059	1	4116	6	4360	3
4060	5	4118	1	4362	3
4061	1	4119	1	4364	2
4062	1	4123	2	4365	5
4064	1	4124	7	4367	18
4068	6	4125	10	4368	5
4069	6	4127	1	4369	7
4070	6	4128	2	4370	14
4073	4	4131	5	4374	1
4074	3	4132	2	4377	1
4076	2	4133	1	4381	3
4079	5	4134	3	4383	2
4082	4	4135	1	4387	3

Reading Mastery Objectives and Frequency of Use (cont.)

MO #	*N*	MO #	*N*	MO #	*N*
4388	12	4478	3		
4389	3	4479	2		
4390	1	4481	2		
4395	1	4482	6		
4397	3	4487	4		
4399	1	4491	5		
4400	3	4496	8		
4401	1	4497	2		
4402	1	4501	1		
4408	1	4503	1		
4410	2	4505	1		
4416	1	4506	2		
4418	1	4518	2		
4419	1	4524	3		
4420	2	4526	5		
4421	2	4529	2		
4423	1	4534	1		
4424	1	4535	1		
4425	1	Total	2250		
4427	1				
4433	1				
4436	2				
4437	1				
4439	1				
4444	1				
4447	1				
4450	5				
4452	1				
4453	3				
4454	1				
4455	1				
4458	3				
4459	3				
4464	2				
4474	1				

Appendix B

Mathematics Mastery Objectives and Frequency of Use

MO #	*N*	MO #	*N*	MO #	*N*
Teacher selected	94	2108	2	2178	3
Not found in the bank	26	2119	1	2184	1
Not found on contractor MO list	20	2120	3	2186	3
1557	1	2121	3	2187	3
1687	1	2122	3	2188	1
1689	1	2123	1	2190	7
2050	1	2124	1	2193	1
2052	2	2125	8	2195	7
2054	4	2126	3	2197	2
2055	4	2127	1	2206	1
2056	2	2128	2	2207	2
2058	2	2130	10	2209	1
2059	15	2132	1	2210	1
2060	4	2135	3	2211	1
2061	2	2137	1	2213	12
2064	1	2139	1	2214	5
2066	2	2140	1	2215	2
2067	1	2141	3	2216	3
2070	4	2146	6	2217	2
2071	3	2150	6	2218	4
2076	4	2151	2	2219	9
2077	1	2152	11	2220	3
2078	2	2153	15	2221	2
2079	5	2154	1	2222	2
2080	3	2155	2	2224	1
2084	3	2157	2	2225	2
2086	3	2163	1	2233	2
2089	2	2165	2	2235	3
2091	1	2166	1	2236	6
2100	6	2168	1	2237	4
2101	3	2169	1	2238	3
2104	1	2170	1	2239	4
2105	3	2171	1	2240	5
2106	5	2173	2	2241	3
2107	3	2174	2	2242	2

Mathematics Mastery Objectives and Frequency of Use (cont)

MO #	*N*	MO #	*N*	MO #	*N*
2243	8	2310	1	2353	2
2244	2	2313	2	2354	3
2245	4	2314	2	2355	1
2247	1	2316	2	2356	1
2248	2	2317	1	2358	8
2250	3	2318	2	2359	7
2252	4	2319	3	2360	2
2253	7	2320	6	2361	2
2254	2	2321	5	2362	2
2256	1	2322	3	2364	1
2257	5	2323	9	2365	3
2258	1	2325	2	2366	1
2269	4	2326	6	2372	2
2270	3	2327	14	2374	1
2271	2	2328	1	2377	1
2272	1	2329	1	2378	1
2275	1	2330	3	2379	1
2278	1	2331	4	2380	2
2283	2	2332	1	2383	1
2284	2	2333	2	2384	1
2285	1	2334	2	2385	2
2289	3	2335	4	2387	3
2290	1	2337	9	2389	3
2291	1	2338	1	2391	3
2295	5	2340	5	2393	4
2296	1	2342	9	2397	1
2297	5	2343	1	2399	1
2299	1	2344	2	2403	1
2300	2	2345	19	2405	4
2302	8	2346	2	2406	3
2303	6	2347	7	2407	3
2304	2	2348	6	2408	4
2305	5	2350	1	2409	1
2306	3	2351	1	2412	2
2309	2	2352	3	2413	3

Mathematics Mastery Objectives and Frequency of Use (cont)

