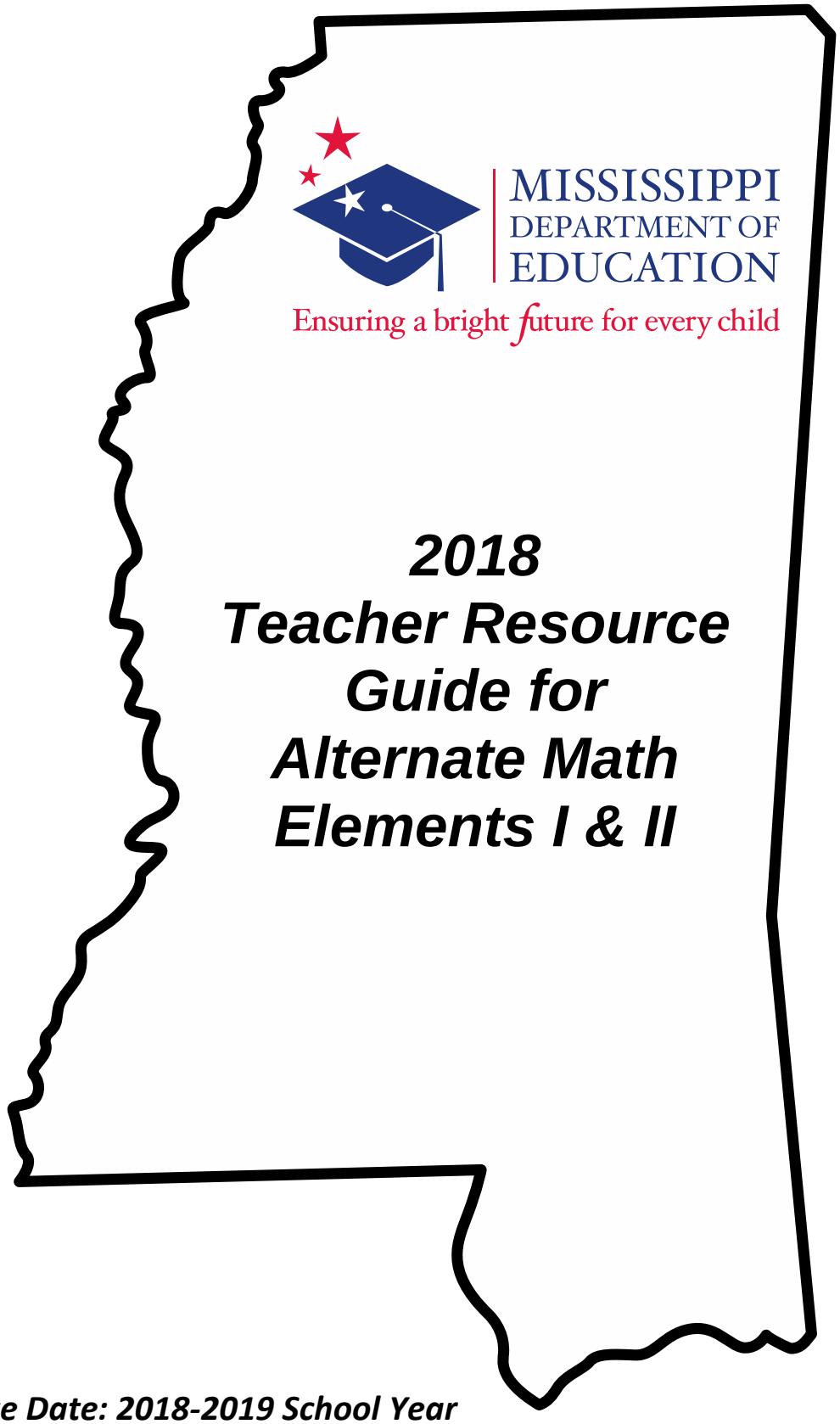


# 2018 Teacher Resource Guide for Alternate Math Elements I & II

***Effective Date: 2018-2019 School Year***


# 2018
# Teacher Resource Guide for Alternate Math Elements I & II

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Director, Office of Human Resources
Mississippi Department of Education

**Table of Contents**

**Acknowledgements**

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|---|---|
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| Stacey Todd | Ocean Springs School District |
| Tiffany Withers | Rankin County School District |

**The Standards:**



Dynamic Learning Maps Consortium. (2013). *Dynamic Learning Maps Essential Elements for Mathematics*. Lawrence, KS: University of Kansas.

**Remaining Material in the Teacher Resource Guide:**

The remaining materials in the teacher resource guide (performance objectives, I can statements, real world connections, vocabulary, and resources) were developed through a collaboration of Mississippi teachers, administrators, MDE Office of Special Education staff, and Mississippi State University Research and Curriculum Unit staff. The information is not part of the Essential Elements and are not the opinions of the DLM Consortium or the University of Kansas Center for Research.

## Introduction

### Mission Statement

The Mississippi Department of Education (MDE) is dedicated to student success, which includes improving student achievement in mathematics and establishing communication skills within a technological environment. The *Mississippi Alternate Academic Achievement Standards (MS AAAS) for Math Elements I & II (DLM Essential Elements)* provide a consistent, clear understanding of what students are expected to know and be able to do by the end of the course. The purpose of the *MS AAAS for Math Elements I & II (DLM Essential Elements)* is to build a bridge from the content in the general education mathematics framework to academic expectations for students with the most significant cognitive disabilities. The standards are designed to be rigorous and relevant to the real world, reflecting the knowledge and skills that students need for success in postsecondary settings.

### Purpose

In an effort to closely align instruction for students with significant cognitive disabilities who are progressing toward postsecondary settings, the *MS AAAS for Math Elements I & II (DLM Essential Elements)* include course-specific standards for mathematics. This document is designed to provide a resource for 9-12 special education teachers with a basis for curriculum development and instructional delivery.

