Geometry | New York Next Generation Mathematics Learning Standards Correlation to *Eureka Math*®

About *Eureka Math*

Created by Great Minds®, a mission-driven Public Benefit Corporation, *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

Great Minds offers detailed analyses that demonstrate how each grade of *Eureka Math* aligns with specific state standards. Access these free alignment studies at greatminds.org/state-studies.

Data

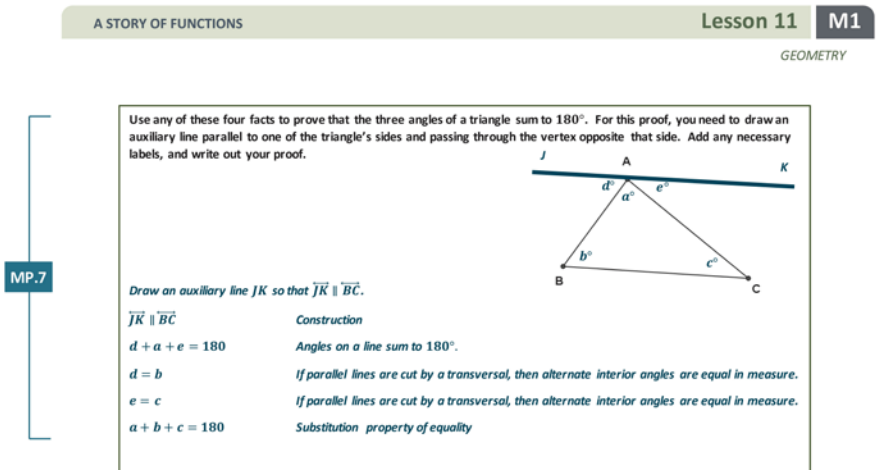
Schools and districts nationwide are experiencing student growth and impressive test scores after using *Eureka Math*. See their stories and data at greatminds.org/data.

Full Suite of Resources

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

Standards for Mathematical Practice	Aligned Components of *Eureka Math*
MP.1 Make sense of problems and persevere in solving them.	Lessons in every module engage students in mathematical practices. These are designated in the Module Overview and labeled in lessons. For example: 
MP.2 Reason abstractly and quantitatively.	
MP.3 Construct viable arguments and critique the reasoning of others.	
MP.4 Model with mathematics.	
MP.5 Use appropriate tools strategically.	
MP.6 Attend to precision.	
MP.7 Look for and make use of structure.	
MP.8 Look for and express regularity in repeated reasoning.	

Congruence

Experiment with transformations in the plane.

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.CO.1 Know precise definitions of angle, circle, perpendicular lines, parallel lines, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc as these exist within a plane.	Geometry M1 Lesson 1: Construct an Equilateral Triangle Geometry M1 Lesson 3: Copy and Bisect an Angle Geometry M1 Lesson 4: Construct a Perpendicular Bisector Geometry M1 Lesson 33: Review of the Assumptions
GEO-G.CO.2 Represent transformations as geometric functions that take points in the plane as inputs and give points as outputs. Compare transformations that preserve distance and angle measure to those that do not.	Geometry M1 Lesson 12: Transformations—The Next Level Geometry M1 Lesson 13: Rotations Geometry M1 Lesson 14: Reflections Geometry M1 Lesson 15: Rotations, Reflections, and Symmetry Geometry M1 Lesson 16: Translations Geometry M1 Lesson 18: Looking More Carefully at Parallel Lines Geometry M1 Lesson 19: Construct and Apply a Sequence of Rigid Motions Geometry M1 Lesson 20: Applications of Congruence in Terms of Rigid Motions Geometry M1 Lesson 21: Correspondence and Transformations Geometry M2 Lesson 6: Dilations as Transformations of the Plane
GEO-G.CO.3 Given a regular or irregular polygon, describe the rotations and reflections (symmetries) that carry the polygon onto itself.	Geometry M1 Lesson 15: Rotations, Reflections, and Symmetry Geometry M1 Lesson 21: Correspondence and Transformations

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.CO.4 Develop definitions of rotations, reflections, and translations in terms of points, angles, circles, perpendicular lines, parallel lines, and line segments.	Geometry M1 Lesson 12: Transformations—The Next Level Geometry M1 Lesson 13: Rotations Geometry M1 Lesson 14: Reflections Geometry M1 Lesson 16: Translations
GEO-G.CO.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure. Specify a sequence of transformations that will carry a given figure onto another.	Geometry M1 Lesson 13: Rotations Geometry M1 Lesson 14: Reflections Geometry M1 Lesson 16: Translations Geometry M1 Lesson 18: Looking More Carefully at Parallel Lines Geometry M1 Lesson 19: Construct and Apply a Sequence of Rigid Motions Geometry M1 Lesson 20: Applications of Congruence in Terms of Rigid Motions Geometry M1 Lesson 21: Correspondence and Transformations

Congruence

Understand congruence in terms of rigid motions.

