# EUREKA MATH<sup>™</sup>

ABOUT EUREKA MATH	Created by the nonprofit Great Minds, <i>Eureka Math</i> helps teachers deliver unparalleled math instruction that provides students with a deep understanding and fluency in math. Crafted by teachers and math scholars, the curriculum carefully sequences the mathematical progressions to maximize coherence from Prekindergarten through Precalculus—a principle tested and proven to be essential in students' mastery of math.	
	Teachers and students using <i>Eureka Math</i> find the trademark "Aha!" moments in <i>Eureka Math</i> to be a source of joy and inspiration, lesson after lesson, year after year.	
ALIGNED	<i>Eureka Math</i> is the only curriculum found by EdReports.org to align fully with the Common Core State Standards for Mathematics for all grades, Kindergarten through Grade 8. Great Minds offers detailed analyses which demonstrate how each grade of <i>Eureka Math</i> aligns with specific state standards. Access these free alignment studies at greatminds.org/state-studies.	
DATA	Schools and districts nationwide are experiencing student growth and impressive test scores after using <i>Eureka Math</i> . See their stories and data at greatminds.org/data.	
FULL SUITE OF RESOURCES	As a nonprofit, Great Minds offers the <i>Eureka Math</i> curriculum as PDF downloads for free, noncommercial use. Access the free PDFs at greatminds.org/math/curriculum.	
	The teacher–writers who created the curriculum have also developed essential resources, available only from Great Minds, including the following:	
	Printed material in English and Spanish	
	Digital resources	
	Professional development	
	Classroom tools and manipulatives	
	Teacher support materials	

• Parent resources

### **GRADE 2 MATHEMATICS**

The majority of the Grade 2 Alaska Mathematical Standards are fully covered by the Grade 2 *Eureka Math* curriculum. The primary area where the Grade 2 Alaska Mathematical Standards and *Eureka Math* do not align is in the domain of Operations and Algebraic Thinking. One standard from this domain will require the use of supplemental materials. A detailed analysis of alignment is provided in the table below. With strategic placement of supplemental materials, *Eureka Math* can ensure students are successful in achieving the proficiencies of the Alaska Mathematical Standards while still benefiting from the coherence and rigor of *Eureka Math*.

### **INDICATORS**

Green indicates that the Alaska standard is fully addressed in *Eureka Math*.

Yellow indicates that the Alaska standard may not be completely addressed in *Eureka Math*.

Red indicates that the Alaska standard is not addressed in *Eureka Math*.

Blue indicates there is a discrepancy between the grade level at which this standard is addressed in the Alaska standards and in *Eureka Math*.

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# 1: Make sense of problems and persevere in solving them.

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, "Does this make sense?" They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

#### Lessons in every module engage students in making sense of problems and persevering in solving them as required by this standard. This practice standard is analogous to the CCSSM Standards for Mathematical Practice 1, which is specifically addressed in the following modules:

G2 M4: Addition and Subtraction Within 200 with Word Problems to 100

G2 M7: Problem Solving with Length, Money, and Data

G2 M8: Time, Shapes, and Fractions as Equal Parts of Shapes

#### Aligned Components of Eureka Math

#### 2: Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents and the ability to *contextualize*, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects. Lessons in every module engage students in reasoning abstractly and quantitatively as required by this standard. This practice standard is analogous to the CCSSM Standards for Mathematical Practice 2, which is specifically addressed in the following modules:

G2 M1: Sums and Differences to 100

G2 M2: Addition and Subtraction of Length Units

G2 M3: Place Value, Counting, and Comparison of Numbers to 1,000

G2 M4: Addition and Subtraction Within 200 with Word Problems to 100

G2 M7: Problem Solving with Length, Money, and Data

## **3:** Construct viable arguments and critique the reasoning of others.

Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and-if there is a flaw in an argumentexplain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

Lessons in every module engage students in constructing viable arguments and critiquing the reasoning of others as required by this standard. This practice standard is analogous to the CCSSM Standards for Mathematical Practice 3, which is specifically addressed in the following modules:

