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Academic curriculum for students with significant cognitive disabilities:
Evidence from five states

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Abstract

In response to federal requirements for general curriculum access and participation in large-scale academic assessments, states have shifted curriculum for students with significant cognitive disabilities from a primarily functional model to one that includes academics. What does academic instruction look like for students with significant cognitive disabilities, ten years after the first requirements for access to the general curriculum in IDEA 1997 and six years after the mandates for assessments of academic content knowledge in NCLB? The purpose of this paper is to present aggregated findings from a teacher self-report curriculum measure administered in five states during the 2006-07 academic year. Findings highlight the curricula being taught to students eligible to take alternate assessments based on alternate achievement standards; gaps in academic instruction; and differences in curricular priorities for students with varying levels of symbolic communication. While students are being taught a wide range of academic content, the most intensive instruction is still grounded in functional academic areas. There are few differences in the content taught to students with different levels of symbolic communication use, although performance expectations differ across those groups. Some patterns in relationships within English language arts content are also explored.

Academic curriculum for students with significant cognitive disabilities: Evidence from five states

Students with significant disabilities were first included in large-scale assessment after Individuals with Disabilities Education Act (IDEA) 1997 required alternate assessments be provided for students who could not participate in typical tests, even with accommodations. Final No Child Left Behind (NCLB) regulations permitted states to develop alternate achievement standards (AAS) for reporting adequate yearly progress for students with significant cognitive disabilities, but stipulated that these AAS must be aligned with a state's academic content standards, promote access to the general curriculum, and reflect the highest achievement standards possible (200.1(d), U.S. Department of Education, 2003).

The Alternate Achievement Standards for Students with the Most Significant Cognitive Disabilities: Non-Regulatory Guidance states that the content of alternate assessments based on alternate achievement standards (AA-AAS) should be “clearly related to grade-level content, although it may be restricted in scope or complexity or take the form of introductory or pre-requisite skills” (U.S. Department of Education, 2005, p. 26). Educators may begin with academic content standards for the grade level in which the student is enrolled and then adapt or “extend” these content standards for the individual with disabilities.

In order for students to have the opportunity to learn the extended content that is tested through alternate assessments, teachers must know how to effectively translate extended standards into meaningful instruction. As this shift to academics represents a major curriculum change for this population (Browder, Flowers, Ahlgrim-Delzell, Karvonen, Spooner, & Algozzine, 2004), teachers still need considerable help with curriculum planning; identifying, developing, and adapting materials; and learning how to effectively teach academic skills to students with significant cognitive disabilities. Surveys reveal that some teachers question the relevance of this grade level content for students with significant intellectual disabilities (Agran, Alper, & Wehmeyer, 2002) or do not agree

that alternate assessment promotes access to the general curriculum standards (Kleinert, Kennedy, & Kearns, 1999). Further complicating this curriculum shift are (1) the lack of research-based strategies for teaching a wide range of academic content to the population (Browder, Spooner, Ahlgrim-Delzell, Harris, & Wakeman, in press; Browder, Wakeman, Spooner, Ahlgrim-Delzell, & Algozzine, 2006); (2) a lack of understanding of academics, especially among special educators who teach students with significant disabilities (Otis-Wilborn, Winn, Griffin, & Kilgore, 2005); and (3) the need to combine academic instruction for alternate achievement standards with individual curricular priorities represented in students' IEPs. Teachers must still determine how to balance the demands for academic instruction with other priorities (e.g., functional, transition, and therapeutic goals). Preservice teacher education programs may not structure curriculum courses in such a way that adequately prepares teachers for these challenges. Combined with the historically low expectations for academic performance and teachers' resistance to this major curriculum shift, there are certainly challenges in creating instruction related to what is assessed in AA-AAS.

To help overcome some of these challenges, numerous resources have emerged to help teachers learn how to create opportunities for students to access the general curriculum (cf. Clayton, Burge, Denham, Kleinert, & Kearns, 2006). However, the availability of resources alone does not guarantee teachers have developed and effectively implemented curricula that create access to academics using high-quality instructional methods.

To see how well federal mandates have translated into practice ten years after IDEA 1997, this question is posed: what is the breadth and depth with which academics are being taught to students with significant cognitive disabilities? The purpose of this paper is to present a cross-section of English language arts (ELA), math, and science curriculum taught to students who are eligible to take alternate assessments based on alternate achievement standards. Specific questions guiding this study include:

1. What academic curricula are teachers teaching to students who are eligible to take alternate assessments based on alternate achievement standards? Where do gaps in academic instruction still exist?
2. Are there differences in the patterns of enacted curriculum for students who have varying levels of pre-symbolic and symbolic communication?
3. Are there relationships between what is taught across strands within a subject?