MO #	*N*	MO #	*N*	MO #	*N*
2415	2	2496	5	2554	1
2416	5	2497	2	2556	3
2417	3	2499	1	2557	1
2418	2	2500	1	2560	1
2419	6	2501	1	2562	2
2420	3	2502	1	2564	1
2421	1	2503	1	2566	2
2426	4	2504	1	2567	1
2427	1	2505	3	2569	1
2428	1	2506	2	2572	1
2434	1	2508	2	2574	1
2439	1	2509	2	2583	2
2444	3	2510	1	2586	1
2445	3	2511	3	2587	6
2446	1	2512	2	2589	6
2447	2	2513	2	2590	4
2448	4	2514	2	2592	4
2451	3	2515	1	2593	9
2460	1	2517	6	2594	1
2461	1	2518	4	2595	6
2464	1	2519	1	2596	3
2465	1	2520	1	2597	1
2468	2	2521	3	2599	1
2470	3	2523	6	2600	2
2471	1	2524	4	2602	7
2472	1	2525	1	2603	6
2480	2	2526	2	2604	1
2481	3	2528	1	2608	1
2482	1	2529	1	2609	1
2483	1	2535	1	2611	1
2484	2	2538	2	2615	1
2487	1	2548	4	2620	1
2493	1	2549	1	2633	2
2494	3	2550	2	2636	5
2495	4	2551	2	2642	1

Mathematics Mastery Objectives and Frequency of Use (cont)

MO #	*N*	MO #	*N*	MO #	*N*
2643	1	2691	1	2750	1
2646	4	2692	1	2751	1
2647	5	2693	13	2754	2
2655	1	2694	3	2755	3
2656	1	2696	3	2760	1
2657	1	2698	2	2762	5
2658	3	2699	2	2763	3
2659	8	2700	1	2764	6
2660	3	2701	5	2765	2
2661	2	2702	9	2768	9
2662	4	2703	4	2769	3
2663	1	2704	2	2770	3
2664	2	2705	1	2771	2
2667	1	2706	14	2773	6
2668	1	2707	4	2774	12
2669	1	2710	4	2775	1
2670	2	2715	4	2776	9
2672	3	2716	7	2777	9
2673	12	2717	1	2778	4
2675	1	2720	2	2779	2
2676	1	2721	2	2780	3
2677	2	2723	3	2781	5
2678	4	2724	1	2782	5
2679	1	2732	2	2783	5
2680	7	2734	1	2784	5
2681	2	2736	2	2785	1
2682	2	2737	3	2788	1
2683	1	2739	1	2789	1
2684	1	2740	1	2790	5
2685	7	2743	1	2792	1
2686	2	2744	1	2797	1
2687	7	2745	2	2799	6
2688	4	2747	1	2800	2
2689	4	2748	1	2802	1
2690	1	2749	1	2806	1

Mathematics Mastery Objectives and Frequency of Use (cont)

MO #	*N*	MO #	*N*	MO #	*N*
2807	3	2858	2	2897	4
2808	2	2859	6	2898	3
2809	1	2860	6	2899	2
2811	7	2861	3	2901	6
2812	6	2862	3	2902	7
2816	2	2863	2	2903	1
2817	1	2864	8	2904	5
2819	6	2865	4	2906	1
2820	1	2866	8	2908	1
2821	2	2867	3	2909	1
2822	1	2868	2	2911	1
2823	2	2869	9	2912	2
2825	2	2870	4	2916	2
2826	4	2871	7	2918	1
2827	3	2872	12	2920	1
2829	1	2873	27	2922	1
2832	1	2874	1	2924	4
2833	1	2875	13	2925	2
2834	8	2876	1	2926	4
2835	4	2877	2	2929	2
2836	7	2878	14	2932	1
2837	4	2879	4	2935	1
2838	12	2880	8	2937	6
2839	4	2881	2	2938	1
2840	5	2882	6	2943	1
2841	1	2883	4	2944	8
2842	3	2884	5	2945	3
2845	1	2885	1	2946	10
2846	3	2887	13	2947	3
2847	2	2888	1	2948	5
2848	3	2892	2	3917	1
2851	3	2893	1	3920	4
2855	8	2894	2	3922	1
2856	4	2895	1	3924	1
2857	7	2896	3	3926	2

Mathematics Mastery Objectives and Frequency of Use (cont)

MO #	*N*	MO #	*N*	MO #	*N*
3928	1	3994	1	4047	9
3931	2	3997	8	4048	5
3935	2	3998	1	4049	2
3936	1	3999	4	4051	1
3937	1	4000	1	4052	2
3939	2	4001	5	4054	3
3942	1	4003	5	4055	3
3943	2	4004	2	4056	10
3945	1	4005	1	4057	1
3948	1	4006	2	4058	2
3951	2	4010	2	4059	4
3959	1	4012	2	4060	3
3960	1	4014	1	4061	3
3962	1	4015	3	4062	5
3964	10	4016	6	4063	1
3965	5	4017	1	4064	7
3966	8	4018	1	4065	3
3967	2	4020	4	4066	4
3968	4	4025	1	4067	3
3969	4	4026	1	4068	1
3970	9	4027	3	4069	1
3971	6	4029	2	4070	7
3972	6	4030	1	4071	2
3973	1	4033	1	4072	5
3974	1	4034	1	4073	2
3975	2	4035	2	4074	1
3976	3	4037	1	4075	2
3977	1	4038	1	4076	1
3978	2	4039	3	4077	11
3983	1	4040	3	4078	2
3984	2	4041	1	4079	8
3986	2	4042	1	4080	5
3989	1	4044	1	4081	5
3990	1	4045	2	4082	1
3991	2	4046	1	4083	8