G2 M2: Addition and Subtraction of Length Units

G2 M3: Place Value, Counting, and Comparison of Numbers to 1,000

G2 M4: Addition and Subtraction Within 200 with Word Problems to 100

G2 M5: Addition and Subtraction Within 1,000 with Word Problems to 100

G2 M6: Foundations of Multiplication and Division

G2 M8: Time, Shapes, and Fractions as Equal Parts of Shapes

#### 4: Model with mathematics.

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts, and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

Lessons in every module engage students in modeling with mathematics as required by this standard. This practice standard is analogous to the CCSSM Standards for Mathematical Practice 4, which is specifically addressed in the following modules:

G2 M4: Addition and Subtraction Within 200 with Word Problems to 100

G2 M6: Foundations of Multiplication and Division

G2 M7: Problem Solving with Length, Money, and Data

#### 5: Use appropriate tools strategically.

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

Lessons in every module engage students in using appropriate tools strategically as required by this standard. This practice standard is analogous to the CCSSM Standards for Mathematical Practice 5, which is specifically addressed in the following modules:

G2 M1: Sums and Differences to 100

G2 M2: Addition and Subtraction of Length Units

G2 M7: Problem Solving with Length, Money, and Data

#### 6: Attend to precision.

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions. Lessons in every module engage students in attending to precision as required by this standard. This practice standard is analogous to the CCSSM Standards for Mathematical Practice 6, which is specifically addressed in the following modules:

G2 M2: Addition and Subtraction of Length Units

G2 M3: Place Value, Counting, and Comparison of Numbers to 1,000

G2 M4: Addition and Subtraction Within 200 with Word Problems to 100

G2 M5: Addition and Subtraction Within 1,000 with Word Problems to 100

G2 M7: Problem Solving with Length, Money, and Data

G2 M8: Time, Shapes, and Fractions as Equal Parts of Shapes

#### 7: Look for and make use of structure.

Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see  $7 \times 8$ equals the well remembered  $7 \times 5 + 7 \times 3$ , inpreparation for learning about the distributive property. In the expression  $x^2 + 9x + 14$ , older students can see the 14 as  $2 \times 7$  and the 9 as 2 + 7. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see  $5-3(x-y)^2$  as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers *x* and *y*.

Lessons in every module engage students in looking for and making use of structure as required by this standard. This practice standard is analogous to the CCSSM Standards for Mathematical Practice 7, which is specifically addressed in the following modules:

G2 M1: Sums and Differences to 100

G2 M3: Place Value, Counting, and Comparison of Numbers to 1,000

G2 M5: Addition and Subtraction Within 1,000 with Word Problems to 100

G2 M6: Foundations of Multiplication and Division

G2 M8: Time, Shapes, and Fractions as Equal Parts of Shapes

## 8: Look for and express regularity in repeated reasoning.

Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation (y - 2)/(x - 1) = 3. Noticing the regularity in the way terms cancel when expanding  $(x - 1)(x + 1), (x - 1)(x^2 + x + 1), \text{ and } (x - 1)(x^3 + x^2 + x + 1)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results. Lessons in every module engage students in looking for and expressing regularity in repeated reasoning as required by this standard. This practice standard is analogous to the CCSSM Standards for Mathematical Practice 8, which is specifically addressed in the following modules:

