## ABOUT *EUREKA MATH*

Created by the nonprofit Great Minds, *Eureka Math* 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 *Eureka Math* find the trademark "Aha!" moments in *Eureka Math* to be a source of joy and inspiration, lesson after lesson, year after year.

## ALIGNED

*Eureka Math* 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 *Eureka Math* 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 *Eureka Math*. See their stories and data at greatminds.org/data.

## FULL SUITE OF RESOURCES

As a nonprofit, Great Minds offers the *Eureka Math* 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


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# GRADE 8 MATHEMATICS

The majority of the Grade 8 Utah Core Standards for Mathematics are fully covered by the Grade 8 *Eureka Math* curriculum. The primary area where the Grade 8 Utah Core Standards for Mathematics and *Eureka Math* do not align is in the strand of Expressions and Equations. 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 Utah Core Standards for Mathematics while still benefiting from the coherence and rigor of *Eureka Math*.

# INDICATORS

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

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

Red indicates that the Utah 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 Utah standards and in *Eureka Math*.


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| Standards for Mathematical Practice | Aligned Components of *Eureka Math* |
|---|---|
| **1: Make sense of problems and persevere in solving them.**<br>Explain the meaning of a problem and look for entry points to its solution. Analyze givens, constraints, relationships, and goals. Make conjectures about the form and meaning of the solution, plan a solution pathway, and continually monitor progress asking, "Does this make sense?" Consider analogous problems, make connections between multiple representations, identify the correspondence between different approaches, look for trends, and transform algebraic expressions to highlight meaningful mathematics. Check answers to problems using a different method. | 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:<br><br>G8 M1: Integer Exponents and Scientific Notation<br><br>G8 M4: Linear Equations |
| **2: Reason abstractly and quantitatively.**<br>Make sense of the quantities and their relationships in problem situations. Translate between context and algebraic representations by contextualizing and decontextualizing quantitative relationships. This includes the ability to decontextualize a given situation, representing it algebraically and manipulating symbols fluently as well as the ability to contextualize algebraic representations to make sense of the problem. | 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:<br><br>G8 M1: Integer Exponents and Scientific Notation<br><br>G8 M2: The Concept of Congruence<br><br>G8 M4: Linear Equations<br><br>G8 M5: Examples of Functions from Geometry<br><br>G8 M6: Linear Functions |


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| Standards for Mathematical Practice | Aligned Components of *Eureka Math* |
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| **3: Construct viable arguments and critique the reasoning of others.**<br>Understand and use stated assumptions, definitions, and previously established results in constructing arguments. Make conjectures and build a logical progression of statements to explore the truth of their conjectures. Justify conclusions and communicate them to others. Respond to the arguments of others by listening, asking clarifying questions, and critiquing the reasoning of others. | 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:<br><br>G8 M1: Integer Exponents and Scientific Notation<br><br>G8 M2: The Concept of Congruence<br><br>G8 M3: Similarity<br><br>G8 M4: Linear Equations |
| **4: Model with mathematics.**<br>Apply mathematics to solve problems arising in everyday life, society, and the workplace. Make assumptions and approximations, identifying important quantities to construct a mathematical model. Routinely interpret 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:<br><br>G8 M3: Similarity<br><br>G8 M4: Linear Equations<br><br>G8 M6: Linear Functions |


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| **5: Use appropriate tools strategically.**<br>Consider the available tools and be sufficiently familiar with them to make sound decisions about when each tool might be helpful, recognizing both the insight to be gained as well as the limitations. Identify relevant external mathematical resources and use them to pose or solve problems. Use 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:<br><br>G8 M3: Similarity<br><br>G8 M4: Linear Equations<br><br>G8 M6: Linear Functions |
| **6: Attend to precision.**<br>Communicate precisely to others. Use explicit definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose. Specify units of measure and label axes to clarify the correspondence with quantities in a problem. Calculate accurately and efficiently, and express numerical answers with a degree of precision appropriate for the problem context. | 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:<br><br>G8 M1: Integer Exponents and Scientific Notation<br><br>G8 M2: The Concept of Congruence<br><br>G8 M3: Similarity<br><br>G8 M4: Linear Equations<br><br>G8 M5: Examples of Functions from Geometry<br><br>G8 M6: Linear Functions<br><br>G8 M7: Introduction to Irrational Numbers Using Geometry |