These questions will be answered using aggregated data from teacher self-reported curriculum measures administered in five states during the 2006-07 academic year.

Methods

Participants

Samples of teachers from five states, took the short version of the Curriculum Indicators Survey (CIS). This group included one northwestern, two midwestern, one northeastern, and one southeastern state. There were a total of 123 respondents from across the states, with the number of respondents per state ranging from seven (in the least populous state) to 51 (in the state with the greatest population density). While response rates could not be calculated in all states because of the recruitment methods used, estimated rates ranged from 2% to 29% of eligible teachers. Details about respondents' educational backgrounds, teaching experience, and professional development experiences are provided in the Results section.

Instrumentation

The Curriculum Indicators Survey (CIS) was developed to measure the enacted curriculum for students with significant cognitive disabilities who participate in alternate assessments based on alternate achievement standards. CISs have been developed in English language arts (ELA), math, and science. The CIS also assesses some information about instructional resources and professional development.

Part 1 of the CIS 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. For each academic skill taught, teachers rate three pieces of information: (1) the intensity of coverage of the topic, (2) the highest performance expectation (depth of knowledge, or DOK) of the student on the topic, and (3) the grade level or band from which activities, materials, and contexts have been adapted for instruction on that skill. Intensity of coverage is rated on a scale from 0 (none) to 4 (systematic and intensive, such as daily or nearly daily for the entire year). DOK is rated on a six-point scale that was adapted from Bloom's taxonomy to extend downward for greater sensitivity to the cognitive demand typical of instruction for students with significant cognitive disabilities. The upper end of Bloom's taxonomy was then collapsed in order to reduce response burden, for a final scale ranging from 1 (attend, vocalize, gesture) to 6 (analyze, synthesize, evaluate). Sample items from the CIS are provided in Figure 1.

The CIS has been subjected to initial pilot testing, expert reviews, and full field tests (Karvonen, Flowers, Wakeman, & Browder, 2007). Recent studies have provided some validity evidence based on relationships with external curriculum measures (criterion-related) and cognitive interviews (response processes) (Karvonen, Wakeman, Flowers, & Browder, 2007). The CIS is available in both long and short forms, which may be used depending upon the "grain size" at which stakeholders prefer to receive information. In the current analysis, results are based on the short forms (27 items in ELA, 16 items in math, 21 items in science). This paper incorporates some data related to teacher and student backgrounds from Parts 1 and 2 of the survey, but primarily focuses

on the academic content in Parts 3-5. Responses to items from Part 2 of the survey were used to categorize students based on their level of symbol use in communication: presymbolic (i.e., beginning with symbols), concrete symbolic (i.e., moving forward with symbols), or abstract symbolic (i.e., going far with symbols).

Data Collection Procedures

CISs were completed in each cooperating state within the context of each state's alternate assessment alignment study. Precise procedures for recruiting teachers varied by state, but in most cases recruitment and informed consent information was distributed via email to distribution lists that included eligible teachers (i.e., those who administered at least one alternate assessment based on alternate achievement standards in 2006-07), testing coordinators, and administrators. Surveys were made available in each state for approximately 2-3 weeks. The first state participated in December 2006 and the last state's completion window was in May 2007. Gift cards with small monetary value were provided as an incentive for teachers to complete all parts of the survey. Surveys were administered online and all data were automatically stored in a database.

Data Analysis Procedures

To answer the first research question (what is being taught and where are the gaps), we calculated the frequency and percent of target students who reportedly received instruction in each content area at any level of intensity (ranging from slight to intensive). To better identify the content that was given greater emphasis, the frequency and percent of target students to whom the content was taught at 'sustained' or 'intensive' levels (i.e., ranging from 21 times per year to daily instruction) was also calculated (i.e., high frequency).

The second question (patterns in content across levels of symbolic communication) was answered by examining both the distribution of content across the strands within a subject, and the distribution of DOK at which the content was taught within each strand. Tables summarizing

content x DOK were constructed separately for students at each level of symbolic communication. Chi-square was used to determine whether the proportional coverage of each strand was statistically significantly different across the three levels of communication. No inferential tests were conducted on the distributions of DOK.

Correspondence between coverage of certain topics within the same subject area (question three) was explored using the binary variable created to identify intensively covered content for research question 1. Preliminary results reported in this paper are based on an exploratory analysis of ELA content. Phi coefficients were calculated for each pair of items within the ELA survey to determine whether intensive coverage in one area was associated with intensive coverage in another area.

Results

Teacher and Student Characteristics

The majority of the 123 respondents were female (89%) and held a Master's degree (65%). Thirty-eight percent (38%) of respondents had 10 or fewer years of teaching experience, while another two-thirds of teachers had between 11-20 years of teaching experience (37%). The remaining respondents had 21-30 years of experience (20%) or more than 30 years (6%).

