EUREKA MATH™

GREAT MINDS

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

Texas Essential Knowledge and Skills for Mathematics Correlation to *Eureka Math*™

GEOMETRY

The majority of the Geometry Texas Essential Knowledge and Skills for Mathematics are fully covered by the Geometry *Eureka Math* curriculum. The areas where the Geometry Texas Essential Knowledge and Skills for Mathematics and Geometry *Eureka Math* do not align will require the use of *Eureka Math* content from other grade levels or courses, or 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 Texas Essential Knowledge and Skills for Mathematics while still benefiting from the coherence and rigor of *Eureka Math*.

INDICATORS

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

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

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

Mathematical Process Standards		Aligned Components of *Eureka Math*
(1) The student uses mathematical processes to acquire and demonstrate mathematical understanding. The student is expected to:		
a. apply mathematics to problems arising in everyday life, society, and the workplace;		This process standard is analogous to the CCSSM Standards for Mathematical Practice 1, which is specifically addressed in the following modules: Geometry M4: Connecting Algebra and Geometry Through Coordinates Geometry M5: Circles With and Without Coordinates
b. use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution;		This process standard is analogous to the CCSSM Standards for Mathematical Practice 1, which is specifically addressed in the following modules: Geometry M4: Connecting Algebra and Geometry Through Coordinates Geometry M5: Circles With and Without Coordinates
c. select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems;		This process standard is analogous to the CCSSM Standards for Mathematical Practice 5, which is specifically addressed in the following modules: Geometry M1: Congruence, Proof, and Constructions

Mathematical Process Standards		Aligned Components of *Eureka Math*
d. communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate;		This process standard is analogous to the CCSSM Standards for Mathematical Practice 4, which is specifically addressed in the following modules: Geometry M1: Congruence, Proof, and Constructions Geometry M4: Connecting Algebra and Geometry Through Coordinates
e. create and use representations to organize, record, and communicate mathematical ideas;		This process standard is analogous to the CCSSM Standards for Mathematical Practice 6, which is specifically addressed in the following modules: Geometry M1: Congruence, Proof, and Constructions Geometry M3: Extending to Three Dimensions
f. analyze mathematical relationships to connect and communicate mathematical ideas; and		This process standard is analogous to the CCSSM Standards for Mathematical Practice 2, which is specifically addressed in the following modules: Geometry M4: Connecting Algebra and Geometry Through Coordinates

Mathematical Process Standards	Aligned Components of *Eureka Math*
g. display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.	This process standard is analogous to the CCSSM Standards for Mathematical Practice 3, which is specifically addressed in the following modules: Geometry M1: Congruence, Proof, and Constructions Geometry M2: Similarity, Proof, and Trigonometry Geometry M5: Circles With and Without Coordinates

Skill	Expectations		Aligned Components of *Eureka Math*
Coordinate and Transformational Geometry	**111.41.2** The student uses the process skills to understand the connections between algebra and geometry and uses the one- and two-dimensional coordinate systems to verify geometric conjectures. The student is expected to:		
	a. determine the coordinates of a point that is a given fractional distance less than one from one end of a line segment to the other in one- and two-dimensional coordinate systems, including finding the midpoint;		Geometry M2 Lesson 7: How Do Dilations Map Segments? Geometry M2 Lesson 10: Dividing the King's Foot into 12 Equal Pieces Geometry M4 Lesson 1: Searching a Region in the Plane Geometry M4 Topic D: Partitioning and Extending Segments and Parameterization of Lines
	b. derive and use the distance, slope, and midpoint formulas to verify geometric relationships, including congruence of segments and parallelism or perpendicularity of pairs of lines; and		Geometry M2 Lesson 7: How Do Dilations Map Segments? Geometry M2 Lesson 19: Families of Parallel Lines and the Circumference of the Earth Geometry M2 Lesson 29: Applying Tangents Geometry M4: Connecting Algebra and Geometry Through Coordinates

Skill	Expectations	Aligned Components of *Eureka Math*
	c. determine an equation of a line parallel or perpendicular to a given line that passes through a given point.	Geometry M4 Lesson 4: Designing a Search Robot to Find a Beacon Geometry M4 Topic B: Perpendicular and Parallel Lines in the Cartesian Plane Geometry M5 Lesson 19: Equations for Tangent Lines to Circles