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| **7: Look for and make use of structure.**<br>Look closely at mathematical relationships to identify the underlying structure by recognizing a simple structure within a more complicated structure. See complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. | 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:<br><br>G8 M1: Integer Exponents and Scientific Notation<br><br>G8 M4: Linear Equations<br><br>G8 M6: Linear Functions<br><br>G8 M7: Introduction to Irrational Numbers Using Geometry |
| **8: Look for and express regularity in repeated reasoning.**<br>Notice if reasoning is repeated, and look for both generalizations and shortcuts. Evaluate the reasonableness of intermediate results by maintaining oversight of the process while attending to the details. | 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:<br><br>G8 M1: Integer Exponents and Scientific Notation<br><br>G8 M3: Similarity<br><br>G8 M5: Examples of Functions from Geometry<br><br>G8 M7: Introduction to Irrational Numbers Using Geometry |


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| Strand | Standards for Mathematical Content | | Aligned Components of *Eureka Math* |
|---|---|---|---|
| **Number System** | **Cluster: Know that there are numbers that are not rational, and approximate them by rational numbers.** | | |
| | **8.NS.1**<br>Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers, show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number. | | G8 M7 Topic B: Decimal Expansions of Numbers |
| | **8.NS.2**<br>Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., $\pi^2$). | | G8 M7 Topic A: Square and Cube Roots<br>G8 M7 Lesson 10: Converting Repeating Decimals to Fractions<br>G8 M7 Lesson 11: The Decimal Expansion of Some Irrational Numbers<br>G8 M7 Lesson 13: Comparing Irrational Numbers<br>G8 M7 Lesson 14: Decimal Expansion of $\pi$ |
| | **8.NS.3**<br>Understand how to perform operations and simplify radicals with emphasis on square roots. | | G8 M7 Topic D: Applications of Radicals and Roots |


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| Strand | Standards for Mathematical Content | | Aligned Components of *Eureka Math* |
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| **Expressions and Equations** | **Cluster: Work with radical and integer exponents.** | | |
| | **8.EE.1**<br>Know and apply the properties of integer exponents to generate equivalent numerical expressions. | | G8 M1: Integer Exponents and Scientific Notation |
| | **8.EE.2**<br>Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where $p$ is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational. | | G8 M7 Lesson 2: Square Roots<br>G8 M7 Lesson 5: Solving Equations with Radicals |
| | **8.EE.3**<br>Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. | | G8 M1 Lesson 7: Magnitude<br>G8 M1 Lesson 8: Estimating Quantities |


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| | **8.EE.4**<br>Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology. | G8 M1: Integer Exponents and Scientific Notation |
| | **Cluster: Understand the connections between proportional relationships, lines, and linear relationships.** | |
| | **8.EE.5**<br>Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. | G8 M4 Topic B: Linear Equations in Two Variables and Their Graphs<br>G8 M4 Lesson 15: The Slope of a Non-Vertical Line<br>G8 M4 Lesson 22: Constant Rates Revisited<br>G8 M4 Lesson 24: Introduction to Simultaneous Equations |
| | **8.EE.6**<br>Use similar triangles to explain why the slope $m$ is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at $b$. | G8 M4 Topic C: Slope and Equations of Lines |


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| | **Cluster: Analyze and solve linear equations and inequalities and pairs of simultaneous linear equations.** | | |
| | **8.EE.7**<br>Solve linear equations and inequalities in one variable. | | |
| | a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where $a$ and $b$ are different numbers). | | G8 M4 Topic A: Writing and Solving Linear Equations |
| | b. Solve single-variable linear equations and inequalities with rational number coefficients, including equations and inequalities whose solutions require expanding expressions using the distributive property and collecting like terms. | | G8 M4 Topic A: Writing and Solving Linear Equations |
| | c. Solve single-variable absolute value equations. | | *Eureka Math* does not address absolute value equations. |