#### G2 M1: Sums and Differences to 100

G2 M3: Place Value, Counting, and Comparison of Numbers to 1,000

G2 M5: Addition and Subtraction Within 1,000 with Word Problems to 100

G2 M6: Foundations of Multiplication and Division

Domain	Standards for Mathematical Content	Aligned Components of Eureka Math
Operations	Cluster: Represent and solve problems inv	olving addition and subtraction.
and Algebraic Thinking	<b>2.OA.1</b> Use addition and subtraction strategies to estimate, then solve one- and two-step word problems (using numbers up to 100) 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). Record and explain using equation symbols and a symbol for the unknown number to represent the problem.	<ul> <li>G2 M1 Topic A: Foundations for Fluency with Sums and Differences Within 100</li> <li>G2 M1 Lesson 5: Make a ten to add within 100.</li> <li>G2 M1 Lesson 8: Take from 10 within 100.</li> <li>G2 M2 Lesson 9: Measure lengths of string using measurement tools, and use tape diagrams to represent and compare the lengths.</li> <li>G2 M4 Lesson 31: Solve two-step word problems within 100.</li> <li>G2 M6 Lesson 9: Solve word problems involving addition of equal groups in rows and columns.</li> </ul>
	Cluster: Add and subtract using numbers u	1p to 20.
	2.0A.2	G2 M1: Sums and Differences to 100
	Fluently add and subtract using numbers up to 20 using mental strategies. Know from memory all sums of two one-digit numbers.	G2 M4 Lesson 5: Solve one- and two-step word problems within 100 using strategies based on place value.
		G2 M4 Lesson 16: Solve one- and two-step word problems within 100 using strategies based on place value.

Domain	<b>Standards for Mathematical Content</b>	Aligned Components of Eureka Math
	Cluster: Work with equal groups of object	s to gain foundations for multiplication.
	2.0A.3	G2 M6 Topic D: The Meaning of Even and Odd Numbers
	Determine whether a group of objects (up to 20) is odd or even (e.g., by pairing objects and comparing, counting by 2s). Model an even number as two equal groups of objects and then write an equation as a sum of two equal addends.	
	<b>2.OA.4</b> Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns. Write an equation to express the total as repeated addition (e.g., array of 4 by 5 would be 5 + 5 + 5 + 5 = 20).	G2 M6: Foundations of Multiplication and Division
	Cluster: Identify and continue patterns.	
	<b>2.OA.5</b> Identify, continue and label number patterns (e.g., aabb, abab). Describe a rule that determines and continues a sequence or pattern.	<i>Eureka Math</i> does not address these types of patterns.

Domain	Standards for Mathematical Content	Aligned Components of Eureka Math	
Number and	Cluster: Understand place value.		
Operations in Base Ten	<b>2.NBT.1</b> Model and identify place value positions of three-digit numbers. Include:		
	a. 100 can be thought of as a bundle of ten tens—called a "hundred."	G2 M3: Place Value, Counting, and Comparison of Numbers to 1,000	
	b. The numbers 100, 200, 300, 400, 500, 600, 700, 800, 900 refer to one, two, three, four, five, six, seven, eight, or nine hundreds (and 0 tens and 0 ones).	G2 M3: Place Value, Counting, and Comparison of Numbers to 1,000	
	<b>2.NBT.2</b> Count up to 1,000, skip-count by 5s, 10s, and 100s.	G2 M3: Place Value, Counting, and Comparison of Numbers to 1,000	
	<b>2.NBT.3</b> Read, write, order up to 1,000 using base-ten numerals, number names, and expanded form.	G2 M3 Topic C: Three-Digit Numbers in Unit, Standard, Expanded, and Word Forms	
		G2 M3 Topic E: Modeling Numbers Within 1,000 with Place Value Disks	
		G2 M3 Topic F: Comparing Two Three-Digit Numbers	
	<b>2.NBT.4</b> Compare two three-digit numbers based on the meanings of the hundreds, tens and ones digits, using >, =, < symbols to record the results.	G2 M3 Topic F: Comparing Two Three-Digit Numbers	