Skill	Expectations		Aligned Components of *Eureka Math*
	111.41.3 The student uses the process skills to generate and describe rigid transformations (translation, reflection, and rotation) and non-rigid transformations (dilations that preserve similarity and reductions and enlargements that do not preserve similarity). The student is expected to:		
	a. describe and perform transformations of figures in a plane using coordinate notation;		G8 M2 Topic A: Definitions and Properties of the Basic Rigid Motions Geometry M2 Lesson 5: Scale Factors Geometry M2 Lesson 6: Dilations as Transformations of the Plane Geometry M2 Lesson 7: How Do Dilations Map Segments? Geometry M2 Lesson 13: Properties of Similarity Transformations Geometry M4 Topic C: Perimeters and Areas of Polygonal Regions in the Cartesian Plane

Skill	Expectations	Aligned Components of *Eureka Math*
	b. determine the image or pre-image of a given two-dimensional figure under a composition of rigid transformations, a composition of non-rigid transformations, and a composition of both, including dilations where the center can be any point in the plane;	Geometry M1 Topic C: Transformations/Rigid Motions Geometry M2 Lesson 10: Dividing the King's Foot into 12 Equal Pieces Geometry M2 Topic A: Scale Drawings Geometry M2 Topic B: Dilations Geometry M2 Lesson 12: What Are Similarity Transformations, and Why Do We Need Them? Geometry M2 Lesson 13: Properties of Similarity Transformations Geometry M4 Topic C: Perimeters and Area of Polygonal Regions in the Cartesian Plane
	c. identify the sequence of transformations that will carry a given pre-image onto an image on and off the coordinate plane; and	Geometry M1 Topic C: Transformations/Rigid Motions Geometry M1 Topic D: Congruence Geometry M2 Lesson 12: What Are Similarity Transformations, and Why Do We Need Them? Geometry M2 Lesson 13: Properties of Similarity Transformations Geometry M4 Topic C: Perimeters and Areas of Polygonal Regions in the Cartesian Plane

Skill	Expectations		Aligned Components of *Eureka Math*
	d. identify and distinguish between reflectional and rotational symmetry in a plane figure.		Geometry M1 Lesson 15: Rotations, Reflections, and Symmetry Geometry M2 Lesson 20: How Far Away Is the Moon? Geometry M5 Lesson 3: Rectangles Inscribed in Circles
Logical Argument and Constructions	**111.41.4** The student uses the process skills with deductive reasoning to understand geometric relationships. The student is expected to:		
	a. distinguish between undefined terms, definitions, postulates, conjectures, and theorems;		Geometry M1 Topic A: Basic Constructions Geometry M1 Lesson 11: Unknown Angle Proofs—Proofs of Known Facts Geometry M1 Lesson 33: Review of the Assumptions Geometry M3 Lesson 5: Three-Dimensional Space

Skill	Expectations		Aligned Components of *Eureka Math*
	b. identify and determine the validity of the converse, inverse, and contrapositive of a conditional statement and recognize the connection between a biconditional statement and a true conditional statement with a true converse;		Geometry M1 Lesson 11: Unknown Angle Proofs—Proofs of Known Facts Geometry M1 Lesson 18: Looking More Carefully at Parallel Lines Geometry M1 Lesson 21: Correspondence and Transformation Geometry M1 Lesson 28: Properties of Parallelograms Note: Supplemental material may be necessary to completely address this standard.
	c. verify that a conjecture is false using a counterexample; and		*Eureka Math* does not explicitly address counterexamples.
	d. compare geometric relationships between Euclidean and spherical geometries, including parallel lines and the sum of the angles in a triangle.		Geometry M1 Topic B: Unknown Angles Geometry M1 Lesson 18: Looking More Carefully at Parallel Lines Geometry M2 Topic A: Scale Drawings Geometry M2 Lesson 19: Families of Parallel Lines and the Circumference of the Earth Geometry M4 Lesson 8: Parallel and Perpendicular Lines Note: Supplemental material is necessary to address spherical geometry.

Skill	Expectations		Aligned Components of *Eureka Math*
	111.41.5 The student uses constructions to validate conjectures about geometric figures. The student is expected to:		
	a. investigate patterns to make conjectures about geometric relationships, including angles formed by parallel lines cut by a transversal, criteria required for triangle congruence, special segments of triangles, diagonals of quadrilaterals, interior and exterior angles of polygons, and special segments and angles of circles choosing from a variety of tools;		Geometry M1: Congruence, Proof, and Constructions Geometry M2 Topic A: Scale Drawings Geometry M2 Lesson 19: Families of Parallel Lines and the Circumference of the Earth Geometry M4 Lesson 13: Analytic Proofs of Theorems Previously Proved by Synthetic Means Geometry M5 Lesson 12: Tangent Segments Geometry M5 Topic E: Cyclic Quadrilaterals and Ptolemy's Theorem