The *Teacher Resource Guide for Alternate Math Elements I & II* contains prioritized content, which is presented as a matrix to show the continuum of the concept across complexity levels. The matrix shows varying access points to the prioritized content. A student's progression through content contained in the matrix is intended to be fluid. It is not the intent, nor should it be practice, for a student to be exposed to content in a straight vertical line through one of the columns. Every student, regardless of disability, comes to the learning environment with a different set of prior knowledge and experience. For this reason, a student may be able to access some content from the middle complexity level and access other concepts at the more complex level. Teachers should evaluate a student's ability in relation to the content and select the entry point based on that evaluation. Students should not be locked into receiving exposure to all content at the same entry point.

## Support Documents and Resources

The MDE Office of Special Education aims to provide local districts, schools, and teachers supporting documents to construct standards-based instruction and lessons, allowing them to customize content and delivery methods to fit each student's needs. The teacher resource guide includes suggested resources, instructional strategies, sample lessons, and activities. Additional sample activities and resources for selected standards may be added; this shall be a living document with ongoing updates based on educator feedback. The intent of these resources is to assist teachers in linking their instruction to the prioritized content. The teacher resource guide includes activity adaptations for students with a varying range of abilities within the classroom. The activities and adaptations provided are intended to serve as a model of how students participating in the Mississippi Academic Assessment Program-Alternate (MAAP-A) may receive academic instruction in mathematics. There are many ways in which skills and concepts can be incorporated based on student's individual learning styles and needs. Professional development efforts are aligned to the *MS AAAS for Math Elements I & II (DLM Essential Elements)* and delivered in accord with teacher resources to help expand expertise in delivering student-centered lessons.

**Structure of the Teacher Resource Guide for Alternate Math Elements I & II**

*Mississippi Alternate Academic Achievement Standards for Math Elements I & II (DLM Essential Elements)*: A general statement of what students with significant cognitive disabilities should know and be able to do because of instruction.

Performance Objectives: Statements that describe in precise, measurable terms what learners will be able to do at the end of an instructional sequence.

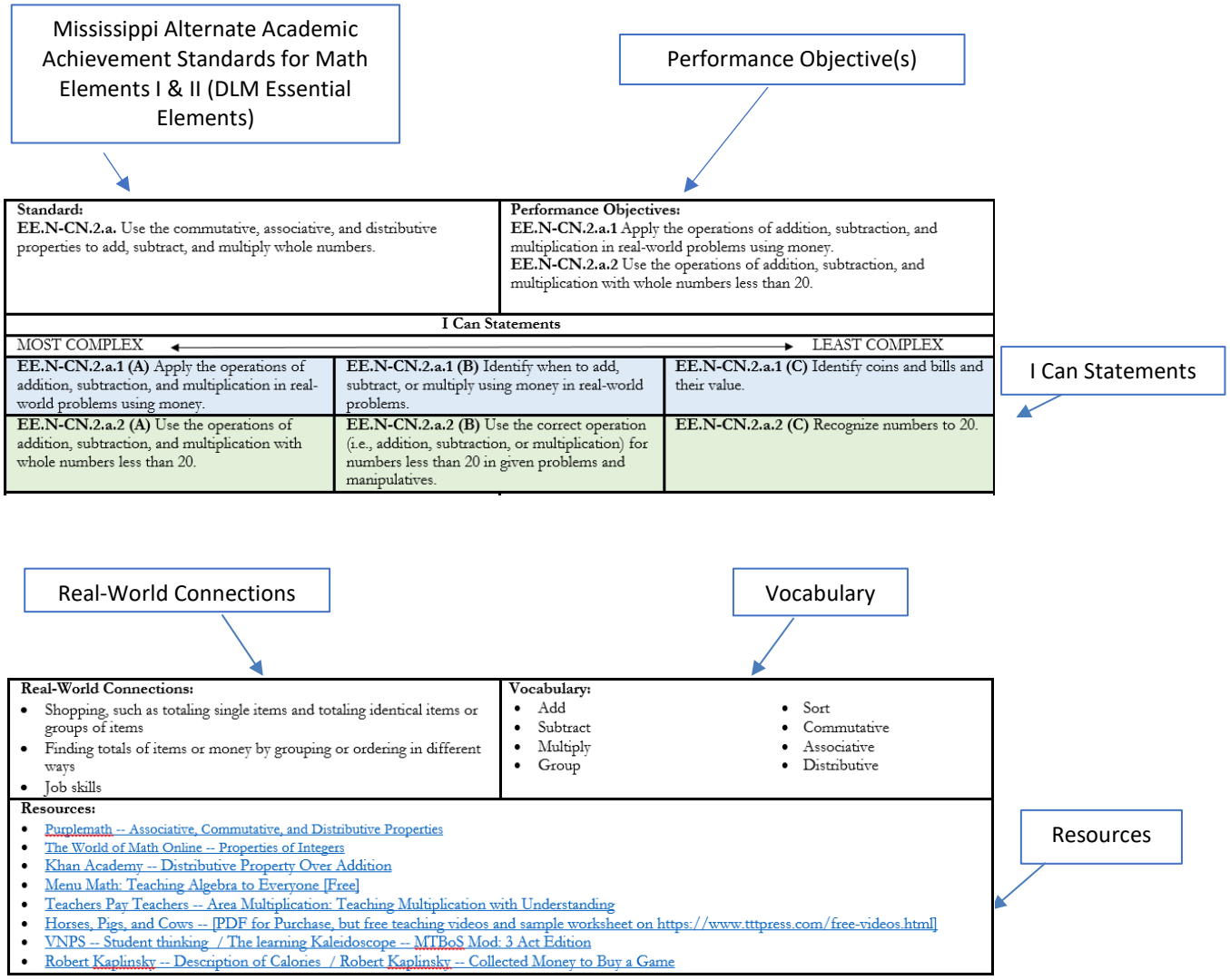
I Can Statement(s): Includes the Performance Objective(s) as the *Most Complex* and scaffolds the performance objectives two additional levels (B) and (C) to *Least Complex*. This matrix demonstrates the continuum of the concept across complexity levels. The purpose is to assist teachers in modifying to meet the unique diverse needs of learners with significant cognitive disabilities.