Respondents were asked to indicate the grade levels at which they taught in 2006-07. Seventeen percent (17%) taught pre-kindergarten through second grade; 35% of teachers taught third through fifth grade; 36% taught sixth through eighth grade; and 32% of teachers taught ninth through twelfth grade. Teachers also varied in how many students were in their class or on their caseload in 2006-07. Fifteen percent (15%) of teachers had between 3 and 5 students; 33% had between 6 and 8 students; 20% had between 9 and 11 students; 13% had between 12 and 15 students; and 19% of teachers had more than 15 students in their class or on their caseload.

Almost all respondents (98%) were certified to teach in special education. A small minority of teachers held a teaching license with a concentration in ELA/Reading (13%), Mathematics (9%), or Science (5%). Other certifications held by teachers in the current study were Elementary Education (49%), Middle Education (17%), Secondary Education (11%), and National Board of Professional Teaching Standards (3%).

Responding teachers received varying degrees of professional development in ELA, math, and science content standards and instructional strategies (see Table 1). The majority of teachers reported receiving 0-3 hours of professional development related to science in 2006-07 (82% in instructional strategies, 76% in content standards), and 54% participated in 0-3 hours of development related to math. In contrast, 70% reported receiving four or more hours of professional development in ELA instructional strategies that year, and 62% received at least four hours of training in ELA content standards.

Characteristics of the student population included in the current study were also diverse. The students that teachers chose as their focus for the survey tended to be identified as having abstract symbolic communication (75%), followed by presymbolic (14%) and concrete symbolic (11%). Data reported on students is arranged in grade bands of pre-kindergarten to second grade (4.6%), third through fifth grade (26.9%), sixth through eighth grade (36.1%), ninth through twelfth grade (30.6%), and no grade assigned (1.9%). Table 2 summarizes the communication levels reported by grade band.

The sample of target students was also characterized by their classification of Individuals with Disabilities Education Act (IDEA) disability label. More than two-thirds (70%) were labeled as having mental retardation. Twenty-nine percent had autism or multiple disabilities, while 24% had speech/language impairments. About one-tenth had orthopedic impairments (12%) or other health

impairments (9%). All other IDEA categories were represented as less than 6% of the sample, with the exception of deaf-blindness (0%).

Content Taught and Gaps in Coverage

English Language Arts. The breadth of ELA curriculum was examined both in terms of overall coverage (i.e., ranging from slight to intensive) and high-frequency coverage (i.e., sustained or intensive) to identify areas of emphasis. Table 3 provides a summary of ELA coverage.

According to teacher reports, the most frequently taught content in the *Language* strand occurred in the content area of “Questioning, Listening, and Contributing” (91.5%), followed by “Discussion” (88.9%) and then “Vocabulary and Concept Development” (81.2%). For *Reading*, the most frequently taught content was “Beginning Reading” (87.2%), “Understanding a text” (86.3%), and “Nonfiction” (79.5%). Under *Composition*, teachers focused most on “Writing” with 79.5% of teachers reporting teaching this content to the target student. In general, the *Media* strand was taught at a lower rate than other strands, but most ELA content was taught at fairly high rates across the sample of target students.

When restricted to the high-frequency responses, clearer priorities within ELA content emerged. The most frequently taught content included “Beginning Reading” (72%), “Discussion” (72%), and “Questioning/Listening/Contributing” (70%). Only three other topics (“Understanding Text”, “Writing”, and “Standard English Conventions”) were intensively taught to more than half of the target students. Several topics, including certain “Genres of Literature”, “Research and Evaluation in Writing”, and “Media”, were rarely endorsed, suggesting these topics were not prioritized in the target students’ curricula that year.

Math. The breadth of math curriculum was examined both in terms of overall coverage (i.e., ranging from slight to intensive) and high-frequency coverage (i.e., sustained or intensive) to identify areas of emphasis. The coverage of topics within the five math strands is summarized in Table 4.

In general, *Number Sense and Operations* and *Measurement* had higher rates of endorsement across topics than the other strands. Overall, the most frequently reported topic of instruction for *Number and Sense Operations* was “Number Sense” with 85.2% of teachers reporting they taught this content area. For *Patterns, Relations, and Algebra*, the most frequently taught topic was “Patterns, Relations, and Functions” (79.1%) and in *Geometry*, “Characteristics of Geometric Shapes” was the most frequently taught (70.4%). For *Measurement*, teachers focused most on “Measurement Tools” (81.7%). “Data and Statistics” within the *Data Analysis, Statistics, and Probability* strand was the more frequently taught topic within its category (48.7%).