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.CO.6 Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure. Given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.	Geometry M1 Lesson 15: Rotations, Reflections, and Symmetry Geometry M1 Lesson 19: Construct and Apply a Sequence of Rigid Motions Geometry M1 Lesson 21: Correspondence and Transformations

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.CO.7 Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.	Geometry M1 Lesson 19: Construct and Apply a Sequence of Rigid Motions Geometry M1 Lesson 20: Applications of Congruence in Terms of Rigid Motions Geometry M1 Lesson 21: Correspondence and Transformations Geometry M1 Topic D: Congruence Geometry M1 Lesson 34: Review of the Assumptions
GEO-G.CO.8 Explain how the criteria for triangle congruence (ASA, SAS, SSS, AAS and HL (Hypotenuse Leg)) follow from the definition of congruence in terms of rigid motions.	Geometry M1 Lesson 22: Congruence Criteria for Triangles—SAS Geometry M1 Lesson 24: Congruence Criteria for Triangles—ASA and SSS Geometry M1 Lesson 25: Congruence Criteria for Triangles—AAS and HL Geometry M1 Lesson 34: Review of the Assumptions

Congruence

Prove geometric theorems.

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.CO.9 Prove and apply theorems about lines and angles.	Geometry M1 Topic B: Unknown Angles Geometry M1 Lesson 18: Looking More Carefully at Parallel Lines Geometry M1 Lesson 33: Review of the Assumptions
GEO-G.CO.10 Prove and apply theorems about triangles.	Geometry M1 Lesson 23: Base Angles of Isosceles Triangles Geometry M1 Lesson 29: Special Lines in Triangles Geometry M1 Lesson 30: Special Lines in Triangles Geometry M1 Topic G: Axiomatic Systems

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.CO.11 Prove and apply theorems about parallelograms.	Geometry M1 Lesson 28: Properties of Parallelograms Geometry M1 Lesson 34: Review of the Assumptions

Congruence

Make geometric constructions.

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.CO.12 Make, justify, and apply formal geometric constructions.	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 Lesson 18: Looking More Carefully at Parallel Lines
GEO-G.CO.13 Make and justify the constructions for inscribing an equilateral triangle, a square and a regular hexagon in a circle.	Geometry M1 Lesson 1: Construct an Equilateral Triangle Geometry M1 Lesson 2: Construct an Equilateral Triangle Geometry M1 Topic F: Advanced Constructions

Similarity, Right Triangles, and Trigonometry

Understand similarity in terms of similarity transformations.

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.SRT.1 Verify experimentally the properties of dilations given by a center and a scale factor.	Geometry M2 Lesson 1: Scale Drawings Geometry M2 Lesson 2: Making Scale Drawings Using the Ratio Method Geometry M2 Lesson 3: Making Scale Drawings Using the Parallel Method Geometry M2 Lesson 5: Scale Factors Geometry M2 Topic B: Dilations
GEO-G.SRT.1.a Verify experimentally that dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.	Geometry M2 Lesson 3: Making Scale Drawings Using the Parallel Method 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 8: How Do Dilations Map Lines, Rays, and Circles? Geometry M2 Lesson 9: How Do Dilations Map Angles? Geometry M2 Lesson 11: Dilations from Different Centers
GEO-G.SRT.1.b Verify experimentally that the dilation of a line segment is longer or shorter in the ratio given by the scale factor.	Geometry M2 Lesson 1: Scale Drawings Geometry M2 Lesson 2: Making Scale Drawings Using the Ratio Method Geometry M2 Lesson 3: Making Scale Drawings Using the Parallel Method Geometry M2 Lesson 5: Scale Factors Geometry M2 Topic B: Dilations

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.SRT.2 Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar. Explain using similarity transformations that similar triangles have equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.	Geometry M2 Lesson 12: What Are Similarity Transformations, and Why Do We Need Them? Geometry M2 Lesson 13: Properties of Similarity Transformations Geometry M2 Lesson 14: Similarity
GEO-G.SRT.3 Use the properties of similarity transformations to establish the AA~, SSS~, and SAS~ criterion for two triangles to be similar.	Geometry M2 Lesson 15: The Angle-Angle (AA) Criterion for Two Triangles to Be Similar Geometry M2 Lesson 17: The Side-Angle-Side (SAS) and Side-Side-Side (SSS) Criteria for Two Triangles to Be Similar

Similarity, Right Triangles, and Trigonometry

Prove theorems involving similarity.