Real-World Connections: One way to facilitate learning that is meaningful to students and prepares them for their professional lives outside of school. When teachers move beyond textbook or curricular examples and connect content learned in the classroom to real people, places and events, students are able to see a greater relevance to their learning. Real-world connections are used to help students see that learning is not confined to the school, allow them to apply knowledge and skills in real-world situations, and personalize learning to increase and sustain student engagement.

Vocabulary: Includes a list of difficult or unfamiliar words.

Resources: Includes suggested resources, instructional strategies, lessons, and activities. Additional sample activities and resources for selected standards may be added; this shall be a living document with ongoing updates based on educator feedback. The intent of these activities is to assist teachers in linking their instruction to the prioritized content.

## Structure of the Teacher Resource Guide for Alternate Math Elements I & II (Graphic)



## Levels of Support (LOS)

Students with significant cognitive disabilities require varying LOS to engage in academic content. The goal is to move the student along the continuum of assistance toward independence by decreasing the LOS provided and increasing student accuracy within the context of content to demonstrate progress.

The following chart describes the continuum of LOS. Appropriate LOS are important to increase student engagement and student independence and to track student achievement and progress.

| Level of Assistance | Definition | Example | Non-Example |
|---|---|---|---|
| **Non-Engagement (N)** | The student requires assistance from the teacher to initiate, engage, or perform; however, the student actively refuses or is unable to accept teacher assistance. | The student resists the teacher's physical assistance toward the correct answer. | The student does not look at the activity. |
| **Physical Assistance (P)** | The student requires physical contact from the teacher to initiate, engage, or perform. | The teacher physically moves the student's hand to the correct answer. | The teacher taps the correct answer and expects the student to touch where he/she tapped. |
| **Gestural Assistance (G)** | The student requires the teacher to point to the specific answer. | When presenting a choice of three pictures and asking the student which picture is a triangle, the teacher will point to or tap on the correct picture to prompt the student to indicate that picture. | The teacher moves the student's hand to gesture toward the right answer. |
| **Verbal Assistance (V)** | The student requires the teacher to verbally provide the correct answer to a specific item. | The teacher says, "Remember, the main character was George. Point to the picture of the main character." | The teacher says "Who is the main character?" without providing the information verbally. |
| **Model Assistance (M)** | The student requires the teacher to model a similar problem/opportunity and answer prior to performance. | The teacher models one-to-one correspondence using manipulatives and then asks the student to perform a similar item. | The teacher completes the exact same activity as the student is expected to perform. |
| **Independent (I)** | The student requires no assistance to initiate, engage, or perform. The student may still require other supports and accommodations to meaningfully engage in the content but does not require assistance to participate and respond. | The teacher asks the student, "Who is the main character of the book?" and the student meaningfully responds without any prompting or assistance. | The teacher asks the student, "Who is the main character?" and points to the picture of the main character. |

# Teacher Resource Guide for Alternate Math Elements I & II

COURSE: Alternate Math Elements I and II
DOMAIN: Statistics and Probability – Making Inferences and Justifying Conclusions
CLUSTER: Understand and evaluate random processes underlying statistical experiments.

<table>
<tr><td colspan="2">Standard:<br>EE.N-CN.2.a. Use the commutative, associative, and distributive properties to add, subtract, and multiply whole numbers.</td><td>Performance Objectives:<br>EE.N-CN.2.a.1 Apply the operations of addition, subtraction, and multiplication in real-world problems using money.<br>EE.N-CN.2.a.2 Use the operations of addition, subtraction, and multiplication with whole numbers less than 20.</td></tr>
<tr><td colspan="3">I Can Statements</td></tr>
<tr><td>MOST COMPLEX</td><td colspan="1"></td><td>LEAST COMPLEX</td></tr>
<tr><td>EE.N-CN.2.a.1 (A) Apply the operations of addition, subtraction, and multiplication in real-world problems using money.</td><td>EE.N-CN.2.a.1 (B) Identify when to add, subtract, or multiply using money in real-world problems.</td><td>EE.N-CN.2.a.1 (C) Identify coins and bills and their value.</td></tr>
<tr><td>EE.N-CN.2.a.2 (A) Use the operations of addition, subtraction, and multiplication with whole numbers less than 20.</td><td>EE.N-CN.2.a.2 (B) Use the correct operation (i.e., addition, subtraction, or multiplication) for numbers less than 20 in given problems and manipulatives.</td><td>EE.N-CN.2.a.2 (C) Recognize numbers to 20.</td></tr>
<tr><td colspan="2">Real-World Connections:<br>• Shopping, such as totaling single items and totaling identical items or groups of items<br>• Finding totals of items or money by grouping or ordering in different ways<br>• Job skills</td><td>Vocabulary:<br>• Add<br>• Subtract<br>• Multiply<br>• Group<br>• Sort<br>• Commutative<br>• Associative<br>• Distributive</td></tr>
<tr><td colspan="3">Resources:<br>• Purplemath -- Associative, Commutative, and Distributive Properties<br>• The World of Math Online -- Properties of Integers<br>• Khan Academy -- Distributive Property Over Addition<br>• Menu Math: Teaching Algebra to Everyone [Free]<br>• Teachers Pay Teachers -- Area Multiplication: Teaching Multiplication with Understanding<br>• Horses, Pigs, and Cows -- [PDF for Purchase, but free teaching videos and sample worksheet on https://www.tttpress.com/free-videos.html]<br>• VNPS -- Student thinking / The learning Kaleidoscope -- MTBoS Mod: 3 Act Edition<br>• Robert Kaplinsky -- Description of Calories / Robert Kaplinsky -- Collected Money to Buy a Game</td></tr>
</table>

COURSE: Alternate Math Elements I and II
DOMAIN: Statistics and Probability – Making Inferences and Justifying Conclusions
CLUSTER: Understand and evaluate random processes underlying statistical experiments.