Domain	Standards for Mathematical Content	Aligned Components of Eureka Math
Cluster: Use place value understanding and properties of operations to add and s		nd properties of operations to add and subtract.
	<b>2.NBT.5.1</b> Fluently add and subtract using numbers up to 100.	
	a. Use: strategies based on place value	G2 M1: Sums and Differences to 100
		G2 M4 Topic A: Sums and Differences Within 100
		G2 M7 Topic B: Problem Solving with Coins and Bills
	b. Use: properties of operations	G2 M1: Sums and Differences to 100
		G2 M4 Topic A: Sums and Differences Within 100
		G2 M7 Topic B: Problem Solving with Coins and Bills
	c. Use: and/or the relationship between	G2 M1: Sums and Differences to 100
	addition and subtraction.	G2 M4 Topic A: Sums and Differences Within 100
		G2 M7 Topic B: Problem Solving with Coins and Bills
	<b>2.NBT.6</b> Add up to four two-digit numbers using strategies based on place value and properties of operations.	G2 M4 Lesson 22: Solve additions with up to four addends with totals within 200 with and without two compositions of larger units.

Domain	Standards for Mathematical Content	Aligned Components of Eureka Math
	<b>2.NBT.7.1</b> Add and subtract using numbers up to 1,000.	
	a. Use: concrete models or drawings and strategies based on place value	G2 M4: Addition and Subtraction Within 200 with Word Problems to 100
		G2 M5: Addition and Subtraction Within 1,000 with Word Problems to 100
	b. Use: properties of operations	G2 M4: Addition and Subtraction Within 200 with Word Problems to 100
		G2 M5: Addition and Subtraction Within 1,000 with Word Problems to 100
	c. Use: and/or the relationship between addition and subtraction.	G2 M4: Addition and Subtraction Within 200 with Word Problems to 100
		G2 M5: Addition and Subtraction Within 1,000 with Word Problems to 100
	<b>2.NBT.7.2</b> Add and subtract using numbers up to 1,000.	G2 M4: Addition and Subtraction Within 200 with Word Problems to 100
	Relate the strategy to a written method and explain the reasoning used.	G2 M5: Addition and Subtraction Within 1,000 with Word Problems to 100

Domain	Standards for Mathematical Content	Aligned Components of Eureka Math
	<b>2.NBT.7.3</b> Add and subtract using numbers up to 1,000. Demonstrate in adding or subtracting three- digit numbers, hundreds and hundreds are added or subtracted, tens and tens are added or subtracted, ones and ones are added or subtracted, and sometimes it is necessary to compose a ten from ten ones or a hundred from ten tens.	G2 M4: Addition and Subtraction Within 200 with Word Problems to 100 G2 M5: Addition and Subtraction Within 1,000 with Word Problems to 100
	<b>2.NBT.8</b> Mentally add 10 or 100 to a given number 100–900 and mentally subtract 10 or 100 from a given number.	<ul> <li>G2 M3 Topic G: Finding 1, 10, and 100 More or Less than a Number</li> <li>G2 M4 Topic A: Sums and Differences Within 100</li> <li>G2 M4 Lesson 17: Use mental strategies to relate compositions of 10 tens as 1 hundred to 10 ones as 1 ten.</li> <li>G2 M5 Topic A: Strategies for Adding and Subtracting Within 1,000</li> </ul>
	<b>2.NBT.9</b> Explain or illustrate the processes of addition or subtraction and their relationship using place value and the properties of operations.	G2 M4: Addition and Subtraction Within 200 with Word Problems to 100 G2 M5: Addition and Subtraction Within 1,000 with Word Problems to 100

Domain	Standards for Mathematical Content		Aligned Components of Eureka Math
Measurement	Cluster: Measure and estimate lengths in standard units.		
and Data	2.MD.1		G2 M2: Addition and Subtraction of Length Units
	Measure the length of an object by selecting and using standard tools such as rulers,		G2 M7 Topic C: Creating an Inch Ruler
	yardsticks, meter sticks, and measuring tapes.		G2 M7 Topic D: Measuring and Estimating Length Using Customary and Metric Units
	2.MD.2		G2 M2 Topic C: Measure and Compare Lengths Using
	Measure the length of an object twice		Different Length Units
	using different length units for the two measurements. Describe how the two measurements relate to the size of the unit chosen.		G2 M7 Lesson 18: Measure an object twice using different length units and compare; relate measurement to unit size.
	<b>2.MD.3</b> Estimate, measure and draw lengths using whole units of inches, feet, yards, centimeters, and meters.		G2 M2 Topic B: Measure and Estimate Length Using Different Measurement Tools
			G2 M7 Topic D: Measuring and Estimating Length Using Customary and Metric Units
	<b>2.MD.4</b> Measure to compare lengths of two objects, expressing the difference in terms of a standard length unit.		G2 M2 Topic C: Measure and Compare Lengths Using Different Length Units
			G2 M2 Lesson 9: Measure lengths of string using measurement tools, and use tape diagrams to represent and compare lengths.
			G2 M7 Lesson 19: Measure to compare the differences in lengths using inches, feet, and yards.