Mathematics Mastery Objectives and Frequency of Use (cont)

MO #	*N*	MO #	*N*	MO #	*N*
4084	3	4244	2	4312	5
4085	10	4245	1	4316	1
4086	8	4248	1	4319	1
4087	1	4253	5	4321	2
4088	3	4254	1	4322	8
4089	3	4255	3	4323	1
4090	1	4256	1	4324	2
4202	1	4257	5	4325	1
4204	4	4258	2	4326	2
4206	13	4259	3	4327	1
4207	14	4262	1	4329	2
4209	4	4264	1	4332	4
4210	10	4266	3	4333	2
4211	1	4267	2	4334	2
4212	3	4268	1	4340	1
4213	2	4269	1	Total	2308
4214	2	4270	4		
4215	5	4271	4		
4216	1	4272	3		
4217	3	4273	3		
4218	8	4275	1		
4219	2	4276	1		
4220	2	4277	1		
4222	6	4287	2		
4223	4	4292	2		
4224	1	4294	3		
4226	1	4295	1		
4227	7	4301	2		
4228	6	4302	1		
4230	3	4303	1		
4232	1	4305	1		
4233	1	4306	1		
4240	2	4308	1		
4241	1	4309	2		
4243	1	4310	1		

Appendix C
Reading MOs Rated No Content Centrality

MO #	MO #	MO #
1120	3991	4131
1181	3994	4133
1193	3999	4134
1337	4001	4140
1354	4014	4141
1509	4016	4142
1535	4018	4143
1670	4048	Examiner
1689	4049	
1815	4050	
1821	4051	
1822	4053	
1853	4054	
1864	4055	
1871	4056	
1978	4057	
1992	4058	
2010	4059	
3956	4060	
3958	4061	
3959	4062	
3960	4064	
3963	4068	
3967	4069	
3968	4070	
3969	4073	
3972	4074	
3973	4076	
3974	4079	
3975	4093	
3975	4094	
3977	4114	
3978	4124	
3983	4125	
3984	4127	

Appendix D
Mathematics MOs Rated No Content Centrality

MO #
2253
2359
2495
2664
2687
2783
2916
2922
3917
3920
3926
3931
3935
3937
3939
3943
3945
3948
3964
3971
3972
3973
3974
3975
3976
3978
3983
3984
3986
3991
4001
4003
4322
MO not found Examiner

Appendix E
ELA Grade Level Content Standards and Number of Mastery Objectives that Aligned

Some of the MOs are not included in the following list. There were 44 MOs with no grade level reference, 355 MOs referenced to below grade level, and 20 MOs that could not be found in the state provided database.

3rd Grade

Standard	Topic	Indicator	Number of MOs
General Reading Processes			
	Phonics: Students will apply their knowledge of letter/sound relationships and word structure to decode unfamiliar words		
		Use a variety of phonetic skills to read unfamiliar words	
		Decode words in grade-level texts	2
	Fluency: Students will read orally with accuracy and expression at a rate that sounds like speech		
		Read orally from familiar text at an appropriate rate	
		Read grade-level text accurately	3
		Read grade level text with expression	
	Vocabulary: Students will use a variety of strategies and opportunities to understand word meaning and to increase vocabulary		
		Develop and apply vocabulary through exposure to a variety of texts	
		Develop a conceptual understanding of new words	28
		Understand, acquire, and use new vocabulary	9
	Comprehension: Students will use a variety of strategies to understand what they read (construct meaning)		
		Develop comprehension skills through exposure to a variety of texts	
		Use strategies to prepare for reading (before reading)	20
		Use strategies to make meaning from text (during reading)	3
		Use strategies to demonstrate understanding of the text (after reading)	15
Comprehension of Informational Text			
	Students will read, comprehend, interpret, analyze, and evaluate informational texts		
		Develop comprehension skills by reading a variety of self-selected and assigned informational texts	20
		Identify and use text features to facilitate understanding of informational texts	14
		Develop knowledge of organizational structure of informational text to understand what is read	5
		Determine important ideas and messages in informational texts	10
		Identify and explain the author's use of language	
		Read critically to evaluate informational text	
Comprehension of Literary Text			
	Students will read, comprehend, interpret, analyze, and evaluate literary texts		
		Develop comprehension skills by reading a variety of self-selected and assigned literary texts	
		Use text features to facilitate understanding of literary texts	8