| **Standard:**<br>**EE.N-CN.2.b.** Solve real-world problems involving addition and subtraction of decimals, using models when needed. | **Performance Objectives:**<br>**EE.N-CN.2.b.1** Use the operations of addition and subtraction up to the tenths place with decimals<br>**EE.N-CN.2.b.2** Use the operations of addition and subtraction with decimals in real-world situations<br>**EE.N-CN.2.b.3** Apply the operations of addition and subtraction in real-world situations |
|---|---|

**I Can Statements**

MOST COMPLEX ⟷ LEAST COMPLEX

| | | |
|---|---|---|
| **EE.N-CN.2.b.1 (A)** Use the operations of addition and subtraction up to the tenths place with decimals. | **EE.N-CN.2.b.1 (B)** Identify numbers in the tenths and hundredths place. | **EE.N-CN.2.b.1 (C)** Identify decimal numbers. |
| **EE.N-CN.2.b.2 (A)** Use the operations of addition and subtraction with decimals in real-world situations. | **EE.N-CN.2.b.2 (B)** Add and subtract with money. | **EE.N-CN.2.b.2 (C)** Add and subtract decimal numbers. |
| **EE.N-CN.2.b.3 (A)** Apply the operations of addition and subtraction in real-world situations. | **EE.N-CN.2.b.3 (B)** Solve real-world problems involving addition and subtraction of decimals. | **EE.N-CN.2.b.3 (C)** Model real-world problems involving addition and subtraction of decimals. |

**Real-World Connections:**

- Money
- Budgeting
- Meal preparation
- Shopping

**Vocabulary:**

- Decimals
- Tenths
- Hundredths
- Place value
- Add
- Subtract

**Resources:**

- LearnZillion -- Addition and Subtraction Involving Decimals
- Alabama Learning Exchange -- Lesson Plan
- Bluehost -- Math Worksheets, Lessons, Charts, Learning, Equations, Formulas and Tricks
- Menu Math: Teaching Algebra to Everyone [Free]
- Horses, Pigs, and Cows -- [PDF for Purchase, but free teaching videos on https://www.tttpress.com/free-videos.html ]
- Robert Kaplinsky -- Chinese Food Coupon / Pennies value
- Robert Kaplinsky -- Coins Worth / Collected Money to Buy a Game / Monthly or Annual Payments
- VNPS -- Student Thinking
- The Learning Kaleidoscope -- MTBoS Mod: 3 Act Edition

COURSE: Alternate Math Elements I and II
DOMAIN: Statistics and Probability – Making Inferences and Justifying Conclusions
CLUSTER: Understand and evaluate random processes underlying statistical experiments.

<table>
<tr><td colspan="2">Standard:<br>EE.N-CN.2.c. Solve real-world problems involving multiplication of decimals and whole numbers, using models when needed.</td><td colspan="2">Performance Objectives:<br>EE.N-CN.2.c.1 Use the operation of multiplication with decimals and whole numbers in real-world situations.<br>EE.N-CN.2.c.2 Use the operation of multiplication with decimals up to the hundredths place</td></tr>
<tr><td colspan="4">I Can Statements</td></tr>
<tr><td colspan="4">MOST COMPLEX ⟵ ⟶ LEAST COMPLEX</td></tr>
<tr><td colspan="2">EE.N-CN.2.c.1 (A) Use the operation of multiplication with decimals and whole numbers in real-world situations.</td><td>EE.N-CN.2.c.1 (B) Follow multiplication procedures to multiply decimals.</td><td>EE.N-CN.2.c.1 (C) Identify decimal numbers.</td></tr>
<tr><td colspan="2">EE.N-CN.2.c.2 (A) Use the operation of multiplication with decimals up to the hundredths place.</td><td>EE.N-CN.2.c.2 (B) Given a real-world problem and a model, multiply with decimals to the hundredths position.</td><td>EE.N-CN.2.c.2 (C) Identify tenth and hundredth decimal place values.</td></tr>
<tr><td colspan="2">Real-World Connections:<br>• Money<br>• Meal preparation<br>• Shopping<br>• Budgeting</td><td colspan="2">Vocabulary:<br>• Decimals<br>• Tenths<br>• Hundredths<br>• Place Value<br>• Multiply</td></tr>
<tr><td colspan="4">Resources:<br>• CK-12 Multiplication and Division of Decimals<br>• Margaret B. Pollard Middle -- Pollard Announcements<br>• Newfoundland Multiplication and Division of Decimals<br>• Menu Math: Teaching Algebra to Everyone [Free]<br>• Optical Art Task<br>• Robert Kaplinsky -- Chinese Coupon / Pennies value<br>• Robert Kaplinsky -- Coins Worth / Collected Money to Buy a Game<br>• VNPS - Student Thinking / The Learning Kaleidoscope -- MTBoS Mod: 3 Act Edition</td></tr>
</table>

COURSE: Alternate Math Elements I and II
DOMAIN: Statistics and Probability – Making Inferences and Justifying Conclusions
CLUSTER: Understand and evaluate random processes underlying statistical experiments.

