

Common Core Essential Elements for Mathematics

From the State Members of the

Dynamic Learning Maps
Alternate Assessment Consortium
and
Edvantia, Inc.

June, 2012



Common Core Essential Elements for Mathematics

Table of Contents

ACKNOWLEDGEMENTS	xi
INTRODUCTION	2
NCLB GUIDANCE.....	2
ACCESS TO INSTRUCTION AND ASSESSMENT	3
ACCESSING THE GENERAL CURRICULUM	3
GUIDANCE AND SUPPORT	4
RELATIONSHIP TO THE DYNAMIC LEARNING MAPS ASSESSMENT	4
SYSTEM ALIGNMENT.....	5
DOCUMENT ORGANIZATION	5
COMMON CORE ESSENTIAL ELEMENTS.....	8
KINDERGARTEN.....	8
KINDERGARTEN COMMON CORE ESSENTIAL ELEMENTS	10
Identify and describe shapes (squares, circles, triangles, rectangles, hexagons, cubes, cones, cylinders, and spheres).	12
COMMON CORE ESSENTIAL ELEMENTS.....	14
FIRST-GRADE.....	14
COMMON CORE ESSENTIAL ELEMENTS FOR FIRST-GRADE	16
Represent and solve problems involving addition and subtraction.	16
1.OA.1. Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.	16
Understand and apply properties of operations and the relationship between addition and subtraction.	16
1.OA.3. Apply properties of operations as strategies to add and subtract. <i>Examples: If $8+3 = 11$ is known, then $3+8 = 11$ is also known. (Commutative property of addition.) To add $2+6+4$, the second two numbers can be added to make a 10, so $2+6+4 = 2+10 = 12$. (Associative property of addition.)</i>	16

EE1.OA.3. N/A	16
Add and subtract within 20	16
Work with addition and subtraction equations	17
Extend the counting sequence	17
1.NBT.1 . Count to 120, starting at any number less than 120. In this range, read and write numerals and represent a number of objects with a written numeral.....	17
Understand place value	17
Measure lengths indirectly and by iterating length units	18
1.MD.2 . Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. <i>Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps</i>	18
Tell and write time	18
1.MD.3 . Tell and write time in hours and half-hours using analog and digital clocks...	18
Represent and interpret data	18
1.MD.4 . Organize, represent, and interpret data with up to three categories; ask and answer questions about the total number of data points, how many in each category, and how many more or less are in one category than in another.	18
Reason with shapes and their attributes	19
COMMON CORE ESSENTIAL ELEMENTS.....	20
FOR MATHEMATICS.....	20
SECOND-GRADE.....	20
COMMON CORE ESSENTIAL ELEMENTS FOR SECOND GRADE.....	22
Represent and solve problems involving addition and subtraction	22
Add and subtract within 20	22
Work with equal groups of objects to gain foundations for multiplication	22
Understand place value	22
Use place value understanding and properties of operations to add and subtract	23
Measure and estimate lengths in standard units	24
2.MD.4 . Measure to determine how much longer one object is than another, expressing the length difference in terms of a standard length unit.....	24
Relate addition and subtraction to length	24
2.MD.5 . Use addition and subtraction within 100 to solve word problems involving lengths that are given in the same units, e.g., by using drawings (such as drawings of rulers) and equations with a symbol for the unknown number to represent the problem.	24
Work with time and money	24
Represent and interpret data	24