		Use elements of narrative texts to facilitate understanding	22
		Use elements of poetry to facilitate understanding	1
		Use elements of drama to facilitate understanding	4
		Determine important ideas and messages in literary texts	11
		Identify and describe the author's use of language	2
		Read critically to evaluate literary texts	.
4th Grade			
General Reading Processes			.
	Phonics: Students will apply their knowledge of letter/sound relationships and word structure to decode unfamiliar words		.
		Use a variety of phonetic skills to read unfamiliar words	2
	Fluency		.
		Read orally at an appropriate rate	.
		Read grade-level text with both high accuracy and appropriate pacing, intonation, and expression	1
	Vocabulary		.
		Develop and apply vocabulary through exposure to a variety of texts	.
		Develop a conceptual understanding of new words	42
		Understand, acquire, and use new vocabulary	17
	Comprehension: Students will use a variety of strategies to understand what they read (construct meaning)		.
		Develop comprehension skills through exposure to a variety of texts	.
		Use strategies to prepare for reading (before reading)	21
		Use strategies to make meaning from text (during reading)	11
		Use strategies to demonstrate understanding of the text (after reading)	21
Comprehension of Informational Text			.
	Students will read, comprehend, interpret, analyze, and evaluate informational texts		.
		Develop comprehension skills by reading a variety of self-selected and assigned print and electronic informational texts	1
		Identify and use text features to facilitate understanding of informational texts	20
		Develop knowledge of organizational structure of informational text to understand what is read	.
		Determine important ideas and messages in informational texts	13
		Identify and explain the author's use of language	.
		Read critically to evaluate informational text	.
Comprehension of Literary Text			.
	Students will read, comprehend, interpret, analyze, and evaluate literary texts		.
		Develop comprehension skills by reading a variety of self-selected and assigned literary texts	.
		Use text features to facilitate understanding of literary texts	13
		Use elements of narrative texts to facilitate understanding	26
		Use elements of poetry to facilitate understanding	5
		Use elements of drama to facilitate understanding	.
		Determine important ideas and messages in literary texts	.

		Identify and describe the author's use of language	.
		Read critically to evaluate literary texts	.
5th Grade			
General Reading Processes			.
	Fluency: Students will read orally with accuracy and expression at a rate that sounds like speech		.
		Read orally at an appropriate rate	.
		Read grade-level text with both high accuracy and appropriate pacing, intonation, and expression	6
	Vocabulary: Students will use a variety of strategies and opportunities to understand word meaning and to increase vocabulary		.
		Develop and apply vocabulary through exposure to a variety of texts	.
		Develop and apply a conceptual understanding of new words	47
		Understand, acquire, and use new vocabulary	30
	General Reading Comprehension		.
		Develop and apply comprehension skills through exposure to a variety of texts, including traditional print and electronic texts	.
		Use strategies to prepare for reading (before reading)	22
		Use strategies to make meaning from text (during reading)	14
		Use strategies to demonstrate understand of the text (after reading)	26
Comprehension of Informational Text			.
	Students will read, comprehend, interpret, analyze, and evaluate informational texts		.
		Develop and apply comprehension skills by reading a variety of self-selected and assigned print and electronic informational texts	21
		Identify and use text features to facilitate understanding of informational texts	23
		Develop and apply knowledge of organizational structure of informational text to understand what is read	5
		Determine and analyze important ideas and messages in informational texts	22
		Identify and explain the author's use of language	1
		Read critically to evaluate informational text	.
Comprehension of Literary Text			.
	Students will read, comprehend, interpret, analyze, and evaluate literary texts		.
		Develop and apply comprehension skills by reading a variety of self-selected and assigned literary texts	.
		Analyze text features to facilitate understanding of literary texts	20
		Analyze elements of narrative texts to facilitate understanding of interpretation	24
		Analyze elements of poetry to facilitate understanding and interpretation	2
		Analyze elements of drama to facilitate understanding	1
		Determine important ideas and messages in literary texts	23
		Identify and describe the author's use of language	3
		Read critically to evaluate literary texts	1
6th Grade			
General Reading Processes			.
	Fluency: Students will read orally with accuracy and expression at a rate that sounds like speech		.