<table>
<tr><td colspan="2">Standard:<br>EE.S-IC.1-2. Determine the likelihood of an event occurring when the outcomes are equally likely to occur.</td><td colspan="2">Performance Objectives:<br>EE.S-IC.1-2.a Determine the likelihood of an event occurring when the outcomes are not equally likely to occur.<br>EE.S-IC.1-2.b Determine the likelihood of an event occurring when the outcomes are equally likely to occur.<br>EE.S-IC.1-2.c Determine the possible outcomes of an event occurring.</td></tr>
<tr><td colspan="4">I Can Statements</td></tr>
<tr><td colspan="4">MOST COMPLEX ⟵ ⟶ LEAST COMPLEX</td></tr>
<tr><td>EE.S-IC.1-2.a (A) Determine the likelihood of an event occurring when the outcomes are not equally likely to occur.</td><td>EE.S-IC.1-2.c (B) Given an event and the possibilities, identify the outcome that is most likely to occur.</td><td colspan="2">EE.S-IC.1-2.c (C) Given an event and its outcome, identify the outcome.</td></tr>
<tr><td>EE.S-IC.1-2.b (A) Determine the likelihood of an event occurring when the outcomes are equally likely to occur.</td><td>EE.S-IC.1-2.b (B) Using a graphic organizer or chart, demonstrate understanding of the likelihood of an event occurring when the outcomes are equally likely to occur.</td><td colspan="2">EE.S-IC.1-2.b (C) Given an event in which the outcomes are equally likely to occur, identify the outcome.</td></tr>
<tr><td>EE.S-IC.1-2.c (C) Determine the possible outcomes of an event occurring.</td><td>EE.S-IC.1-2.c (B) Using a graphic organizer or chart, identify the possible outcomes of an event occurring.</td><td colspan="2">EE.S-IC.1-2.c (C) Given an event, identify the outcome of the event.</td></tr>
<tr><td colspan="2">Real-World Connections:<br>• Random selection<br>• Games<br>• Populations<br>• Samples</td><td colspan="2">Vocabulary:<br>• Probability<br>• Event<br>• Occur<br>• Outcome<br>• Population<br>• Sample</td></tr>
<tr><td colspan="4">Resources:<br>• Math Goodies<br>• IXL Experimental Probability<br>• Stat Trek Probability</td></tr>
</table>

COURSE: Alternate Math Elements I and II
DOMAIN: Statistics and Probability – Making Inferences and Justifying Conclusions
CLUSTER: Understand independence and conditional probability, and use them to interpret data.

| **Standard:**<br>**EE.S-CP.1-5.** Identify when events are independent or dependent. | **Performance Objectives:**<br>**EE.S-CP.1-5.a** Find the probability of an event after another event has occurred.<br>**EE.S-CP.1-5.b** Identify when events are independent or dependent. |
|---|---|

**I Can Statements**

MOST COMPLEX ⟷ LEAST COMPLEX

| | | |
|---|---|---|
| **EE.S-CP.1-5.a (A)** Find the probability of an event after another event has occurred. | **EE.S-CP.1-5.a (B)** Using a graphic organizer or chart, demonstrate understanding of the likelihood of an event after another event has occurred. | **EE.S-CP.1-5.a (C)** Given a choice of probabilities, identify the probability of an event after another event has occurred. |
| **EE.S-CP.1-5.b (A)** Identify when events are independent or dependent. | **EE.S-CP.1-5.b (B)** Identify the outcomes of an event. | **EE.S-CP.1-5.b (C)** Determine which event occurs first in a sequence. |

**Real-World Connections:**

- Counting
- Risk management
- Risk analysis

**Vocabulary:**

- Probability
- Event
- Occur
- Outcome
- Replace
- Independent
- Dependent

**Resources:**

- Teaching Channel – Grade6 – Math Probability
- Probability of Independent and Dependent Events
- Lesson – Introduction to Probability and Difference Between Independent and Dependent Events
- Robert Kaplinsky – Stronger Passwords

COURSE: Alternate Math Elements I and II
DOMAIN: Geometry – Congruence
CLUSTER: Experiment with transformation in the plane.

| **Standard:**<br>**EE.G-CO.1.** Know the attributes of perpendicular lines, parallel lines, and line segments; angles; and circles. | **Performance Objectives:**<br>**EE.G-CO.1.a** Name two attributes for angles and circles.<br>**EE.G-CO.1.b** Draw perpendicular lines, parallel lines, and line segments. |
|---|---|

**I Can Statements**

MOST COMPLEX ⟵ ⟶ LEAST COMPLEX

| | | |
|---|---|---|
| **EE.G-CO.1.a (A)** Name two attributes for angles and circles. | **EE.G-CO.1.a (B)** Given a list, choose two attributes of angles and circles. | **EE.G-CO.1.a (C)** Choose the correct picture to identify an angle and a circle. |
| **EE.G-CO.1.b (A)** Draw perpendicular lines, parallel lines, and line segments. | **EE.G-CO.1.b (B)** From an array, choose a perpendicular line, parallel line, and line segment. | **EE.G-CO.1.b (C)** Choose an example of a perpendicular line, parallel line, and line segment. |

**Real-World Connections:**

- Street directions, bus routes, maps
- Clockwise and counter-clockwise directions
- Architecture and drafting
- Design
- Construction
- Drawing
- Career Preparation

**Vocabulary:**

- Perpendicular
- Parallel
- Line
- Segment
- Angle
- Circle

**Resources:**

- GeoGebra -- Equations, Graph Functions, Data analysis, and 3D Math
- Gizmos -- Simulations
- Math Solutions – Fourth- and Fifth-Grade Lesson
- Optical Art Task

COURSE: Alternate Math Elements I and II
DOMAIN: Geometry – Congruence
CLUSTER: Experiment with transformation in the plane.

<table>
<tr><td colspan="2">Standard:<br>EE.G-CO.4-5. Given a geometric figure and a rotation, reflection, or translation of that figure, identify the components of the two figures that are congruent.</td><td colspan="2">Performance Objectives:<br>EE.G-CO.4-5.a Given geometric figures, identify two figures that are congruent.<br>EE.G-CO.4-5.b Identify rotations, reflections, and slides of a geometric figure.</td></tr>
<tr><td colspan="4">I Can Statements</td></tr>
<tr><td colspan="4">MOST COMPLEX ⟷ LEAST COMPLEX</td></tr>
<tr><td>EE.G-CO.4-5.a (A) Given geometric figures, identify two figures that are congruent.</td><td>EE.G-CO.4-5.a (B) From an array of figures, choose two figures that are congruent.</td><td colspan="2">EE.G-CO.4-5.a (C) Choose a picture of a geometric figure.</td></tr>
<tr><td>EE.G-CO.4-5.b (A) Identify rotations, reflections, and slides of a geometric figure.</td><td>EE.G-CO.4-5.b (B) From an array of figures, choose examples of rotations, reflections, and slides.</td><td colspan="2">EE.G-CO.4-5.b (C) Attend to movement, demonstrating rotations, reflections, and slides.</td></tr>
<tr><td colspan="2">Real-World Connections:<br>• Mirror image<br>• Graphic design<br>• Career preparation</td><td colspan="2">Vocabulary:<br>• Rotation<br>• Reflection<br>• Slide<br>• Translation<br>• Congruent</td></tr>
<tr><td colspan="4">Resources:<br>• EduGains -- Guides to Effective Instruction Math Grades 4-6 Geometry and Spatial Sense<br>• Desmos -- Des-Patterns, Transformation Golf: Rigid Motion<br>• Youcubed -- Optical Art Task</td></tr>
</table>

COURSE: Alternate Math Elements I and II
DOMAIN: Geometry – Congruence
CLUSTER: Understand congruence in terms of rigid motions.