Reason with shapes and their attributes.	25
COMMON CORE ESSENTIAL ELEMENTS.....	26
FOR MATHEMATICS.....	26
THIRD-GRADE	26
COMMON CORE ESSENTIAL ELEMENTS FOR THIRD GRADE	28
Represent and solve problems involving multiplication and division.	28
3.OA.6. Understand division as an unknown-factor problem. <i>For example, find $32 \div 8$ by finding the number that makes 32 when multiplied by 8.</i>	28
Multiply and divide within 100.	29
Solve problems involving the four operations, and identify and explain patterns in arithmetic.	29
Use place value understanding and properties of operations to perform multi-digit arithmetic.	29
Develop understanding of fractions as numbers.	30
Solve problems involving measurement and estimation of intervals of time, liquid volumes, and masses of objects.	31
Represent and interpret data.	31
3.MD.3. Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step “how many more” and “how many less” problems using information presented in scaled bar graphs. <i>For example, draw a bar graph in which each square in the bar graph might represent 5 pets.</i>	31
Geometric measurement: recognize perimeter as an attribute of plane figures and distinguish between linear and area measures.	32
Reason with shapes and their attributes.	33
COMMON CORE ESSENTIAL ELEMENTS.....	34
FOURTH-GRADE	34
COMMON CORE ESSENTIAL ELEMENTS FOR FOURTH GRADE.....	36
Use the four operations with whole numbers to solve problems.	36
Gain familiarity with factors and multiples.	36
Generate and analyze patterns.	36
Generalize place value understanding for multi-digit whole numbers.	37
4.NBT.3. Use place value understanding to round multi-digit whole numbers to any place.	37
EE4.NBT.3. Round one- and two-digit whole numbers from 0—50 to the nearest 10.37	
Use place value understanding and properties of operations to perform multi-digit arithmetic.	37
Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.	38

▪ Solve word problems involving multiplication of a fraction by a whole number, e.g., by using visual fraction models and equations to represent the problem. <i>For example, if each person at a party will eat $\frac{3}{8}$ of a pound of roast beef, and there will be 5 people at the party, how many pounds of roast beef will be needed? Between what two whole numbers does your answer lie?</i>	39
Understand decimal notation for fractions, and compare decimal fractions.	39
Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit.	40
Represent and interpret data.	40
4.MD.4. Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. <i>For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.</i>	40
Geometric measurement: understand concepts of angle and measure angles. ..	40
EE4.MD.7. N/A (See EE4.MD.5.)	41
Draw and identify lines and angles, and classify shapes by properties of their lines and angles.	41
COMMON CORE ESSENTIAL ELEMENTS.....	42
FIFTH-GRADE	42
COMMON CORE ESSENTIAL ELEMENTS FOR FIFTH GRADE.....	44
Write and interpret numerical expressions.	44
Understand the place value system.	44
Perform operations with multi-digit whole numbers and with decimals to hundredths.	45
Use equivalent fractions as a strategy to add and subtract fractions.	45
5.NF.2. Solve word problems involving addition and subtraction of fractions referring to the same whole, including cases of unlike denominators, e.g., by using visual fraction models or equations to represent the problem. Use benchmark fractions and number sense of fractions to estimate mentally and assess the reasonableness of answers. <i>For example, recognize an incorrect result $\frac{2}{5} + \frac{1}{2} = \frac{3}{7}$, by observing that $\frac{3}{7} < \frac{1}{2}$.</i>	45
Convert like measurement units within a given measurement system.	48
Represent and interpret data.	48
Geometric measurement: understand concepts of volume and relate volume to multiplication and to addition.	48
5.MD.3. Recognize volume as an attribute of solid figures and understand concepts of volume measurement.....	48
Graph points on the coordinate plane to solve real-world and mathematical problems.	49