When narrowed to the content taught with high frequency, the priorities appeared to be in “Number Sense” (72%), “Measurement Tools” (59%), “Operations” (51%), and “Patterns, Relations and Functions” (48%). Half of the topics were taught with high frequency to fewer than 10% of the target students.

Science. According to teacher reports, the most frequently taught content in the *Earth and Space Science* strand was “Structure and energy in the Earth’s system” (75.7%). For *Life Science*, the most frequently taught topic was “Personal and community health” (73%), followed by “Characteristics of organisms” (67.8%). Under *Physical Science*, the most frequently taught topic was “Properties of matter” (59.1%). Slightly more than half of the target students received instruction in the *Technology/Engineering* and *Science as Inquiry* strands. Endorsement of items under *History and Nature of Science* was generally lower (16.5% - 39.1%) compared with other strands.

When restricted to the high-frequency responses, the rates at which science content was taught decreased considerably. None of the topics in any strand was taught intensively to more than one-third of the target students. For two-thirds of the items, the content was taught with high frequency to fewer than 10% of the students. Thus, while a broad range of science was taught to some degree, very little science was emphasized through frequent or daily instruction.

Patterns of Enacted Curriculum, by Communication Level

The second question (differences in curriculum based on level of symbolic communication) are based on matrices of content coverage by strand and DOK, constructed separately for students identified as communicating at a presymbolic level (i.e., those who may not yet use objects or pictures to communicate, but may touch or vocalize, or gesture), concrete symbolic (i.e., those who have some use of symbols for a communication system), or abstract symbolic communication (i.e., those who communicate with signs, symbols, or other ways or representing words). The purpose of these comparisons is to determine if there are emphases or gaps unique to these groups of students.

ELA. The distribution of ELA content at each communication level is summarized in Table 6. In general, the greatest coverage of ELA content was in the *Reading and Literature* strand for students at all three symbolic levels (ranging from 44% for abstract symbolic to 50% for concrete symbolic). Most of the remaining emphasis was in the *Language Composition* strands. There was no statistically significant difference in the distribution of ELA content coverage across strands, by communication level, $\chi^2(6, N = 1664) = 9.45, p = .15$. However, there was a clear pattern of differences in DOK at which the content was taught for the three groups. Frequency distributions for DOK among students with abstract symbolic communication were more evenly distributed from the attention to the application level, with a few teachers even indicating they taught content to those students at the analysis/synthesis/evaluation level. The range of DOK was narrower for students with concrete symbolic communication. The majority of students at the presymbolic level were being expected to learn their ELA content at the attention level.

Math. The distribution of math content at each communication level is summarized in Table 7. In general, coverage of math content was relatively evenly distributed across *Number Sense and Operations, Algebra, Geometry, and Measurement* strands, while *Statistics and Probability* was emphasized to a lesser degree. There was no statistically significant difference in the distribution of math content

coverage across strands, by communication level, $\chi^2 (8, N = 828) = 2.14, p = .98$. However, the pattern of differences in DOK at which the content was taught for the three groups was similar to the pattern seen in ELA. Frequency distributions for DOK among students with abstract symbolic communication were more evenly distributed from the attention to the application level, with a few teachers even indicating they taught content to those students at the analysis/synthesis/evaluation level. The range of DOK was narrower for students with concrete symbolic communication. The majority of students at the presymbolic level were being expected to learn their math content at the attention level.

Science. The distribution of science content at each communication level is summarized in Table 8. In general, the greatest emphasis was placed on *Life Science*, followed by *Physical Science* and *Earth and Space Science*. There was no statistically significant difference in the distribution of science content coverage across strands, by communication level, $\chi^2 (10, N = 936) = 6.14, p = .80$. The pattern of differences in DOK at which the content was taught for the three groups was similar to the other subject areas, except that the range was slightly more restricted. Distributions for DOK among students with abstract symbolic communication primarily ranged from attention to comprehension. The range of DOK was narrower for students with concrete symbolic communication (mostly attention to performance), while the expectation for students at the presymbolic level tended to be the attention level.

Relationships among Content within a Subject

The third research question (relationships within a subject) was asked to determine if there are patterns in the content that tends to be taught to individual students (e.g., are those who are taught beginning reading also taught standard English conventions?). Preliminary results are reported in this paper based on an exploratory analysis of ELA content. Using the “high-frequency” binary variable created to designate intensively covered content for research question one, phi

coefficients were calculated for each pair of items within the ELA survey to determine whether intensive coverage in one area was associated with intensive coverage in another area. Table 9 summarizes these findings.