		Read orally at an appropriate rate	.
		Read grade-level text with both high accuracy and appropriate pacing, intonation, and expression	1
	Vocabulary: Students will use a variety of strategies and opportunities to understand word meaning and to increase vocabulary		.
		Develop and apply vocabulary through exposure to a variety of texts	.
		Apply a conceptual understanding of new words	23
		Understand, acquire, and use new vocabulary	17
	General Reading Comprehension		.
		Develop and apply comprehension skills through exposure to a variety of texts, including traditional print and electronic texts	.
		Use strategies to prepare for reading (before reading)	9
		Use strategies to make meaning from text (during reading)	8
		Use strategies to demonstrate understanding of the text (after reading)	33
Comprehension of Informational Text			.
	Students will read, comprehend, interpret, analyze, and evaluate informational texts		.
		Develop and apply comprehension skills by reading a variety of self-selected and assigned print and electronic informational texts	.
		Identify and use text features to facilitate understanding of informational texts	.
		Develop and apply knowledge of organizational structure of informational text to facilitate understanding	2
		Determine and analyze important ideas and messages in informational texts	8
		Analyze purposeful use of language	.
		Read critically to evaluate informational text	.
Comprehension of Literary Text			.
	Students will read, comprehend, interpret, analyze, and evaluate literary texts		.
		Develop and apply comprehension skills by reading and analyzing a variety of self-selected and assigned literary texts	5
		Analyze text features to facilitate understanding of literary texts	23
		Analyze elements of narrative texts to facilitate understanding of interpretation	12
		Analyze elements of poetry to facilitate understanding and interpretation	.
		Analyze elements of drama to facilitate understanding	1
		Determine important ideas and messages in literary texts	10
		Analyze the author's purposeful use of language	1
		Read critically to evaluate literary texts	.
7th Grade			
General Reading Processes			.
	Fluency: Students will read orally with accuracy and expression at a rate that sounds like speech		.
		Read orally at an appropriate rate	1
		Read grade-level text with both high accuracy and appropriate pacing, intonation, and expression	4
	Vocabulary: Students will use a variety of strategies and opportunities to understand word meaning and to increase vocabulary		.

		Develop and apply vocabulary through exposure to a variety of texts	.
		Apply a conceptual understanding of new words	47
		Understand, acquire, and use new vocabulary	30
	General Reading Comprehension		.
		Apply comprehension skills through exposure to a variety of texts, including traditional print and electronic texts	.
		Use strategies to prepare for reading (before reading)	19
		Use strategies to make meaning from text (during reading)	10
		Use strategies to demonstrate understanding of the text (after reading)	19
Comprehension of Informational Text			.
	Students will read, comprehend, interpret, analyze, and evaluate informational texts		.
		Apply comprehension skills by selecting, reading, and interpreting a variety of print and electronic informational texts	37
		Analyze text features to facilitate understanding of informational texts	.
		Apply knowledge of organizational patterns of informational text to facilitate understanding	6
		Analyze important ideas and messages in informational texts	24
		Analyze purposeful use of language	3
		Read critically to evaluate informational text	1
Comprehension of Literary Text			.
	Students will read, comprehend, interpret, analyze, and evaluate literary texts		.
		Apply comprehension skills by reading and analyzing a variety of self-selected and assigned literary texts	.
		Analyze text features to facilitate understanding of literary texts	17
		Analyze elements of narrative texts to facilitate understanding of interpretation	22
		Analyze elements of poetry to facilitate understanding and interpretation	4
		Analyze elements of drama to facilitate understanding and interpretation	3
		Analyze important ideas and messages in informational texts	18
		Analyze the author's purposeful use of language	3
		Read critically to evaluate literary texts	.
8th Grade			
General Reading Processes			.
	Fluency: Students will read orally with accuracy and expression at a rate that sounds like speech		.
		Read orally at an appropriate rate	.
		Read-grade level text with both accuracy and appropriate pacing, intonation, and expression	.
	Vocabulary		.
		Develop and apply vocabulary through exposure to a variety of texts	.
		Apply and refine a conceptual understanding of new words	61
		Understand, acquire, and use new vocabulary	52
	General Reading Comprehension		.
		Apply and refine comprehension skills through exposure to a variety of texts, including traditional print and electronic texts	.