5.G.1. Use a pair of perpendicular number lines, called axes, to define a coordinate system, with the intersection of the lines (the origin) arranged to coincide with the 0 on each line and a given point in the plane located by using an ordered pair of numbers, called its coordinates. Understand that the first number indicates how far to travel from the origin in the direction of one axis, and the second number indicates how far to travel in the direction of the second axis, with the convention that the names of the two axes and the coordinates correspond (e.g., x-axis and x-coordinate, y-axis and y-coordinate)...	49
COMMON CORE ESSENTIAL ELEMENTS.....	50
SIXTH-GRADE.....	50
Understand ratio concepts and use ratio reasoning to solve problems.	52
Apply and extend previous understandings of multiplication and division to divide fractions by fractions.	53
6.NS.1. Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because $3/4$ of $8/9$ is $2/3$. (In general, $(a/b) \div (c/d) = ad/bc$.) How much chocolate will each person get if 3 people share $1/2$ lb. of chocolate equally? How wide is a rectangular strip of land with length $3/4$ mi and area $1/2$ square mi? Compute fluently with multi-digit numbers and find common factors and multiples.....	53
EE6.NS.1. Compare the relationships between two unit fractions.....	53
Compute fluently with multi-digit numbers and find common factors and multiples.	53
EE6.NS.4. N/A.....	53
Apply and extend previous understandings of numbers to the system of rational numbers.	53
Apply and extend previous understandings of arithmetic to algebraic expressions.	55
Solve real-world and mathematical problems involving area, surface area, and volume.	56
6.G.4. Represent three-dimensional figures using nets made up of rectangles and triangles, and use the nets to find the surface area of these figures. Apply these techniques in the context of solving real-world and mathematical problems.	57
Develop understanding of statistical variability.	57
Summarize and describe distributions.	57
EE6.SP.4. N/A (See EE6.SP.1-2).....	57
EE6.SP.5. Summarize data distributions on a graph or table.	57
COMMON CORE ESSENTIAL ELEMENTS.....	58
SEVENTH-GRADE.....	58

COMMON CORE ESSENTIAL ELEMENTS FOR SEVENTH GRADE.....	60
Analyze proportional relationships and use them to solve real-world and mathematical problems.	60
Apply and extend previous understandings of operations with fractions to add, subtract, multiply, and divide rational numbers.	61
EE7.NS.2.a. Solve multiplication problems with products to 100.	61
Use properties of operations to generate equivalent expressions.	62
Solve real-life and mathematical problems using numerical and algebraic expressions and equations.	62
Draw construct, and describe geometrical figures and describe the relationships between them.	63
Solve real-life and mathematical problems involving angle measure, area, surface area, and volume.	63
Use random sampling to draw inferences about a population.	63
Draw informal comparative inferences about two populations.	64
Investigate chance processes and develop, use, and evaluate probability models. 64	
▪ Develop a probability model (which may not be uniform) by observing frequencies in data generated from a chance process. <i>For example, find the approximate probability that a spinning penny will land heads up or that a tossed paper cup will land open-end down. Do the outcomes for the spinning penny appear to be equally likely based on the observed frequencies?</i>	64
COMMON CORE ESSENTIAL ELEMENTS.....	66
EIGHTH-GRADE.....	66
COMMON CORE ESSENTIAL ELEMENTS FOR EIGHTH GRADE.....	68
Know that there are numbers that are not rational, and approximate them by rational numbers.	68
Understand the connections between proportional relationships, lines, and linear equations.	69
Analyze and solve linear equations and pairs of simultaneous linear equations. 69	
Define, evaluate, and compare functions.	70
Use functions to model relationships between quantities.	70
8.F.5. Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.	70
Understand congruence and similarity using physical models, transparencies, or geometry software.	71
8.G.5. Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. <i>For example, arrange three copies of the</i>	

<i>same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.</i>	71
Understand and apply the Pythagorean Theorem.	71
Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.	71
Investigate patterns of association in bivariate data.	72
8.SP.4. Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. <i>For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?</i>	72
COMMON CORE ESSENTIAL ELEMENTS.....	74
HIGH SCHOOL	74
COMMON CORE ESSENTIAL ELEMENTS FOR HIGH SCHOOL	76
Extend the properties of exponents to rational exponents.	76
EEA-RN.1. Solve division problems with remainders using concrete objects.....	76
Use properties of rational and irrational numbers.	76
Perform arithmetic operations with complex numbers.	76
N-CN.2. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.....	77
Use complex numbers in polynomial identities and equations.	77
Interpret the structure of expressions.	77
Write expressions in equivalent forms to solve problems.	77
EEA-SSE.4 Identify the missing part in any other equivalent ratio when given any ratio.	77
Perform arithmetic operations on polynomials.	78
Create equations that describe numbers or relationships.	78
EEA-CED.1. Solve an algebraic expression using subtraction.....	78
A-CED.3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. <i>For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.</i>	78
EEA-CED.2-4. Solve one-step inequalities.....	78
Understand solving equations as a process of reasoning and explain the reasoning.	78
EEA-REI.1-2. N/A	78
Solve equations and inequalities in one variable.	79