Skill	Expectations	Aligned Components of *Eureka Math*
	b. construct congruent segments, congruent angles, a segment bisector, an angle bisector, perpendicular lines, the perpendicular bisector of a line segment, and a line parallel to a given line through a point not on a line using a compass and a straightedge;	Geometry M1 Topic A: Basic Constructions Geometry M1 Lesson 13: Rotations Geometry M1 Lesson 14: Reflections Geometry M1 Lesson 16: Translations Geometry M1 Lesson 17: Characterize Points on a Perpendicular Bisector Geometry M1 Topic F: Advanced Constructions Geometry M2 Lesson 1: Scale Drawings Geometry M2 Lesson 10: Dividing the King's Foot into 12 Equal Pieces Geometry M2 Lesson 13: Properties of Similarity Transformations Geometry M2 Lesson 18: Similarity and the Angle Bisector Theorem Geometry M4 Lesson 4: Designing a Search Robot to Find a Beacon

Skill	Expectations	Aligned Components of *Eureka Math*
	c. use the constructions of congruent segments, congruent angles, angle bisectors, and perpendicular bisectors to make conjectures about geometric relationships; and	Geometry M1: Congruence, Proof, and Constructions Geometry M2 Lesson 1: Scale Drawings Geometry M2 Lesson 2: Making a Scale Drawing Using the Ratio Method Geometry M2 Lesson 10: Dividing the King's Foot into 12 Equal Pieces Geometry M2 Lesson 13: Properties of Similarity Transformations Geometry M2 Lesson 18: Similarity and the Angle Bisector Theorem Geometry M2 Lesson 19: Families of Parallel Lines and the Circumference of the Earth Geometry M2 Lesson 20: How Far Away Is the Moon?
	d. verify the Triangle Inequality theorem using constructions and apply the theorem to solve problems.	G7 M6 Topic B: Constructing Triangles

Skill	Expectations		Aligned Components of *Eureka Math*
Proof and Congruence	**111.41.6** The student uses the process skills with deductive reasoning to prove and apply theorems by using a variety of methods such as coordinate, transformational, and axiomatic and formats such as two-column, paragraph, and flow chart. The student is expected to:		
	a. verify theorems about angles formed by the intersection of lines and line segments, including vertical angles, and angles formed by parallel lines cut by a transversal and prove equidistance between the endpoints of a segment and points on its perpendicular bisector and apply these relationships to solve problems;		Geometry M1: Congruence, Proof, and Constructions Geometry M2 Topic A: Scale Drawings Geometry M2 Lesson 10: Dividing the King's Foot into 12 Equal Pieces Geometry M2 Lesson 15: The Angle-Angle (AA) Criterion for Two Triangles to Be Similar Geometry M2 Lesson 19: Families of Parallel Lines and the Circumference of the Earth Geometry M4 Lesson 15: The Distance from a Point to a Line
	b. prove two triangles are congruent by applying the Side-Angle-Side, Angle-Side-Angle, Side-Side-Side, Angle-Angle-Side, and Hypotenuse-Leg congruence conditions;		Geometry M1 Topic D: Congruence Geometry M1 Lesson 28: Properties of Parallelograms Geometry M1 Topic G: Axiomatic Systems Geometry M2 Lesson 15: The Angle-Angle (AA) Criterion for Two Triangles to Be Similar

Skill	Expectations	Aligned Components of *Eureka Math*
	c. apply the definition of congruence, in terms of rigid transformations, to identify congruent figures and their corresponding sides and angles;	Geometry M1 Topic C: Transformations/Rigid Motions Geometry M1 Lesson 22: Congruence Criteria for Triangles—SAS Geometry M1 Lesson 34: Review of the Assumptions Geometry M2 Lesson 13: Properties of Similarity Transformations Geometry M2 Lesson 14: Similarity
	d. verify theorems about the relationships in triangles, including proof of the Pythagorean Theorem, the sum of interior angles, base angles of isosceles triangles, midsegments, and medians, and apply these relationships to solve problems; and	Geometry M1 Lesson 11: Unknown Angle Proofs—Proofs of Known Facts Geometry M1 Lesson 23: Base Angles of Isosceles Triangles Geometry M1 Topic E: Proving Properties of Geometric Figures Geometry M1 Topic G: Axiomatic Systems Geometry M2 Topic D: Applying Similarity to Right Triangles Geometry M2 Lesson 30: Trigonometry and the Pythagorean Theorem Geometry M2 Lesson 33: Applying the Laws of Sines and Cosines Geometry M4 Lesson 13: Analytic Proofs of Theorems Previously Proved by Synthetic Means