		Use strategies to prepare for reading (before reading)	29
		Use strategies to make meaning from text (during reading)	25
		Use strategies to demonstrate understanding of the text (after reading)	42
Comprehension of Informational Text			.
	Students will read, comprehend, interpret, analyze, and evaluate informational texts		.
		Apply and refine comprehension skills through exposure to a variety of texts, including traditional print and electronic texts	27
		Analyze text features to facilitate and extend understanding of informational texts	35
		Apply knowledge of organizational patterns of informational text to facilitate understanding and analysis	10
		Analyze important ideas and messages in informational texts	26
		Analyze purposeful use of language	3
		Read critically to evaluate informational text	1
Comprehension of Literary Text			.
	Students will read, comprehend, interpret, analyze, and evaluate literary texts		.
		Refine comprehension skills by reading and analyzing a variety of self-selected and assigned literary texts	1
		Analyze and evaluate text features to facilitate and extend understanding of literary texts	23
		Analyze and evaluate elements of narrative texts to facilitate understanding and interpretation	38
		Analyze and evaluate elements of poetry to facilitate understand and interpretation	6
		Analyze and evaluate elements of drama to facilitate understanding and interpretation	6
		Analyze and interpret important ideas and messages in literary texts	25
		Analyze and evaluate the author's purposeful use of language	4
		Read critically to evaluate literary texts	.
10th Grade			
English			.
	Reading, Reviewing and Responding to Texts		.
		The student will use effective strategies before, during, and after reading, viewing, and listening to self-selected and assigned materials.	228
		The student will construct, examine, and extend meaning of traditional and contemporary works recognized as having significant literary merit.	40
		The student will evaluate textual changes in a work and explain how these changes alter tone, clarify meaning, address a particular audience, or fulfill a purpose.	.
	Evaluating the Content, Organization, and Language Use of Texts		.
		The student will describe the effect that a given text, heard or read, has on a listener or reader.	6
		The student will assess the effectiveness of choice of details, organizational pattern, word choice, syntax, use of figurative language, and rhetorical devices.	3

Appendix F
Math Grade Level Content Standards and Number of Mastery Objectives that Aligned

Some of the MOs are not included in the following list. There were 14 MOs with no grade level reference, 1 MOs referenced to below grade level, and 26 MOs that could not be found in the state provided database.

3rd Grade

Standard	**Topic**	**Indicator**	**Number of MOs**
Knowledge of Algebra, Patterns, and Functions			
	Patterns and Functions		
		Identify, describe, extend, and create numeric patterns and functions	38
		identify, describe, extend, and create non-numeric patterns or repeating patterns	
	Expressions, Equations, and Inequalities		
		Write and identify expressions	
		Identify, write, solve, and apply equations, and inequalities	4
	Numeric and Graphic Representations of Relationships		
		Locate points on a number line	9
Knowledge of Geometry			
	Plane Geometric Figures		
		Analyze the properties of plane geometric figures	24
		Analyze geometric relationships	
	Solid Geometric Figures		
		Analyze the properties of solid geometric figures	17
	Representation of Geometric Figures		
		Represent plane geometric figures	5
	Congruence		
		Analyze congruent figures	5
	Transformations		
		Analyze a transformation	
		Analyze geometric figures and pictures	
Knowledge of Measurement			
	Measurement Units		
		Read customary and metric measurement units	39
	Measurement Tools		
		Measure in customary and metric units	11
	Applications in Measurement		
		Apply measurement concepts	
		Calculate equivalent measurements	
	Data Analysis		
		Analyze data	47

Knowledge of Statistics			
	Data Displays		
		Collect, organize, and display data	
Knowledge of Probability			
	Sample Space		
		Identify possible outcomes	
	Theoretical Probability		
		Identify the probability of an event	
Knowledge of Number Relationships and Computation/Arithmetic			
	Knowledge of Number and Place Value		
		Apply knowledge of whole numbers and place value	16
		Apply knowledge of fractions	1
		Apply knowledge of Money	26
	Number Theory		
		Apply number relationships	4
	Number Computation		
		Analyze number relations and compute	3
		Estimation	
Processes of Mathematics			
	Problem Solving		
		Apply a variety of concepts, processes, and skills to solve problems	
	Reasoning		
		Justify ideas or solutions with mathematical concepts or proofs	
	Communication		
		Present mathematical ideas using words, symbols, visual displays, or technology	
	Connections		
		Relate or apply mathematics within the discipline, to other disciplines, and to life	
4th Grade			
Knowledge of Algebra, Patterns, and Functions			
	Patterns and Functions		
		Identify, describe, extend, and create numeric patterns and functions	50
	Expressions, Equations, and Inequalities		
		Write and identify expressions Identify, write, solve, and apply equations and inequalities	
	Numeric and Graphic Representations of Relationships		
		Locate points on a number line and in a coordinate grid	3
Knowledge of Geometry			
	Plane Geometric Figures		
		Analyze the properties of plane geometric figures	29
	Solid geometric figures		
		Analyze the properties of solid	12

		geometric figures	
		Analyze the relationship between plane geometric figures and surfaces of solid geometric figures	
	Representation of Geometric Figures		
		Represent plane geometric figures	4
	Congruence		
		Analyze geometric figures	6
	Transformation		
		Analyze a transformation	3
Knowledge of Measurement			
	Measurement Units		
		Read customary and metric measurement units	49
		Calculate equivalent measurements	
	Measurement Tools		
		Measure in customary and metric units	1
		Compare right angles to a corner	
	Applications in Measurement		
		Apply measurement concepts	2
Knowledge of Statistics			
	Data Displays		
		Collect, organize, and display data	
	Data Analysis		
		Analyze data	52
		Describe a set of data	2
Knowledge of Probability			
	Theoretical Probability		
		Determine the probability of one simple event comprised of equally likely outcomes	
Knowledge of Number Relationships and Computation/Arithmetic			
	Knowledge of Number and Place Value		
		Apply knowledge of whole numbers and place value	22
		Apply knowledge of fractions and decimals	2
		Apply knowledge of money	19
	Number Theory		
		Apply number relationships	
	Number Computation		
		Analyze number relations and compute	9
		Estimation	
Processes of Mathematics			
	Problem Solving		
		Apply a variety of concepts, processes, and skills to solve problems	
	Reasoning		
		Justify ideas or solutions with mathematical concepts or proofs	
	Communication		