▪ Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b	79
EEA-REI.3. N/A (See EEA-ECED.1-2.)	79
Solve systems of equations.	79
A-REI.7. Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = -3x$ and the circle $x^2 + y^2 = 3$	79
Represent and solve equations and inequalities graphically.	79
A-REI.12. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.....	79
Understand the concept of a function and use function notation.	80
F-IF.1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x . The graph of f is the graph of the equation $y = f(x)$. 80	80
Interpret functions that arise in applications in terms of the context.	80
F-IF.6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. ...	80
EEF-IF.4-6. Interpret rate of change (e.g., higher/lower, faster/slower).	80
Analyze functions using different representations.	80
F-IF.9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.</i>	81
EEF-IF.9. N/A.....	81
Build new functions from existing functions.	81
EEF-LE.1. Model a simple linear function such as $y=mx$ to show functions grow by equal factors over equal intervals.	82
Interpret expressions for functions in terms of the situation they model.	82
EEF-LE.5. N/A.....	82
Extend the domain of trigonometric functions using the unit circle.	82
Model periodic phenomena with trigonometric functions.	82
Prove and apply trigonometric identities.	83
Experiment with transformations in the plane.	83
G-CO.2. Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs	

and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).....	83
EEG-CO.2. N/A.....	83
EEG-CO.3. N/A.....	83
G-CO.5. Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.	83
EEG-CO.4-5. Identify rotations, reflections, and slides.	83
Understand congruence in terms of rigid motions.	83
G-CO.8. Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.....	83
Prove geometric theorems	84
G-CO.11. Prove theorems about parallelograms. <i>Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals. ...</i>	84
EEG-CO.9-11. N/A.....	84
Make geometric constructions.	84
G-CO.13. Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.....	84
EEG-CO.12-13. N/A	84
Understand similarity in terms of similarity transformations.	84
Prove theorems involving similarity.	85
EEG-SRT.4-5. N/A	85
Define trigonometric ratios and solve problems involving right triangles.	85
EEG-SRT.6-8. N/A	85
High School Mathematics Standards: Geometry - Circles	85
Find arc lengths and areas of sectors of circles.	85
Translate between the geometric description and the equation for a conic section.	86
Use coordinates to prove simple geometric theorems algebraically.	86
EEG-GPE.4. N/A (See EEG-GPE).....	86
EEG-GPE.5-6. N/A (See EEG.CO.1).....	86
Explain volume formulas and use them to solve problems.	86
Visualize relationships between two-dimensional and three-dimensional objects.	86
Apply geometric concepts in modeling situations.	87
Summarize, represent, and interpret data on a single count or measurement variable.	87
EES-ID.1-2. Given data, construct a simple graph (table, line, pie, bar, or picture) and answer questions about the data.....	87
Summarize, represent, and interpret data on two categorical and quantitative variables.	88