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.SRT.4 Prove and apply similarity theorems about triangles.	Geometry M2 Lesson 4: Comparing the Ratio Method with the Parallel Method Geometry M2 Lesson 5: Scale Factors Geometry M2 Lesson 7: How Do Dilations Map Segments? Geometry M2 Lesson 8: How Do Dilations Map Lines, Rays, and Circles? Geometry M2 Lesson 9: How Do Dilations Map Angles? Geometry M2 Lesson 17: The Side-Angle-Side (SAS) and Side-Side-Side (SSS) Criteria for Two Triangles to Be Similar

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.SRT.4 ***continued***	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 21: Special Relationships Within Right Triangles—Dividing into Two Similar Sub-Triangles Geometry M2 Lesson 24: Prove the Pythagorean Theorem Using Similarity
GEO-G.SRT.5 Use congruence and similarity criteria for triangles to:	*This standard is fully addressed by the lessons aligned to its subsections.*
GEO-G.SRT.5.a Solve problems algebraically and geometrically.	Geometry M2 Lesson 16: Between-Figure and Within-Figure Ratios Geometry M2 Lesson 17: The Side-Angle-Side (SAS) and Side-Side-Side (SSS) Criteria for Two Triangles to Be Similar Geometry M2 Lesson 18: Similarity and the Angle Bisector Theorem Geometry M2 Topic D: Applying Similarity to Right Triangles
GEO-G.SRT.5.b Prove relationships in geometric figures.	Geometry M2 Lesson 16: Between-Figure and Within-Figure Ratios Geometry M2 Lesson 17: The Side-Angle-Side (SAS) and Side-Side-Side (SSS) Criteria for Two Triangles to Be Similar Geometry M2 Lesson 18: Similarity and the Angle Bisector Theorem Geometry M2 Topic D: Applying Similarity to Right Triangles

Similarity, Right Triangles, and Trigonometry

Define trigonometric ratios and solve problems involving right triangles.

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.SRT.6 Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of sine, cosine and tangent ratios for acute angles.	Geometry M2 Lesson 25: Incredibly Useful Ratios Geometry M2 Lesson 26: The Definition of Sine, Cosine, and Tangent Geometry M2 Lesson 29: Applying Tangents
GEO-G.SRT.7 Explain and use the relationship between the sine and cosine of complementary angles.	Geometry M2 Lesson 27: Sine and Cosine of Complementary Angles and Special Angles Geometry M2 Lesson 28: Solving Problems Using Sine and Cosine
GEO-G.SRT.8 Use sine, cosine, tangent, the Pythagorean Theorem and properties of special right triangles to solve right triangles in applied problems.	Geometry M2 Lesson 27: Sine and Cosine of Complementary Angles and Special Angles Geometry M2 Lesson 28: Solving Problems Using Sine and Cosine Geometry M2 Lesson 29: Applying Tangents Geometry M2 Lesson 30: Trigonometry and the Pythagorean Theorem Geometry M2 Lesson 31: Using Trigonometry to Determine Area Geometry M2 Lesson 32: Using Trigonometry to Find Side Lengths of an Acute Triangle Geometry M2 Lesson 33: Applying the Laws of Sines and Cosines Geometry M2 Lesson 34: Unknown Angles

Similarity, Right Triangles, and Trigonometry

Apply Trigonometry to general triangles.

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.SRT.9 Justify and apply the formula $A = \frac{1}{2}ab\sin(C)$ to find the area of any triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.	Geometry M2 Lesson 31: Using Trigonometry to Determine Area

Circles

Understand and apply theorems about circles.

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.C.1 Prove that all circles are similar.	Geometry M5 Lesson 7: The Angle Measure of an Arc
GEO-G.C.2a Identify, describe and apply relationships between the angles and their intercepted arcs of a circle.	Geometry M5 Topic A: Central and Inscribed Angles Geometry M5 Lesson 7: The Angle Measure of an Arc
GEO-G.C.2b Identify, describe and apply relationships among radii, chords, tangents, and secants of a circle.	Geometry M5 Topic A: Central and Inscribed Angles Geometry M5 Lesson 7: The Angle Measure of an Arc Geometry M5 Lesson 8: Arcs and Chords Geometry M5 Topic C: Secants and Tangents

Circles

Find arc lengths and area of sectors of circles.

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.C.5 Using proportionality, find one of the following given two others: the central angle, arc length, radius or area of sector.	Geometry M5 Topic A: Central and Inscribed Angles Geometry M5 Lesson 9: Arc Length and Areas of Sectors Geometry M5 Lesson 10: Unknown Length and Area Problems

Expressing Geometric Properties with Equations

Translate between the geometric description and the equation of a conic section.