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| | **8.EE.8**<br>Analyze and solve pairs of simultaneous linear equations. | | |
| | a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. | | G8 M4 Topic D: Systems of Linear Equations and Their Solutions<br><br>Note: Learning systems of linear equations is extended in Algebra I M1 Topic C. |
| | b. Solve systems of two linear equations in two variables graphically, approximating when solutions are not integers and estimate solutions by graphing the equations. Solve simple cases by inspection. | | G8 M4 Topic D: Systems of Linear Equations and Their Solutions<br><br>G8 M4 Topic E: Pythagorean Theorem<br><br>Note: Learning systems of linear equations is extended in Algebra I M1 Topic C. |
| | c. Solve real-world and mathematical problems leading to two linear equations in two variables graphically. | | G8 M4 Topic D: Systems of Linear Equations and Their Solutions<br><br>G8 M4 Topic E: Pythagorean Theorem<br><br>Note: Learning systems of linear equations is extended in Algebra I M1 Topic C. |


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| **Functions** | **Cluster: Define, evaluate, and compare functions.** | | |
| | **8.F.1**<br>Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. | | G8 M5: Examples of Functions from Geometry |
| | **8.F.2**<br>Compare properties of two functions, each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). | | G8 M5 Lesson 7: Comparing Linear Functions and Graphs |
| | **8.F.3**<br>Interpret the equation $y = mx + b$ as defining a linear function whose graph is a straight line; give examples of functions that are not linear. | | G8 M5: Examples of Functions from Geometry |


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| | **Cluster: Use functions to model relationships between quantities.** | |
| | **8.F.4**<br>Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two ($x$, $y$) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. | G8 M6 Topic A: Linear Functions |
| | **8.F.5**<br>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. | G8 M6 Topic A: Linear Functions |


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| **Geometry** | **Cluster: Understand congruence and similarity using physical models, transparencies, or geometry software.** | | |
| | **8.G.1**<br>Verify experimentally the properties of rotations, reflections, and translations: | | |
| | a. Lines are taken to lines, and line segments to line segments of the same length. | | G8 M2 Topic A: Definitions and Properties of the Basic Rigid Motions |
| | b. Angles are taken to angles of the same measure. | | G8 M2 Topic A: Definitions and Properties of the Basic Rigid Motions |
| | c. Parallel lines are taken to parallel lines. | | G8 M2 Topic A: Definitions and Properties of the Basic Rigid Motions |
| | **8.G.2**<br>Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them. | | G8 M2: The Concept of Congruence |
| | **8.G.3**<br>Observe that orientation of the plane is preserved in rotations and translations, but not with reflections. Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. | | G8 M3 Topic A: Dilation<br>G8 M3 Lesson 8: Similarity |


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| | **8.G.4**<br>Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them. | G8 M3 Lesson 3: Examples of Dilations<br>G8 M3 Topic B: Similar Figures |
| | **8.G.5**<br>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. | G8 M2 Topic C: Congruence and Angle Relationships<br>G8 M3 Topic B: Similar Figures |
| | **Cluster: Understand and apply the Pythagorean Theorem and its converse.** | |
| | **8.G.6**<br>Explore and explain proofs of the Pythagorean Theorem and its converse. | G8 M2 Topic D: The Pythagorean Theorem<br>G8 M3 Topic C: The Pythagorean Theorem<br>G8 M7 Topic C: The Pythagorean Theorem |
| | **8.G.7**<br>Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. | G8 M2 Topic D: The Pythagorean Theorem<br>G8 M3 Topic C: The Pythagorean Theorem<br>G8 M4 Topic E: Pythagorean Theorem<br>G8 M7: Introduction to Irrational Numbers Using Geometry |


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| | **8.G.8**<br>Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. | G8 M2 Topic D: The Pythagorean Theorem<br>G8 M7 Lesson 17: Distance on the Coordinate Plane |
| | **Cluster: Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.** | |
| | **8.G.9**<br>Know the formulas for the volumes of cones, cylinders, and spheres, and use them to solve real-world and mathematical problems. | G8 M5: Examples of Functions from Geometry<br>G8 M7 Topic D: Applications of Radicals and Roots |
| **Statistics and Probability** | **Cluster: Investigate patterns of association in bivariate data.** | |
| | **8.SP.1**<br>Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association. | G8 M6: Linear Functions |
| | **8.SP.2**<br>Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line. | G8 M6: Linear Functions |


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| | **8.SP.3**<br>Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. | | G8 M6 Topic C: Linear and Nonlinear Models |
| | **8.SP.4**<br>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. | | G8 M6 Topic D: Bivariate Categorical Data |


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