c. Fit a linear function for a scatter plot that suggests a linear association.....	88
Interpret linear models.	88
S-ID.9. Distinguish between correlation and causation.....	88
Understand and evaluate random processes underlying statistical experiments.	88
EES-IC.1-2. Determine the likelihood of an event occurring when the outcomes are equally likely to occur.	88
Make inferences and justify conclusions from sample surveys, experiments, and observational studies.	88
EES-IC.3-6. N/A (See EES-ID.1-2)	88
Understand independence and conditional probability and use them to interpret data.	89
S-CP.5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. <i>For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.</i>	89
Use the rules of probability to compute probabilities of compound events in a uniform probability model.	89
S-CP.7. Apply the Addition Rule, $P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)$, and interpret the answer in terms of the model.....	89
EES-CP.6-7. N/A (See EES-IC.1-2)	89
GLOSSARY AND EXAMPLES OF MATHEMATICS TERMS	90
GLOSSARY OF SPECIAL EDUCATION TERMS	96
BIBLIOGRAPHY OF DEVELOPMENT PROCESS	100
BIBLIOGRAPHY FOR MATHEMATICS CONTENT	101
143	

APPENDIX A: SEA/STAKEHOLDER DEMOGRAPHICS

ACKNOWLEDGEMENTS

*For stakeholder demographics, See Appendix A.

Edvantia Facilitators

Jan Sheinker, Sheinker Educational Services, Inc.
Beth Judy, Director, Assessment, Alignment, and Accountability Services
Nathan Davis, Information Technology Specialist
Kristen Deitrick, Corporate Communications Specialist
Linda Jones, Executive Assistant

Dynamic Learning Maps (DLM) Staff and Consultants

Neal Kingston, Project Director
Alan Sheinker, Associate Project Director
Laura Kramer, Test Development Lead
Karthick Palaniswamy, Technology Development Lead
Kelli Thomas, Mathematics Learning Map Team Lead
Carrie Mark, English Language Arts Learning Map Team Lead
Patti Whetstone, Research Associate
Sue Bechard, Consultant
Karen Erickson, Consultant
Chris Cain, Consultant

Dynamic Learning Maps (DLM) Consortia States

Iowa
Kansas
Michigan
Mississippi
Missouri
New Jersey
North Carolina
Oklahoma
Utah
Virginia
Washington
West Virginia
Wisconsin

Mathematics State Education Agency (SEA)/Stakeholder Representatives

IOWA

SEA Representatives: Tom Deeter, Emily Thatcher

Stakeholders: Barbara Adams, John Butz, Laurel Cakinberk, Dagny Fidler

KANSAS

SEA Representatives: Sidney Cooley, Debbie Matthews

Stakeholders: DiRae Boyd, Teresa Kraft, Michele Luksa, Mona Tjaden

MICHIGAN

SEA Representatives: Linda Howley, Joanne Winkelman

Stakeholders: Tamara Barrientos, Roula AlMouabbi, Brian Pianosi, Larry Timm

MISSOURI

SEA Representatives: Lin Everett, Sara King, Jane VanDeZande

Stakeholders: Sharon Campione, Emily Combs, Karen Pace

NEW JERSEY

SEA Representatives: Shirley Cooper, MaryAnn Joseph

Stakeholders: Sue Burger, Tracey Lank, Katie Slane

NORTH CAROLINA

SEA Representative: Robin Barbour

Stakeholders: Ronda Layman, Janet Sockwell

OKLAHOMA

SEA Representatives: Jennifer Burnes, Amy Daugherty

Stakeholder: Christie Stephenson

UTAH

SEA Representatives: Wendy Carver, Jennie DeFriez

Stakeholders: Lynda Brown, Kim Fratto, Lisa Seipert, Nicole Warren

VIRGINIA

SEA Representatives: John Eisenberg, Deborah Wickham

Stakeholders: Diane Lucas, Laura Scarce, Joyce Viscomi, Roslynn Webb

WASHINGTON

SEA Representatives: Debra Hawkins, Janice Tornow

Stakeholders: Jeff Crawford, John DeBenedetti, Kirsten Dlugo, Angelita Jagla

WEST VIRGINIA

SEA Representatives: Melissa Gholson, Beth Cipoletti

Stakeholders: Wes Lilly, Melissa Mobley, Lisa New, Deena Swain

WISCONSIN

SEA Representative: Brian Johnson

Stakeholders: Amber Eckes, Rosemary Gardner, Mary Richards, Jeff Ziegler

INTRODUCTION

The Common Core Essential Elements (EEs) are linked to the Common Core State Standards (CCSS) for Mathematics. A group of general educators, special educators, and content specialists from member states in the Dynamic Learning Maps (DLM) Consortium gathered to determine the essence of the CCSS. The stakeholder group members were selected by their states to participate in this work. State education agency (SEA) representatives and SEA-selected teachers collaborated to develop the EEs.