The strongest relationships were generally among items within strands, as evidenced by the larger coefficients on the diagonal in Table 9. There were other patterns that may be indicative of commonly taught curriculum within a subject. For instance, “making connections” was strongly related to “structure and origins of modern English” ($\varphi = .50$) and “genre” ($\varphi = .59$), but was not related to “beginning reading” ($\varphi = .08$). “Poetry” and “theme” were also highly correlated ($\varphi = .50$).

Looking across strands, high-frequency “writing” instruction was associated with high-frequency instruction in “beginning reading” ($\varphi = .42$). “Media production” was also related to “style and language” ($\varphi = .43$). “Understanding text” was associated with “standard English conventions” ($\varphi = .45$). Instruction in “revising writing” was associated with “structure and origins of modern English” ($\varphi = .45$).

Discussion

Curriculum has long been the purview of states. Rather than focus on cross-state differences in the enacted curriculum for this population, the purpose of this study was to provide a snapshot of what parts of the core academic subjects are taught to students who have only recently begun to be taught academics at all. Even in light of the study’s limitations (i.e., low response rates, only five states represented), this study has the potential to provide information about what progress the field has made in shifting from the functional curriculum of the 1980s and 1990s to include the academic priorities required under NCLB. Thus, the goal was to understand how curriculum has reformed and identify areas in which teachers may still need assistance to help their students access a broader range of academic content.

On the whole, target students in this study received instruction in a broad range of content in each subject area. Teachers have made progress in exposing students with significant cognitive disabilities to academics that were not historically part of their curricula (e.g., physics, algebra, literature). Science was covered to a lesser extent than ELA and math, although that may be attributed to the timing of federal mandates for the content of AA-AAS. While states implemented AA-AAS in ELA and math beginning in 2000, science was first required in 2006-07. Teachers may have been targeting their instruction to the assessed academic subject areas.

When viewed with a narrower lens, the content that receives the greatest emphasis is still rooted in the functional academics that were the foundation for this shift to general curriculum access (Browder, Spooner, et al., in press; Browder, Wakeman, et al., 2006). For example, the high frequency with which beginning reading was taught may be related to the historic emphasis on signs and sight words. The emphases on numbers and measurement tools may indicate students are still learning basic counting and money skills. Since best practice in instruction for this population requires systematic instruction presented in repeated trials (Browder & Spooner, 2006; Ryndak & Alper, 2003), this narrower range of content is likely to be a better indicator of expectations for students learning (vs. what students may be exposed to with limited expectations for participation or demonstration of learning).

While content coverage was generally similar across students with all levels of symbolic communication, there seemed to be a relationship between the level of expectation (DOK) and students' communication levels. It is not clear whether teachers reported their students' highest expectations or whether some teachers may still have low expectations for their students. For example, it is unclear why students with abstract symbolic communication systems would be taught with the highest performance expectation at the attention level (i.e., vocalizing or gesturing). It may

be that teachers still lack knowledge about how to adapt grade-level instructional activities with challenging expectations for learning for their students.

The analysis of relationships among items within a subject area is in an early stage and is still ongoing. Similar analyses may be conducted to look for differential relationships based on symbolic communication level. The CIS responses from these states may also be compared with cognitive interviews conducted as a validation study (Karvonen, Wakeman, et al., 2007) in order to better understand how teachers decide to combine instruction in certain areas or tend to avoid teaching other content.

It is important to remember that the sample of students upon whom this research is based primarily used abstract symbols to communicate. Teachers may have chosen these target students because of the relative richness of their academic curricula (i.e., they were the students on the case load who were being taught the most academics), and it is possible that the curriculum described here represents the best case scenario in terms of general curriculum access in these states. However, the sample selected by teachers does reflect findings of other researchers regarding characteristics of students who participate in AA-AAS (Towles-Reeves, Kearns, Kleinert, & Kleinert, in press).

Finally, this paper was not intended to make judgments about what academic curriculum teachers *should* be teaching to students who take AA-AAS. The low rates of endorsement of certain items may reflect states' priorities, rather than a failure to teach all possible content within a subject. Instead, the goal was to examine potential areas in which teachers may still need help developing the expertise or capacity to access the general curriculum; in other words, a narrowed focus on certain curriculum should be driven by teacher and state priorities rather than by a lack of knowledge or resources. We may draw upon teachers' responses to other parts of the CIS that indicate what they use to teach academic content, how instruction is delivered, and what factors influence their curriculum choices. Ideally, professional development would help teachers create seamless continua

that support increased expectations so that all students may work toward higher levels of depth of knowledge. Teacher training may also focus on ways to capitalize on relationships among topics within the curriculum. In what ways may different elements of curriculum (within or across subjects) be integrated to broaden what students are taught? Eventually, these findings might also inform the design of courses on general curriculum access for all students in preservice teacher education programs.