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.GPE.1a Derive the equation of a circle of given center and radius using the Pythagorean Theorem. Find the center and radius of a circle, given the equation of the circle.	Geometry M5 Lesson 17: Writing the Equation for a Circle Geometry M5 Lesson 18: Recognizing Equations of Circles
GEO-G.GPE.1b Graph circles given their equation.	Geometry M5 Lesson 17: Writing the Equation for a Circle Geometry M5 Lesson 18: Recognizing Equations of Circles

Expressing Geometric Properties with Equations

Use coordinates to prove simple geometric theorems algebraically.

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.GPE.4 On the coordinate plane, algebraically prove geometric theorems and properties.	Geometry M4 Lesson 5: Criterion for Perpendicularity Geometry M4 Lesson 8: Parallel and Perpendicular Lines Geometry M4 Topic D: Partitioning and Extending Segments and Parameterization of Lines Geometry M5 Lesson 19: Equations for Tangent Lines to Circles
GEO-G.GPE.5 On the coordinate plane:	*This standard is fully addressed by the lessons aligned to its subsections.*
GEO-G.GPE.5.a Explore the proof for the relationship between slopes of parallel and perpendicular lines;	Geometry M4 Lesson 4: Designing a Search Robot to Find a Beacon Geometry M4 Lesson 5: Criterion for Perpendicularity Geometry M4 Lesson 6: Segments That Meet at Right Angles Geometry M4 Lesson 8: Parallel and Perpendicular Lines
GEO-G.GPE.5.b Determine if lines are parallel, perpendicular, or neither, based on their slopes; and	Geometry M4 Lesson 8: Parallel and Perpendicular Lines
GEO-G.GPE.5.c Apply properties of parallel and perpendicular lines to solve geometric problems.	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

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.GPE.6 Find the point on a directed line segment between two given points that partitions the segment in a given ratio.	Geometry M4 Lesson 12: Dividing Segments Proportionately Geometry M4 Lesson 13: Analytic Proofs of Theorems Previously Proved by Synthetic Means
GEO-G.GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles.	Geometry M4 Lesson 1: Searching a Region in the Plane Geometry M4 Lesson 2: Finding Systems of Inequalities That Describe Triangular and Rectangular Regions Geometry M4 Lesson 3: Lines That Pass Through Regions Geometry M4 Topic C: Perimeters and Areas of Polygonal Regions in the Cartesian Plane

Geometric Measurement and Dimension

Explain volume formulas and use them to solve problems.

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.GMD.1 Provide informal arguments for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.	Geometry M3 Topic A: Area Geometry M3 Lesson 8: Definition and Properties of Volume Geometry M3 Lesson 10: The Volume of Prisms and Cylinders and Cavalieri's Principle Geometry M3 Lesson 11: The Volume Formula of a Pyramid and Cone Geometry M3 Lesson 12: The Volume Formula of a Sphere
GEO-G.GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.	Geometry M3 Lesson 8: Definition and Properties of Volume Geometry M3 Lesson 9: Scaling Principle for Volumes Geometry M3 Lesson 11: The Volume Formula of a Pyramid and Cone Geometry M3 Lesson 12: The Volume Formula of a Sphere Geometry M3 Lesson 13: How Do 3D Printers Work?

Geometric Measurement and Dimension

Visualize relationships between two-dimensional and three-dimensional objects.

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.GMD.4 Identify the shapes of plane sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.	Geometry M3 Lesson 6: General Prisms and Cylinders and Their Cross-Sections Geometry M3 Lesson 7: General Pyramids and Cones and Their Cross-Sections

Modeling with Geometry

Apply geometric concepts in modeling situations.

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.MG.1 Use geometric shapes, their measures, and their properties to describe objects.	Geometry M2 Lesson 19: Families of Parallel Lines and the Circumference of the Earth Geometry M2 Lesson 20: How Far Away Is the Moon? Geometry M3 Lesson 5: Three-Dimensional Space Geometry M3 Lesson 6: General Prisms and Cylinders and Their Cross-Sections Geometry M3 Lesson 11: The Volume Formula of a Pyramid and Cone Geometry M3 Lesson 12: The Volume Formula of a Sphere
GEO-G.MG.2 Apply concepts of density based on area and volume of geometric figures in modeling situations.	Geometry M3 Lesson 8: Definition and Properties of Volume Geometry M3 Lesson 11: The Volume Formula of a Pyramid and Cone

New York Next Generation Mathematics Learning Standards	Aligned Components of *Eureka Math*
GEO-G.MG.3 Apply geometric methods to solve design problems.	Geometry M2 Lesson 2: Making Scale Drawings Using the Ratio Method Geometry M3 Lesson 11: The Volume Formula of a Pyramid and Cone Geometry M3 Lesson 12: The Volume Formula of a Sphere Geometry M3 Lesson 13: How Do 3D Printers Work?