This document provides a high-level view of the relationship between the CCSS and the links to performance for students with significant cognitive disabilities. It is intended to provide a beginning structure for the design of a summative alternate assessment. The document is not intended as a stand-alone guide to instruction, nor is it intended to contain all the steps in a complete learning progression or detailed curriculum. The DLM and associated professional development will provide greater detail than described in this document.

Beginning with the Mathematics CCSS, stakeholders defined links to illuminate the precursors for the essential content and skills contained in the grade level CCSS clusters and indicators. These EEs are not intended as a redefinition of the standards. Rather, they are intended to describe challenging expectations for students with significant cognitive disabilities in relation to the CCSS. The EEs clarify the bridge between grade level achievement expectations for students with significant cognitive disabilities who participate in alternate assessments and the CCSS.

Neither are the EEs intended to prescribe the beginning or end of instruction on the content and skills they represent; rather, they indicate the grade level at which initial mastery would be the target to be assessed. Students should begin instruction in content and skills at the earliest point possible and continue instruction until mastery is attained.

NCLB GUIDANCE

The stakeholder group's work was guided by the U. S. Department of Education's Peer Review Guidance (*Standards and Assessments Peer Review Guidance: Information and Examples for Meeting Requirements of the No Child Left Behind Act of 2001 [NCLB]*), which requires that alternate academic achievement standards align with the alternate assessment. They must

- include knowledge and skills that link to grade level expectations,
- promote access to the general curriculum, and
- reflect professional judgment of the highest learning standards possible for the group of students with the most significant cognitive disabilities.

Although the grade-level content may be reduced in complexity or adjusted to reflect prerequisite skills, the link to grade-level standards must be clear. The Peer Review Guidance notes that the concept of alternate achievement standards related to grade level may be ambiguous. According to the Guidance, the descriptors

- should be defined in a way that supports individual growth because of their linkage to different content across grades;
- are not likely to show the same clearly defined advances in cognitive complexity as the general education standards when examined across grade levels;
- should rely on the judgment of experienced special educators and administrators, higher education representatives, and parents of students with disabilities as they define alternate achievement standards; and
- should provide an appropriate challenge for students with the most significant cognitive disabilities as they move through their schooling.

The Guidance requires links to grade-level standards. The EEs were developed by DLM consortium states to differentiate knowledge and skills by grade level. This differentiation is intended to clarify the link between the grade-level EEs and the grade-level CCSS and to show a forward progression across grades. The progression of content and skills across years of instruction reflect the changing priorities

for instruction and learning as students move from grade to grade. The differences from grade level to grade level are often subtle and progression is sometimes more horizontal than vertical. For example, the grade-to-grade level differences may consist of added skills that are not of obvious increasing rigor compared to the differences found in the CCSS across grade levels.

ACCESS TO INSTRUCTION AND ASSESSMENT

The EEs developed by the DLM consortium states are intended to create the maximum possible access to the CCSS for students with significant cognitive disabilities. The way in which information is presented for instruction and assessment and the manner in which students demonstrate achievement is in no way intended to be limited by statements of EEs. To that end, modes of communication, both for presentation or response, are not stated in either the EEs unless a specific mode is an expectation. Where no limitation has been stated, no limitation should be inferred. Students' opportunities to learn and to demonstrate learning should be maximized by providing whatever communication, assistive technologies, augmentative and alternative communication (AAC) devices, or other access tools that are necessary and routinely used by the student during instruction.