This study addresses the following excerpt from the 2008 AERA call for proposals: “Civic responsibility in education requires that multiple sectors of the community...accept the charge of creating high-quality educational opportunities irrespective of neighborhood or other geospatial considerations.” By understanding the progress that has been made in helping teachers meet mandates to teach academics, we can target areas for growth in which teachers may need additional support to create high-quality educational opportunities for students with significant cognitive disabilities.

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Table 1

Teachers' Professional Development Activities During the 2006-07 School Year (N = 123)

Hours Engaged in Activities	ELA/Reading		Mathematics		Science	
	Instructional Strategies	Content Standards	Instructional Strategies	Content Standards	Instructional Strategies	Content Standards
0 - 3	30%	38%	54%	54%	82%	76%
4 - 10	28%	28%	25%	24%	6%	11%
11 - 20	15%	11%	9%	9%	7%	7%
21 - 30	11%	12%	3%	6%	2%	2%
31 or more	17%	11%	9%	8%	2%	4%

Table 2

Communication Levels by Grade Band (N=122)

Grade Band	<i>Communication Level</i>			Total
	Presymbolic	Early Symbolic	Symbolic	
pk - 2	0.9%	1.9%	1.9%	4.6%
3 - 5	3.7%	3.7%	19.4%	26.9%
6 - 8	5.6%	3.7%	26.9%	36.1%
9 - 12	3.7%	0.9%	25.9%	30.6%
None	0.0%	0.9%	0.9%	1.9%
Total	13.9%	11.1%	75.0%	100.0%

Table 3

Teachers Reporting Instruction in Specific Content Areas for ELA (N=117)

Content	Overall		High-Frequency	
	n	%	n	%
Language				
Discussion	104	88.9	84	71.8
Questioning, Listening, and Contributing	107	91.5	82	70.1
Oral Presentation	83	70.9	25	21.4
Vocabulary and Concept Development	95	81.2	56	47.9
Structure and Origins of Modern English	71	60.7	35	29.9
Formal and Informal English	61	52.1	25	21.4
Reading and Literature				
Beginning Reading	102	87.2	84	71.8
Understanding a Text	101	86.3	70	59.8
Making Connections	82	70.1	31	26.5
Genre	78	66.7	25	21.4
Theme	67	57.3	19	16.2
Fiction	92	78.6	43	36.8
Nonfiction	93	79.5	45	38.5
Poetry	72	61.5	13	11.1
Style and Language	63	53.8	12	10.3
Myth, Traditional Narrative, and Classical Literature	53	45.3	8	6.8
Dramatic Literature	48	41.0	6	5.1
Dramatic Reading and Performance	49	41.9	7	6.0
Composition				
Writing	93	79.5	67	57.3
Consideration of Audience and Purpose	59	50.4	15	12.8
Revising	60	51.3	18	15.4
Standard English Conventions	77	65.8	62	53.0
Organizing Ideas in Writing	75	64.1	37	31.6
Research	51	43.6	5	4.3
Evaluating Writing and Presentations	35	29.9	5	4.3
Media				
Analysis of Media	48	41.0	4	3.4
Media Production	56	47.9	6	5.1

Table 4

Teachers Reporting Instruction in Specific Content Areas for Math (N=115)

Content	Overall		High-frequency	
	n	%	n	%
Number Sense and Operations				
Number Sense	98	85.2	83	72.2
Operations	74	64.3	59	51.3
Computation and Estimation	72	62.6	41	35.7
Patterns, Relations, and Algebra				
Patterns, Relations, and Functions	91	79.1	55	47.8
Algebra	39	33.9	11	9.6
Relationships and Mathematical Models	55	47.8	15	13.0
Variables and Change	26	22.6	4	3.5
Geometry				
Characteristics of Geometric Shapes	81	70.4	37	32.2
Spatial Relationships/ Coordinate Geometry	46	40.0	8	7.0
Transformation/Symmetry	46	40.0	4	3.5
Visualization/Spatial Reasoning/Geometric Modeling	52	45.2	9	7.8
Measurement				
Measurement Tools	94	81.7	68	59.1
Concepts and Attributes of Measurement	85	73.9	32	27.8
Formulas of Measurement	38	33.0	9	7.8
Data Analysis, Statistics, & Probability				
Data and Statistics	56	48.7	11	9.6
Probability	42	36.5	8	7.0

Table 5

Teachers Reporting Instruction in Specific Content Areas for Science (N=115)