Skill	Expectations		Aligned Components of *Eureka Math*
	e. prove a quadrilateral is a parallelogram, rectangle, square, or rhombus using opposite sides, opposite angles, or diagonals and apply these relationships to solve problems.		Geometry M1 Topic B: Unknown Angles Geometry M1 Lesson 28: Properties of Parallelograms Geometry M1 Topic G: Axiomatic Systems Geometry M4 Lesson 13: Analytic Proofs of Theorems Previously Proved by Synthetic Means Geometry M5 Lesson 1: Thale's Theorem Geometry M5 Lesson 3: Rectangles Inscribed in Circles Geometry M5 Topic E: Cyclic Quadrilaterals and Ptolemy's Theorem
Similarity, Proof, and Trigonometry	**111.41.7** The student uses the process skills in applying similarity to solve problems. The student is expected to:		
	a. apply the definition of similarity in terms of a dilation to identify similar figures and their proportional sides and the congruent corresponding angles; and		Geometry M2: Similarity, Proof, and Trigonometry Geometry M3 Lesson 3: The Scaling Principle for Area Geometry M3 Lesson 7: General Pyramids and Cones and Their Cross-Sections Geometry M5 Lesson 7: The Angle Measure of an Arc

Skill	Expectations		Aligned Components of *Eureka Math*
	b. apply the Angle-Angle criterion to verify similar triangles and apply the proportionality of the corresponding sides to solve problems.		Geometry M2 Lesson 4: Comparing the Ratio Method with the Parallel Method Geometry M2 Topic C: Similarity and Dilations Geometry M2 Topic D: Applying Similarity to Right Triangles Geometry M5 Lesson 16: Similar Triangles in Circle-Secant (or Circle-Secant-Tangent) Diagrams
	111.41.8 The student uses the process skills with deductive reasoning to prove and apply theorems by using a variety of methods such as coordinate, transformational, and axiomatic and formats such as two-column, paragraph, and flow chart. The student is expected to:		
	a. prove theorems about similar triangles, including the Triangle Proportionality theorem, and apply these theorems to solve problems; and		Geometry M2 Lesson 4: Comparing the Ratio Method with the Parallel Method Geometry M2 Lesson 7: How Do Dilations Map Segments? Geometry M2 Topic C: Similarity and Dilations Geometry M2 Topic D: Applying Similarity to Right Triangles

Skill	Expectations		Aligned Components of *Eureka Math*
	b. identify and apply the relationships that exist when an altitude is drawn to the hypotenuse of a right triangle, including the geometric mean, to solve problems.		Geometry M2 Topic D: Applying Similarity to Right Triangles Note: Supplemental material is necessary to address geometric mean.
	111.41.9 The student uses the process skills to understand and apply relationships in right triangles. The student is expected to:		
	a. determine the lengths of sides and measures of angles in a right triangle by applying the trigonometric ratios sine, cosine, and tangent to solve problems; and		Geometry M1 Lesson 6: Solve for Unknown Angles—Angles and Lines at a Point Geometry M2 Lesson 21: Special Relationships Within Right Triangles—Dividing into Two Similar Sub-Triangles Geometry M2 Topic E: Trigonometry Geometry M5 Topic E: Cyclic Quadrilaterals and Ptolemy's Theorem

Skill	Expectations		Aligned Components of *Eureka Math*
	b. apply the relationships in special right triangles 30°–60°–90° and 45°–45°–90° and the Pythagorean theorem, including Pythagorean triples, to solve problems.		Geometry M2 Topic D: Applying Similarity to Right Triangles Geometry M2 Lesson 27: Since and Cosine of Complementary Angles and Special Angles Geometry M2 Lesson 28: Solving Problems Using Sine and Cosine Geometry M2 Lesson 30: Trigonometry and the Pythagorean Theorem
Two-Dimensional and Three-Dimensional Figures	**111.41.10** The student uses the process skills to recognize characteristics and dimensional changes of two- and three-dimensional figures. The student is expected to:		
	a. identify the shapes of two-dimensional cross-sections of prisms, pyramids, cylinders, cones, and spheres and identify three-dimensional objects generated by rotations of two-dimensional shapes; and		Geometry M3: Extending to Three Dimensions
	b. determine and describe how changes in the linear dimensions of a shape affect its perimeter, area, surface area, or volume, including proportional and non-proportional dimensional change.		Geometry M2 Lesson 20: How Far Away Is the Moon? Geometry M2 Lesson 31: Using Trigonometry to Determine Area Geometry M3: Extending to Three Dimensions Geometry M5 Lesson 7: The Angle Measure of an Arc