		Present mathematical ideas using words, symbols, visual displays, or technology	
	Connections		
		Relate or apply mathematics within the discipline, to other disciplines, and to life	
5th Grade			
Knowledge of Algebra, Patterns, and Functions			
	Patterns and Functions		
		Identify, describe, extend, and create numeric patterns and functions	45
	Expressions, Equations, and Inequalities		
		Write and identify expressions	
		Identify, write, solve, and apply equations and inequalities	19
	Numeric and Graphic Representations of Relationships		
		Locate points on a number line and in a coordinate grid	9
Knowledge of Geometry			
	Plane Geometric Figures		
		Analyze the properties of plane geometric figures	23
		Analyze geometric relationships	
	Solid Geometric Figures		
		Analyze the properties of solid geometric figures	23
		Analyze the relationship between plane geometric figures and faces of solid geometric figures	
	Representation of Geometric Figures		
		Represent plane geometric figures	6
	Congruence and Similarity		
		Analyze similar figures	12
	Transformation		
		Analyze a transformation	7
Knowledge of Measurement			
	Measurement Units		
		Read customary and metric measurement units	61
	Measurement Tools		
		Measure in customary and metric units	6
		Measure Angles	1
	Applications in Measurement		
		Estimate and apply measurement formulas	8
		Calculate equivalent measurements	
Knowledge of Statistics			
	Data Displays		
		Collect, organize, and display data	
	Data Analysis		
		Analyze Data	73
		Describe a set of data	3

Knowledge of Probability			
	Sample Space		
		Identify possible outcomes	
	Theoretical Probability		
		Determine if the probability of one simple event comprised of equally likely outcomes	
Knowledge of Number Relationships and Computation/Arithmetic			
	Knowledge of Number and Place Value		
		Apply knowledge of fractions, decimals, and place value	59
	Number Theory		
		Apply number relationships	
	Number Computation		
		Analyze number relations and compute	19
		Estimation	
Processes of Mathematics			
	Problem Solving		
		Apply a variety of concepts, processes, and skills to solve problems	
	Reasoning		
		Justify ideas or solutions with mathematical concepts or proofs	
	Communication		
		Present mathematical ideas using words, symbols, visual displays, or technology	
	Connections		
		Relate or apply mathematics within the discipline, to other disciplines, and to life	
6th Grade			
Knowledge of Algebra, Patterns, and Functions			
	Patterns and Functions		
		Identify, describe, extend, and create numeric patterns and functions	27
	Expressions, Equations, and Inequalities		
		Write and evaluate expressions Identify, write, solve, and apply equations and inequalities	7
	Numeric and Graphic Representation of Relationships		
		Locate points on a number line and in a coordinate plane	2
		Analyze linear relationships	
Knowledge of Geometry			
	Plane Geometric Figures		
		Analyze the properties of plane geometric figures	27
		Analyze geometric relationships	
	Representation of Geometric Figures		
		Represent plane geometric figures	2
	Congruence and Similarity		

		Analyze congruent figures	5
	Transformations		
		Analyze a transformation on a coordinate plane	3
Knowledge of Measurement			
	Measurement Tools		
		Measure in customary and metric units	1
		Measure angles in polygons	5
	Applications in Measurement		
		Estimate and apply measurement formulas	32
Knowledge of Statistics			
	Data Displays		
		Organize and display data	
	Data Analysis		
		Analyze Data	33
		Describe a set of data	2
Knowledge of Probability			
	Theoretical Probability		
		Determine the probability of one simple event comprised of equally likely outcomes	
	Experimental Probability		
		Analyze the results of a probability experiment	
Knowledge of Number Relationships and Computation/Arithmetic			
	Knowledge of Number and Place Value		
		Apply knowledge of rational numbers and place value	28
	Number Theory		
		Apply number relationships	5
	Number Computation		
		Analyze number relations and compute	
		Estimation Analyze ratios, proportions, or percents	
Processes of Mathematics			
	Problem Solving		
		Apply a variety of concepts, processes, and skills to solve problems	
	Reasoning		
		Justify ideas or solutions with mathematical concepts or proofs	
	Communication		
		Present mathematical ideas using words, symbols, visual displays, or technology	
	Connections		
		Relate or apply mathematics within the discipline, to other disciplines, and to life	
7th Grade			
Knowledge of Algebra, Patterns, and Functions			
	Patterns and Functions		