Content	Overall		High-frequency	
	n	%	n	%
Earth And Space Science				
Structure and energy in the Earth's system	87	75.7	37	32.2
History, origin, and evolution of the earth and the universe	34	29.6	4	3.5
Earth, the Solar System, and objects in the sky	59	51.3	13	11.3
Life Science (Biology)				
Characteristics of organisms	78	67.8	26	22.6
Life cycles of organisms	58	50.4	9	7.8
Organisms and environments, populations, and ecosystems	67	58.3	9	7.8
Cellular and molecular basis of life	35	30.4	5	4.3
Reproduction/heredity, diversity, adaptations, evolution	34	29.6	5	4.3
Regulation and behavior of organisms	50	43.5	6	5.2
Matter, energy, and organization in living systems	48	41.7	7	6.1
Personal and Community Health	84	73.0	32	27.8
Physical Science (Chemistry & Physics)				
Properties of matter	68	59.1	23	20.0
Chemical and physical changes in matter	49	42.6	11	9.6
Motion and forces	35	30.4	5	4.3
Energy	53	46.1	12	10.4
Atomic theory	11	9.6	0	0.0
Technology/Engineering				
Materials and Tools	61	53.0	22	19.1
History/Nature of Science				
Science as a human endeavor	25	21.7	1	0.9
Nature of science	45	39.1	3	2.6
History of science	19	16.5	0	0.0
Science as Inquiry				
Understanding of / abilities necessary to do scientific inquiry	61	53.0	7	6.1

Table 6

Distribution of ELA Content, by DOK and Communication Level

			Attention		Memorize		Perform		Comprehend		Apply		An/Syn/Eval	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Abstract Symbolic														
Language	354	26.3	45	12.7	85	24.0	109	30.8	45	12.7	64	18.1	6	1.7
Reading and Literature	594	44.2	126	21.2	177	29.8	119	20.0	91	15.3	65	10.9	16	2.7
Composition	322	24.0	39	12.1	80	24.8	117	36.3	31	9.6	47	14.6	8	2.5
Media	74	5.5	23	31.1	28	37.8	11	14.9	7	9.5	4	5.4	1	1.4
Concrete Symbolic														
Language	42	29.0	22	52.4	3	7.1	10	23.8	2	4.8	5	11.9	0	0.0
Reading and Literature	73	50.3	43	58.9	11	15.1	15	20.5	3	4.1	1	1.4	0	0.0
Composition	21	14.5	10	47.6	2	9.5	5	23.8	3	14.3	1	4.8	0	0.0
Media	9	6.2	5	55.6	1	11.1	2	22.2	0	0.0	1	11.1	0	0.0
Presymbolic														
Language	48	27.4	36	75.0	6	12.5	6	12.5	0	0.0	0	0.0	0	0.0
Reading and Literature	86	49.1	57	66.3	17	19.8	10	11.6	1	1.2	1	1.2	0	0.0
Composition	31	17.7	18	58.1	6	19.4	6	19.4	1	3.2	0	0.0	0	0.0
Media	10	5.7	8	80.0	0	0.0	2	20.0	0	0.0	0	0.0	0	0.0

Table 7

Distribution of Math Content, by DOK and Communication Level

			Attention		Memorize		Perform		Comprehend		Apply		An/Syn/Eval	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Abstract Symbolic														
Number Sense & Ops	165	25.3	14	8.5	18	10.9	56	33.9	22	13.3	47	28.5	8	4.8
Algebra	138	21.2	30	21.7	24	17.4	44	31.9	15	10.9	21	15.2	4	2.9
Geometry	148	22.7	31	20.9	42	28.4	34	23.0	22	14.9	16	10.8	3	2.0
Measurement	141	21.7	25	17.7	21	14.9	43	30.5	13	9.2	36	25.5	3	2.1
Statistics/Probability	59	9.1	17	28.8	19	32.2	13	22.0	5	8.5	1	1.7	4	6.8
Concrete Symbolic														
Number Sense & Ops	15	21.1	6	40.0	2	13.3	4	26.7	1	6.7	2	13.3	0	0.0
Algebra	15	21.1	8	53.3	1	6.7	4	26.7	1	6.7	1	6.7	0	0.0
Geometry	16	22.5	6	37.5	2	12.5	8	50.0	0	0.0	0	0.0	0	0.0
Measurement	16	22.5	8	50.0	3	18.8	5	31.3	0	0.0	0	0.0	0	0.0
Statistics/Probability	9	12.7	3	33.3	2	22.2	2	22.2	2	22.2	0	0.0	0	0.0
Presymbolic														
Number Sense & Ops	25	23.6	13	52.0	5	20.0	7	28.0	0	0.0	0	0.0	0	0.0
Algebra	20	18.9	12	60.0	4	20.0	3	15.0	1	5.0	0	0.0	0	0.0
Geometry	24	22.6	15	62.5	6	25.0	3	12.5	0	0.0	0	0.0	0	0.0
Measurement	25	23.6	20	80.0	3	12.0	1	4.0	1	4.0	0	0.0	0	0.0
Statistics/Probability	12	11.3	11	91.7	1	8.3	0	0.0	0	0.0	0	0.0	0	0.0