Skill	Expectations		Aligned Components of *Eureka Math*
	111.41.11 The student uses the process skills in the application of formulas to determine measures of two- and three-dimensional figures. The student is expected to:		
	a. apply the formula for the area of regular polygons to solve problems using appropriate units of measure;		Geometry M2 Lesson 31: Using Trigonometry to Determine Area Geometry M3 Lesson 4: Proving the Area of a Disk Note: Supplemental material is necessary to incorporate the formula.
	b. determine the area of composite two-dimensional figures comprised of a combination of triangles, parallelograms, trapezoids, kites, regular polygons, or sectors of circles to solve problems using appropriate units of measure;		Geometry M2 Lesson 31: Using Trigonometry to Determine Area Geometry M2 Lesson 33: Applying the Laws of Sines and Cosines Geometry M3: Extending to Three Dimensions Geometry M4 Topic C: Perimeters and Areas of Polygonal Regions in the Cartesian Plane Geometry M5 Lesson 10: Unknown Length and Area Problems

Skill	Expectations		Aligned Components of *Eureka Math*
	c. apply the formulas for the total and lateral surface area of three-dimensional figures, including prisms, pyramids, cones, cylinders, spheres, and composite figures, to solve problems using appropriate units of measure; and		Geometry M3 Lesson 6: General Prisms and Cylinders and Their Cross-Sections Geometry M3 Lesson 7: General Pyramids and Cones and Their Cross-Sections Geometry M3 Lesson 12: The Volume Formula of a Sphere
	d. apply the formulas for the volume of three-dimensional figures, including prisms, pyramids, cones, cylinders, spheres, and composite figures, to solve problems using appropriate units of measure.		Geometry M3: Extending to Three Dimensions
Circles	**111.41.12** The student uses the process skills to understand geometric relationships and apply theorems and equations about circles. The student is expected to:		
	a. apply theorems about circles, including relationships among angles, radii, chords, tangents, and secants, to solve non-contextual problems;		Geometry M5: Circles With and Without Coordinates
	b. apply the proportional relationship between the measure of an arc length of a circle and the circumference of the circle to solve problems;		Geometry M5 Lesson 10: Unknown Length and Area Problems Note: Supplemental material may be necessary to completely address this standard.

Skill	Expectations		Aligned Components of *Eureka Math*
	c. apply the proportional relationship between the measure of the area of a sector of a circle and the area of the circle to solve problems;		Geometry M3: Extending to Three Dimensions Geometry M5 Topic B: Arc and Sectors
	d. describe radian measure of an angle as the ratio of the length of an arc intercepted by a central angle and the radius of the circle; and		Geometry M5 Topic A: Central and Inscribed Angles Geometry M5 Topic B: Arcs and Sectors
	e. show that the equation of a circle with center at the origin and radius r is $x^2 + y^2 = r^2$ and determine the equation for the graph of a circle with radius r and center (h, k), $(x - h)^2 + (y - k)^2 = r^2$.		Geometry M5 Topic D: Equations for Circles and Their Tangents
Probability	**111.41.13** The student uses the process skills to understand probability in real-world situations and how to apply independence and dependence of events. The student is expected to:		
	a. develop strategies to use permutations and combinations to solve contextual problems;		Precalculus and Advanced Topics M5 Topic A: Probability
	b. determine probabilities based on area to solve contextual problems;		Precalculus and Advanced Topics M5 Lesson 10: Determining Discrete Probability Distributions

Skill	Expectations	Aligned Components of *Eureka Math*
	c. identify whether two events are independent and compute the probability of the two events occurring together with or without replacement;	Algebra II M4 Topic A: Probability Precalculus and Advanced Topics M5 Lesson 1: The General Multiplication Rule Precalculus and Advanced Topics M5 Topic C: Using Probability to Make Decisions
	d. apply conditional probability in contextual problems; and	Algebra II M4 Topic A: Probability Precalculus and Advanced Topics M5 Lessons 18–19: Analyzing Decisions and Strategies Using Probability
	e. apply independence in contextual problems.	Algebra II M4 Topic A: Probability Precalculus and Advanced Topics M5 Lesson 1: The General Multiplication Rule