<table>
<tr><td colspan="2">Standard:<br>EE.G-CO.6-8. Identify corresponding congruent and similar parts of shapes.</td><td colspan="2">Performance Objectives:<br>EE.G-CO.6-8.a Identify parts of shapes (e.g., sides, angles) and the corresponding (the same) congruent parts.</td></tr>
<tr><td colspan="4">I Can Statements</td></tr>
<tr><td colspan="4">MOST COMPLEX ⟷ LEAST COMPLEX</td></tr>
<tr><td>EE.G-CO.6-8.a (A) Identify parts of shapes (e.g., sides, angles) and the corresponding (the same) congruent parts.</td><td>EE.G-CO.6-8.a (B) Given a model, locate a side, angle, and congruent parts of a shape.</td><td colspan="2">EE.G-CO.6-8.a (C) Choose a picture of a geometric shape with angles.</td></tr>
<tr><td colspan="2">Real-World Connections:<br>• Sorting<br>• Drawing<br>• Architecture and drafting<br>• Design<br>• Construction</td><td colspan="2">Vocabulary:<br>• Congruent<br>• Corresponding<br>• Sides<br>• Angles</td></tr>
<tr><td colspan="4">Resources:<br>• Inspire K12 Lesson Plans<br>• Explore Learning<br>• Math Solutions -- Line Segments</td></tr>
</table>

COURSE: Alternate Math Elements I and II
DOMAIN: Geometry – Expressing Geometric Properties with Equations
CLUSTER: Use coordinates to prove simple geometric theorems algebraically.

<table>
<tr><td colspan="2">Standard:<br>EE.G-GPE.7 Find perimeters and areas of squares to solve real-world problems.</td><td colspan="2">Performance Objectives:<br>EE.G-GPE.7.a Find perimeter of squares and rectangles to solve real-world problems.<br>EE.G-GPE.7.b Find the area of squares and rectangles to solve real-world problems.</td></tr>
<tr><td colspan="4">I Can Statements</td></tr>
<tr><td colspan="4">MOST COMPLEX ⟷ LEAST COMPLEX</td></tr>
<tr><td colspan="2">EE.G-GPE.7.a (A) Find perimeter of squares and rectangles to solve real-world problems.</td><td>EE.G-GPE.7.a (B) Given the formula, find the perimeter of squares and rectangles.</td><td>EE.G-GPE.7.a (C) Identify a square and rectangle.</td></tr>
<tr><td colspan="2">EE.G-GPE.7.b (A) Find the area of squares and rectangles to solve real-world problems.</td><td>EE.G-GPE.7.b (B) Find the area of a rectangle of square by counting on a grid.</td><td>EE.G-GPE.7.b (C) Identify the interior space of a rectangle or square.</td></tr>
<tr><td colspan="2">Real-World Connections:<br>• Measure lengths and spaces<br>• Drafting and architecture<br>• Design<br>• Drawing</td><td colspan="2">Vocabulary:<br>• Perimeter<br>• Area<br>• Square<br>• Rectangle<br>• Length<br>• Space</td></tr>
<tr><td colspan="4">Resources:<br>• CPM Area and Perimeter Tiles<br>• LearnZillion -- Rectangles (Perimeters With Different Area)<br>• IXL -- Algebra1: Perimeter<br>• Robert Kaplinsky -- Paint a Handball Wall</td></tr>
</table>

COURSE: Alternate Math Elements I and II
DOMAIN: Geometry – Geometric Measurement and Dimension
CLUSTER: Explain volume formulas, and use them to solve problems.

| **Standard:** | **Performance Objectives:** |
|---|---|
| **EE.G-GMD.1-3.** Make a prediction about the volume of a container, the area of a figure, and the perimeter of a figure, and then test the prediction using formulas or models. | **EE.G-GMD.1-3.a** Make a prediction about the volume of a container and test it to solve real-world problems.<br>**EE.G-GMD.1-3.b** Make a prediction about the area of a figure and test it to solve real-world problems.<br>**EE.G-GMD.1-3.c** Make a prediction about the perimeter of a figure and test it to solve real-world problems. |

**I Can Statements**

MOST COMPLEX ⟵ ⟶ LEAST COMPLEX

| | | |
|---|---|---|
| **EE.G-GMD.1-3.a (A)** Make a prediction about the volume of a container and test it to solve real-world problems. | **EE.G-GMD.1-3.a (B)** Determine the volume of a container using a grid. | **EE.G-GMD.1-3.a (C)** Choose the container with the largest volume capacity. |
| **EE.G-GMD.1-3.b (A)** Make a prediction about the area of a figure and test it to solve real-world problems. | **EE.G-GMD.1-3.b (B)** Determine the area of a figure using a grid. | **EE.G-GMD.1-3.b (C)** Choose the shape with the largest area. |
| **EE.G-GMD.1-3.c (A)** Make a prediction about the perimeter of a figure and test it to solve real-world problems. | **EE.G-GMD.1-3.c (B)** Determine the perimeter of a figure using a grid. | **EE.G-GMD.1-3.c (C)** Choose the shape with the largest perimeter. |

**Real-World Connections:**

- Measure lengths and spaces
- Drafting and architecture
- Design
- Drawing
- Measurement
- Weight
- Volume
- Counting