Students with significant cognitive disabilities include a broad range of students with diverse disabilities and communication needs. For some students with significant cognitive disabilities, graphic organizers similar to those used by students without disabilities provide useful access to content and are adequate to maximize opportunities to learn and demonstrate achievement. Other students require a range of assistive technologies to access content and demonstrate achievement. For some students, AAC devices and accommodations for hearing and visual impairments will be needed. As with other physical disabilities, students with visual impairments may perform some expectations using modified items, presentations, or response formats. A few items may not lend themselves to such modifications. Decisions about the appropriate modifications for visual impairments are accounted for in the design of the assessments.

The access challenge for some is compounded by the presence of multiple disabilities. All of these needs, as well as the impact of levels of alertness due to medication and other physical disabilities which may affect opportunities to respond appropriately, need to be considered.

Most presentation and response access conditions do not constitute accommodations as they are understood for students who take the general assessment. Methods of presentation that do not violate the intended construct by aiding or directing the students' response allow the student to perceive what knowledge or skill is expected. Aids to responding that do not constitute a violation of the intended construct allow the student to demonstrate the expected knowledge and skills. Examples of acceptable access technologies include the following:

- communication devices that compensate for a students' physical inability to produce independent speech.
- devices that compensate for a students' physical inability to manipulate objects or materials, point to responses, turn pages in a book, or use a pencil or keyboard to answer questions or produce writing.
- tools that maximize a students' ability to acquire knowledge and skills and to demonstrate the products of their learning.

ACCESSING THE GENERAL CURRICULUM

Technology is also of particular importance to students with significant cognitive disabilities to access the general curriculum and achieve the EEs. Although educators have traditionally viewed technology as hardware and software, assistive technology tenets provide a broader view of the applications of low, medium, and high levels of technology use. Assistive technology tools can be vital to a student in acquiring and demonstrating learning unimpeded by the barriers that the disability presents.

Many students with significant cognitive disabilities have difficulty with or cannot use speech to communicate and/or are supported by the use of communication symbols (e.g., communication boards, speech generating devices, voice output communication devices) and supports to augment their speech and other means of communication. Students who require symbols and other AAC supports require frequent modeling in the use of those symbols to interact and respond during instruction. Students who use symbols and other communication supports need as much modeling as children who use speech to communicate. Modeling in this way is not viewed as a means of prompting, guidance, or support, just as having a teacher talk serves those purposes for a student who communicates using speech.

When modeling the use of symbols and other communication supports, teachers use the symbols and supports themselves, hand them to students without communication impairments to use, and involve the students who need to use them every day. Each of these steps can play an important role in validating the use of symbols and communication supports and demonstrating multiple levels of expertise in their use.

GUIDANCE AND SUPPORT

The authors of the CCSS use the words, “prompting and support” at the earliest grade levels to indicate when students were not expected to achieve standards completely independently. Generally, “prompting” refers to “the action of saying something to persuade, encourage, or remind someone to do or say something” (McKean, 2005). However, in special education, prompting is often used to mean a system of structured cues to elicit desired behaviors that otherwise would not occur. In order to communicate clearly that teacher assistance is permitted during instruction of the EEs, and is not limited to structured prompting procedures, the decision was made by the stakeholder group to use the more general term *guidance* throughout the EEs.

Guidance and support during instruction should be interpreted as teacher encouragement, general assistance, and informative feedback to support the student in learning. Some examples of the kinds of teacher behaviors that would be considered guidance and support include

- getting the student started (e.g., “Tell me what to do first”),
- providing a hint in the right direction without revealing the answer (e.g., Student wants to write dog but is unsure how, the teacher might say, “See if you can write the first letter in the word, /d/og.”),
- narrowing the field of choices as a student provides an inaccurate response,
- using structured technologies such as task specific word banks, or
- providing the structured cues such as those found in prompting procedures (e.g., least-to-most prompts, simultaneous prompting, and graduated guidance).