Table 8

Distribution of Science Content, by DOK and Communication Level

			Attention		Memorize		Perform		Comprehend		Apply		An/Syn/Eval	
	n	%	n	%	n	%	n	%	n	%	n	%	n	%
Abstract Symbolic														
Earth/Space Science	118	16.6	22	18.6	36	30.5	18	15.3	28	23.7	11	9.3	3	2.5
Life Science	306	43.0	87	28.4	97	31.7	46	15.0	54	17.6	15	4.9	7	2.3
Physical Science	135	19.0	45	33.3	37	27.4	22	16.3	23	17.0	4	3.0	4	3.0
Tech & Eng	41	5.8	11	26.8	13	31.7	4	9.8	5	12.2	6	14.6	2	4.9
History/Nature of Sci	67	9.4	28	41.8	18	26.9	13	19.4	5	7.5	2	3.0	1	1.5
Science as Inquiry	45	6.3	15	33.3	12	26.7	9	20.0	4	8.9	3	6.7	2	4.4
Concrete Symbolic														
Earth/Space Science	21	18.9	10	47.6	5	23.8	5	23.8	1	4.8	0	0.0	0	0.0
Life Science	44	39.6	23	52.3	3	6.8	16	36.4	1	2.3	1	2.3	0	0.0
Physical Science	27	24.3	12	44.4	3	11.1	9	33.3	3	11.1	0	0.0	0	0.0
Tech & Eng	5	4.5	0	0.0	0	0.0	3	60.0	1	20.0	1	20.0	0	0.0
History/Nature of Sci	9	8.1	7	77.8	1	11.1	1	11.1	0	0.0	0	0.0	0	0.0
Science as Inquiry	5	4.5	3	60.0	0	0.0	2	40.0	0	0.0	0	0.0	0	0.0
Presymbolic														
Earth/Space Science	18	15.9	11	61.1	2	11.1	3	16.7	0	0.0	0	0.0	2	11.1
Life Science	48	42.5	37	77.1	3	6.3	8	16.7	0	0.0	0	0.0	0	0.0
Physical Science	28	24.8	19	67.9	1	3.6	7	25.0	1	3.6	0	0.0	0	0.0
Tech & Eng	7	6.2	5	71.4	0	0.0	2	28.6	0	0.0	0	0.0	0	0.0
History/Nature of Sci	6	5.3	1	16.7	2	33.3	2	33.3	0	0.0	0	0.0	1	16.7
Science as Inquiry	6	5.3	4	66.7	1	16.7	1	16.7	0	0.0	0	0.0	0	0.0

Table 9, continued

Content	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	
19 Writing	.42	.34	.20	.27	.26	.24	.27	.28	.28	.20	.01	.34	.29	.14	.24	.10	.20	.22	-								
20 Consideration of Audience/Purpose	.07	.14	.24	.30	.25	.24	.07	.21	.12	.17	.25	.40	.28	.35	.46	.10	.14	.12	.23	-							
21 Revising	.16	.23	.18	.26	.45	.30	.00	.25	.23	.24	.07	.36	.25	.23	.32	.00	.12	.19	.27	.62	-						
22 Standard English Conventions	.29	.21	.16	.35	.43	.28	.32	.45	.37	.24	.23	.36	.32	.28	.26	.05	.14	.17	.47	.31	.35	-					
23 Organizing Ideas in Writing	.18	.24	.27	.31	.32	.27	.10	.33	.38	.32	.25	.44	.45	.29	.44	.18	.26	.22	.44	.56	.53	.57	-				
24 Research	.13	.14	.20	.22	.23	.20	.13	.17	.16	.10	.02	.19	.18	.19	.21	.11	.00	.00	.18	.17	.14	.20	.22	-			
25 Evaluating Writing and Presentations	.04	.05	.10	.14	.14	.20	.00	.09	.16	.10	.25	.19	.18	.19	.07	.11	.00	.00	.01	.17	.14	.20	.22	.16	-		
26 Analysis of Media	.12	.12	.13	.10	.08	.13	.12	.15	.10	.13	.05	.05	.05	.08	.25	.00	.00	.00	.16	.07	.05	.00	.18	.19	.00	-	
27 Media Production	.00	.00	.07	.24	.10	.26	.00	.11	.12	.07	.21	.23	.21	.16	.43	.09	.12	.11	.04	.03	.12	.06	.26	.14	.00	.38	

Figure 1. Sample CIS items from English language arts survey.

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