**Vocabulary:**

- Perimeter
- Area
- Volume
- Prediction
- Grid
- Formula

**Resources:**

- Gizmos: Balancing Blocks / Perimeters and Areas of Similar Figures
- Gizmos: Surface and Lateral Areas of Prisms and Cylinders / Prisms and Cylinders
- Teacher to Teacher Press: 3-D Name Project
- Robert Kaplinsky How Much Money is That?! / Do We Have Enough Paint?
- Robert Kaplinsky How Big is the 2010 Guatemalan Sinkhole? / How Many Gumballs Fit in the Gumball Machine
- Tap Into Teen Minds: Prisms and Pyramids
- Fawn Nguyen: I Am a Doughnut / From Listerine to Fuji Water
- Dan Meyer: You Pour, I Choose

COURSE: Alternate Math Elements I and II
DOMAIN: Geometry – Geometric Measurement and Dimension
CLUSTER: Visualize relationships between two-dimensional and three-dimensional objects.

<table>
<tr><td colspan="2">Standard:<br>EE.G-GMD.4. Identify the shapes of two-dimensional cross-sections of three-dimensional objects.</td><td colspan="2">Performance Objectives:<br>EE.G-GMD.4.a Identify a cross section of a three-dimensional cube, pyramid, and cylinder.<br>EE.G-GMD.4.b Distinguish between two- and three-dimensional shapes.</td></tr>
<tr><td colspan="4">I Can Statements</td></tr>
<tr><td colspan="4">MOST COMPLEX ⟷ LEAST COMPLEX</td></tr>
<tr><td>EE.G-GMD.4.a (A) Identify a cross section of a three-dimensional cube, pyramid, and cylinder.</td><td>EE.G-GMD.4.a (B) Given an array of three-dimensional objects, choose the object named (e.g., cube, pyramid, cylinder).</td><td colspan="2">EE.G-GMD.4.a (C) Identify a square, rectangle, and circle using pictures or objects.</td></tr>
<tr><td>EE.G-GMD.4.b (A) Distinguish between two and three-dimensional shapes.</td><td>EE.G-GMD.4.b (B) Given two examples, determine which is a two-dimensional shape.</td><td colspan="2">EE.G-GMD.4.b (C) Given pictures, sort two- and three-dimensional shapes.</td></tr>
<tr><td colspan="2">Real-World Connections:<br>• Spatial visualization<br>• Design<br>• Drawing<br>• Architecture and drafting</td><td colspan="2">Vocabulary:<br>• Cube<br>• Pyramid<br>• Cylinder<br>• Two-dimensional<br>• Three-dimensional<br>• Square<br>• Rectangle<br>• Circle</td></tr>
<tr><td colspan="4">Resources:<br>• Gizmos: Surface and Lateral Areas of Prisms and Cylinders / Prisms and Cylinders<br>• Gizmos: Surface and Lateral Areas of Pyramids and Cones / Pyramids and Cones / 3D and Orthographic Views<br>• Geogebra: Cross-Sections and Solids</td></tr>
</table>

COURSE: Alternate Math Elements I and II
DOMAIN: Geometry – Modeling with Geometry
CLUSTER: Apply geometric concepts in modeling situations.

<table>
<tr><td colspan="2">Standard:<br>EE.G-MG.1-3. Use properties of geometric shapes to describe real-life objects.</td><td colspan="2">Performance Objectives:<br>EE.G-MG.1-3.a Identify geometric shapes and match them to real-world examples.</td></tr>
<tr><td colspan="4">I Can Statements</td></tr>
<tr><td colspan="4">MOST COMPLEX ⟵ ⟶ LEAST COMPLEX</td></tr>
<tr><td>EE.G-MG.1-3.a (A) Identify geometric shapes and match them to real-world examples.</td><td>EE.G-MG.1-3.a (B) Name basic geometric shapes (e.g., circle, square, triangle, rectangle, etc.).</td><td colspan="2">EE.G-MG.1-3.a (C) Match geometric shapes with real-world objects.</td></tr>
<tr><td colspan="2">Real-World Connections:<br>• Drawing<br>• Architecture and drafting<br>• Construction<br>• Design<br>• Street signs</td><td colspan="2">Vocabulary:<br>• Sides<br>• Angles<br>• Regular<br>• Irregular<br>• Base<br>• Vertex/vertices</td></tr>
<tr><td colspan="4">Resources:<br>• Chapter 10: Identify and Describe Geometric Figures [Pdf]<br>• NCTM Illuminations Shape Tool<br>• Teachnology -- Shapes Lesson Plans<br>• New Visions For Public Schools -- Building Shapes<br>• New Visions For Public Schools -- Net Cutouts<br>• Which One Doesn't Belong -- Shapes<br>• Robert Kaplinsky -- Money Count / Robert Kaplinsky -- Paint a Handball Wall</td></tr>
</table>

## APPENDIX A: Additional Resources

Other Resources for Teaching Mathematics to Students with Significant Cognitive Disabilities

| Title | Keywords | URL |
|---|---|---|
| Students With Disabilities CAN Do Math! | Universal Design for Learning,<br>Standards for Mathematical Practice<br>Instructional Routines<br>I notice/I wonder<br>Counting Collections<br>Contemplate Then Calculate | Universal Design for Learning |
| Contemplate Then Calculate | Teacher Education by Design<br>Mathematical Practices<br>Look for and Make Use of Structure | Teacher Education by Design -- Mathematics Instructional Activities |
| I Notice / I Wonder | Notice and Wonder<br>Problem Solving | NCTM -- The Math Forum -- Notice and Wonder (Problems & Puzzles) |
| New Visions for Public Schools | Curriculum Resources<br>Algebra<br>Geometry | Filter by Types Connecting Representations and Contemplate Then Calculate |
| DUDAMATH | Interactive exploration of mathematics | DUDAMATH -- Arithmetic |
| The Itty Bitty Book of the CIF | Instructional Resources<br>Protocols | The Little Itty Bitty Book of The CIF [PDF] |
| Which One Doesn't Belong? | Patterns, Shapes, Similarities, Differences<br>Numbers, Graphs | Which One Doesn't Belong -- Shapes |
| Robert Kaplinsky | Real world,<br>Low entry, high ceiling | Robert Kaplinsky -- Lessons |

## APPENDIX B: Glossary

**Angle.** A shape formed by two lines or rays that diverge from a common point or vertex.

**Algebra.** The part of mathematics in which letters and other general symbols are used to represent numbers and quantities in formulae and equations.