Guidance and support as described above apply to instruction. Alternate assessments measure the degree to which students with significant cognitive disabilities have mastered the EEs. During any assessment, accommodation(s) allowed on the assessment must have been used and practiced during instruction; however, some accommodations that are permissible during instruction would compromise the integrity of the assessments, thereby yielding invalid and unreliable results and cannot be used for assessment purposes. Some guidance and support strategies may not be allowed for assessment purposes when variance in teacher assistance, cues, and prompts could compromise judgments about mastery of the EEs and comparability of administration.

RELATIONSHIP TO THE DYNAMIC LEARNING MAPS ASSESSMENT

The EEs developed by the DLM consortium states and their stakeholder representatives provide teachers with information about the level of knowledge and skills expected of their students. Standard setting will take into account the overall degree of accuracy with which a student would need to perform in order to achieve at a particular level. Just as on a general education assessment, no individual student will be expected to perform proficiently on every EE.

SYSTEM ALIGNMENT

The EEs are intended to contribute to a fully aligned system of standards, curriculum, teaching, learning, technology, and assessment that optimize equity of opportunity for all students in each classroom, school, and local education agency to access and learn the standards. To the degree possible, the grade level EEs are vertically aligned and linked to the grade level CCSS.

The linkages provided by the EEs to the CCSS are intended to increase access to the general curriculum for all students with disabilities. Just as the EEs are designed to define achievement in academic content areas linked to the CCSS, the EEs reframe the expectations for foundational skills in pre-academic and academic areas. Precursor/prerequisite and the unique enabling skills related to mathematics content is specified in the context of their roles as a foundation for students with significant cognitive disabilities to achieve skills related to academic content.

DOCUMENT ORGANIZATION

Common Core Grade-Level Clusters are the Cluster titles and Grade-Level Indicators as they appear in the CCSS for Mathematics (Common Core State Standards Initiative, 2010).

Common Core Essential Elements (EEs) describe links to the CCSS for access by students with significant cognitive disabilities.

CCSS Grade-Level Clusters	Common Core Essential Elements
Represent and solve problems involving addition and subtraction. 1.OA.1. Use addition and subtraction within 20 to solve word problems involving situations of adding to, taking from, putting together, taking apart, and comparing, with unknowns in all positions, e.g., by using objects, drawings, and equations with a symbol for the unknown number to represent the problem.	EE1.OA.1.a. Use language to describe putting together and taking apart, aspects of addition and subtraction.

Directions for Interpreting Essential Elements

Essential Elements (EEs). The EEs are statements that provide links for students with significant cognitive disabilities to the essential content and skills defined in the grade-level clusters of the CCSS. The EEs provide a bridge for students with significant cognitive disabilities to the CCSS. The EEs are not intended as a reinterpretation of the CCSS; rather, they were developed to create a bridge between the CCSS and challenging achievement expectations for students with significant cognitive disabilities. The order in which the EEs are listed is a direct reflection of the order in which the CCSS are listed. The order is not intended to convey a sequence for instruction; rather, it illustrates progress across years. In the tables, the left column contains the CCSS grade-level clusters and indicators and the right column contains the EE linked to them.. Each EE completes the phrase “Students will”

CCSS marked with an (+) are advanced standards and are not included in this document as it was determined by the stakeholder group that students of this population would not be accessing the curriculum at this advanced level and writing Essential Elements to this level would be unnecessary. Also, if it appears that a standard has been omitted in the high school grades, it is an advanced standard.

“Begins in grade __” is utilized when the expectations for students to begin to demonstrate mastery is found at a higher grade level. Planning for instruction should incorporate instruction related to the higher grade level EE and begin at the earliest possible point for each student. Students with significant cognitive disabilities may require several years of instruction prior to the point at which they may be expected to begin to demonstrate mastery of a concept.