Domain	Standards for Mathematical Content	Aligned Components of Eureka Math	
	Cluster: Relate addition and subtraction to length.		
	<b>2.MD.5</b> Solve addition and subtraction word problems using numbers up to 100 involving length that are given in the same units (e.g., by using drawings of rulers). Write an equation with a symbol for the unknown to represent the problem.	G2 M2 Topic D: Relate Addition and Subtraction to Length G2 M7 Lesson 20: Solve two-digit addition and subtraction word problems involving length by using tape diagrams and writing equations to represent the problem.	
	<b>2.MD.6</b> Represent whole numbers as lengths from 0 on a number line diagram with equally spaced points corresponding to the numbers 0, 1, 2,, and represent whole-number sums and differences within 100 on a number line diagram.	<ul> <li>G2 M2 Lesson 8: Solve addition and subtraction word problems using the ruler as a number line.</li> <li>G2 M7 Topic E: Problem Solving with Customary and Metric Units</li> <li>G2 M7 Lesson 24: Draw a line plot to represent the measurement data; relate the measurement scale to the number line.</li> </ul>	
	Cluster: Work with time and money.		
	<b>2.MD.7</b> Tell and write time to the nearest five minutes using a.m. and p.m. from analog and digital clocks.	G2 M8 Topic D: Application of Fractions to Tell Time	
	<b>2.MD.8</b> Solve word problems involving dollar bills and coins using the \$ and ¢ symbols appropriately.	G2 M7 Topic B: Problem Solving with Coins and Bills	

Domain	Standards for Mathematical Content	Aligned Components of Eureka Math	
	Cluster: Represent and interpret data.		
	2.MD.9	G2 M7 Topic A: Problem Solving with Categorical Data	
	Collect, record, interpret, represent, and describe data in a table, graph, or line plot.	G2 M7 Topic F: Displaying Measurement Data	
	2.MD.10	G2 M7 Topic A: Problem Solving with Categorical Data	
	Draw a picture graph and a bar graph (with single-unit scale) to represent a data set with up to four categories. Solve simple put- together, take-apart, and compare problems using information presented in a bar graph.		
Geometry	Cluster: Reason with shapes and their attributes.		
	<b>2.G.1</b> Identify and draw shapes having specified attributes, such as a given number of angles or a given number of equal faces compared visually, not by measuring. Identify triangles, quadrilaterals, pentagons, hexagons, and cubes.	G2 M8 Topic A: Attributes of Geometric Shapes G2 M8 Lesson 6: Combine shapes to create a composite shape; create a new shape from composite shapes.	
	<b>2.G.2</b> Partition a rectangle into rows and columns of same-size squares and count to find the total number of them.	G2 M6 Topic C: Rectangular Arrays as a Foundation for Multiplication and Division	

Domain	Standards for Mathematical Content	Aligned Components of Eureka Math
	2.G.3	G2 M8: Time, Shapes, and Fractions as Equal Parts of Shapes
	Partition circles and rectangles into shares, describe the shares using the words <i>halves</i> , <i>thirds</i> , <i>half of</i> , <i>a third of</i> , etc., and describe the whole as two halves, three thirds, four fourths. Recognize that equal shares of identical wholes need not have the same shape.	