**Area.** The amount of space a two-dimensional shape occupies, measured in squares.

**Associative property for addition.** The sum of three or more numbers, which is always the same when added together, no matter what order they are in. This is illustrated by $a + (b + c) = (a + b) + c$; $2 + (3 + 4) = (2 + 3) + 4$.

**Associative property for multiplication.** The product of three or more numbers, which is always the same when multiplied together, regardless of their grouping. This is illustrated by $a(bc) = (ab)c$; $2(3\times4) = (2\times3)4$.

**Attributes.** Characteristics of an object or geometric shape. These include qualities of shape, color, size, side, length, and so forth.

**Base.** The surface a solid object stands on, or the bottom line of a shape, such as a triangle or rectangle.

**Categorical data.** Types of data, which may be divided into groups, such as race, sex, age group, and educational level, when categorized into a small number of groups.

**Circle.** A round plane figure with a boundary (i.e., circumference) that consists of points equidistant from a fixed point (i.e., center).

**Commutative property of addition.** The sum of numbers is always the same when added together, no matter if the order of the addends is changed. This is illustrated by a + b = b + a (2 + 1 = 1 + 2).

**Commutative property of multiplication.** The product of numbers is always the same when multiplied together, even if the order of factors is changed (i.e., if $a$ and $b$ are two real numbers, then $a \times b = b \times a$.)

**Compose numbers.** To combine parts/components to form a number (adding parts to obtain a number).

**Congruent figures.** Figures that have the same size and shape.

**Congruent.** The same.

**Cubed.** A number multiplied by itself three times.

**Decompose numbers.** The process of separating numbers into their components (i.e., to divide a number into smaller parts). *Example:* 456 can be decomposed as 456 = 400 + 50 + 6.

**Denominator.** The "bottom" number of a fraction; the number that represents the total number of parts into which one whole is divided (e.g., in 3/4, the 4 is the denominator and indicates that one whole is divided into 4 parts).

**Decimal**. A number with a decimal point in it

**Dependent event.** Two events are dependent if the outcome or occurrence of the first affects the outcome or occurrence of the second so that the probability is changed.

**Distributive property.** The distributive property lets you multiply a sum by multiplying each addend separately and then add the products.

**Equation.** A mathematical sentence of equality between two expressions; equations have an equal sign (e.g., n + 50 = 75 or 75 = n + 50 means that n + 50 must have the same value as 75).

**Event**. A set of possible outcomes resulting from a particular experiment.

**Exponent.** A quantity representing the power to which a given number or expression is to be raised, usually expressed as a raised symbol beside the number or expression.

**Expression.** An operation between numbers that represents a single numeric quantity; expressions do not have an equal sign (e.g., *4r, x+2, y-1*).

**Fraction.** A mathematical expression representing the division of one whole number by another.

**Frequency table.** A table that lists items and uses tally marks to record and show the number of times they occur.

**Functions.** A special kind of relation where each x-value has one and only one y-value.

**Inequality.** A mathematical sentence in which the value of the expressions on either side of the relationship symbol are unequal; relation symbols used in inequalities include > (greater than) and < (less than) symbols (e.g., $7 > 3$, $x < y$).

**Irregular shape.** A polygon that does not have all sides equal and all angles equal.

**Line graph.** A graphical representation using points connected by line segments to show how something changes over time.

**Line segment.** The part of a line that connects two points. It has definite end points.

**Mean.** The "average" – To find the mean, add up all the numbers and then divide by the number of numbers.

**Models.** Pictorial or tactile aids used to explore mathematical ideas and solve mathematical problems – Manipulatives can be used to model situations.

**Numerator.** The top number in a fraction.

**Operations.** Addition, subtraction, multiplication, and division.

**Parallel Lines.** Lines that are the same distance apart and that never intersect. Lines that have the same slope are parallel.

**Perpendicular lines.** Lines that intersect, forming right angles.

**Place value.** The value of a digit depending on its place in a number.

**Ratios.** A comparison between two things. For instance, someone can look at a group of people and refer to the "ratio of boys to girls" in the class. Suppose there are 35 students, 15 of whom are boys; the ratio of boys to girls is 15 to 20.

**Rectangle.** A four-sided polygon (i.e., a flat shape with straight sides) where every angle is a right angle (90°); opposite sides are parallel and of equal length.

**Regular shape.** A polygon is regular when all angles are equal and all sides are equal.

**Set.** A group or collection of things that go together (e.g., a group of four stars).

**Side.** In most general terms, a line segment that is part of the figure. It is connected at either end to another line segment, which, in turn, may or may not be connected to still other line segments.

**Similar shapes.** Objects of the same shape but different sizes in which the corresponding angles are the same.

**Slope.** The steepness/incline/grade of a line.

**Square.** A four-sided polygon (e.g., a flat shape with straight sides) where all sides have equal length and every angle is a right angle (90°).

**Three-dimensional geometric shape.** The study of solid figures in three-dimensional space: cube, rectangular prism, sphere, cone, cylinder, and pyramid.

**Two-dimensional shape.** The study of two-dimensional figures in a plane; drawings of square, rectangle,

circle, triangle, pentagon, hexagon, and octagon.

**Variable.** A symbol for an unknown number to be solved; it is usually a letter like x or y (e.g., in x + 3 = 7, x is the variable).

**Vertex.** The common endpoint of two or more rays or line segments.

**Volume.** The amount of space a three-dimensional shape occupies, measured in cubes.

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