		Identify, describe, extend, and create linear patterns and functions	39
	Expressions, Equations, and Inequalities		
		Write and evaluate expressions	
		Identify, write, solve, and apply equations and inequalities	18
	Numeric and Graphic Representations of Relationships		
		Locate points on a number line and in a coordinate plane	5
		Analyze linear relationships	1
Knowledge of Geometry			
	Plane Geometric Figures		
		Analyze the properties of plane geometric figures	19
		Analyze geometric relationships	6
	Representation of Geometric Figures		
		Represent plane geometric figures	8
	Congruence and Similarity		
		Apply the properties of congruent polygons	10
	Transformations		
		Analyze a transformation on a coordinate plane	8
Knowledge of Measurement			
	Applications in Measurement		
		Estimate and apply measurement formulas	61
		Analyze measurement relationships	5
Knowledge of Statistics			
	Data Displays		
		Organize and display data	
	Data Analysis		
		Analyze data	59
		Describe a set of data	5
Knowledge of Probability			
	Sample Space		
		Identify a sample space	
	Theoretical Probability		
		Determine the probability of an event comprised of no more than 2 independent events	
	Experimental Probability		
		Analyze the results of a survey or simulation	
Knowledge of Number Relationships and Computation/Arithmetic			
	Knowledge of Place Value		
		Apply knowledge of rational numbers and place value	46
	Number Computation		
		Analyze number relations and compute	20
		Estimation Analyze ratios, proportions, or percents	
Processes of Mathematics			

	Problem Solving		
		Apply a variety of concepts, processes, and skills to solve problems	
	Reasoning		
		Justify ideas or solutions with mathematical concepts or proofs	
	Communication		
		Present mathematical ideas using words, symbols, visual displays, or technology	
	Connections		
		Relate or apply mathematics within the discipline, to other disciplines, and to life	
8th Grade			
Knowledge of Algebra, Patterns, and Functions			
	Patterns and Functions		
		Identify, describe, extend, and create patterns, functions, and sequences	56
	Expressions, Equations, and Inequalities		
		Write, simplify, and evaluate expressions	
		Identify, write, solve, and apply equations and inequalities	33
	Numeric and Graphic Representations of Relationships		
		Locate points on a number line and in a coordinate plane	17
		Analyze linear relationships	
Knowledge of Geometry			
	Properties of Plane Geometric Figures		
		Analyze the properties of plane geometric figures	49
		Analyze geometric relationships	23
	Representation of Geometric Figures		
		Represent plane geometric figures	12
	Congruence and Similarity		
		Apply the properties of similar polygons	10
	Transformations		
		Analyze a transformation on a coordinate plane	13
Knowledge of Measurement			
	Applications in Measurement		
		Estimate and apply measurement formulas	85
		Analyze measurement relationships	19
Knowledge of Statistics			
	Data Displays		
		Organize and display data	
	Data Analysis		
		Analyze Data	105
Knowledge of Probability			
	Sample Space		

		Identify a sample space	
	Theoretical Probability		
		Determine the probability of an event comprised of no more than 2 independent events	
		Determine the probability of a second event that is dependent on a first event of equally likely outcomes	
	Experimental Probability		
		Analyze the results of a survey or simulation	
Knowledge of Number Relationships and Computation/Arithmetic			
	Knowledge of Number and Place Value		
		Apply knowledge of rational numbers and place value	66
	Number Computation		
		Analyze number relations and compute	38
		Estimation Analyze ratios, proportions, or percents	
Processes of Mathematics			
	Problem Solving		
		Apply a variety of concepts, processes, and skills to solve problems	
	Reasoning		
		Justify ideas or solutions with mathematical concepts or proofs	
	Communication		
		Present mathematical ideas using words, symbols, visual displays, or technology	
	Connections		
		Relate or apply mathematics within the discipline, to other disciplines, and to life	
10th Grade			
Mathematics			
	Functions and Algebra		
		The student will analyze a wide variety of patterns and functional relationships using the language of mathematics and appropriate technology	99
		The student will model and interpret real-world situations using the language of mathematics and appropriate technology	34
	Geometry, Measurement, And Reasoning		
		The student will represent and analyze two- and three-dimensional figures using tools and technology when appropriate	69
		The student will apply geometric properties and relationships to solve problems using tools and technology when appropriate	9
		The student will apply concepts of measurement using tools and technology when appropriate	62

Data Analysis And Probability	The student will collect, organize, analyze, and present data The student will apply the basic concepts of statistics and probability to predict possible outcomes of real-world situations	69