

Milestones EOC Tutorials for Georgia are designed specifically for the Georgia Standards of Excellence to prepare students for the Georgia Milestones end-of-course assessments. EOC Categories are at the heart of Milestones EOC Tutorial structure – bringing category-based learning to the student experience, and category-based performance and progress tracking to the teacher experience.

Math Tutorials offer targeted instruction, practice and review designed to develop computational fluency, deepen conceptual understanding, and apply mathematical practices. They automatically identify and address learning gaps down to elementary-level content, using adaptive remediation to bring students to grade-level no matter where they start. Students engage with the content in an interactive, feedback-rich environment as they progress through standards-aligned modules. By constantly honing the ability to apply their knowledge in abstract and real world scenarios, students build the depth of knowledge and higher order skills required to demonstrate their mastery when put to the test.

In each module, the Learn It and Try It make complex ideas accessible to students through focused content, modeled logic and process, multi-modal representations, and personalized feedback as students reason through increasingly challenging problems. The Review It offers a high impact summary of key concepts and relates those concepts to students' lives. The Test It assesses students' mastery of the module's concepts, providing granular performance data to students and teachers after each attempt. To help students focus on the content most relevant to them, unit-level pretests and posttests can quickly identify where students are strong and where they're still learning.

Test-Taking Strategies for EOC Tutorials allow students to practice and apply learning approaches that will hone their test-taking skills and focus them for success on the day of their EOC test.

Unit 1: Real Number System

- **LAWS OF EXPONENTS**

- MGSE9-12.N.RN.2: Extend the properties of exponents to rational exponents Rewrite expressions involving radicals (i.e., simplify and/or use the operations of addition, subtraction, and multiplication, with radicals within expressions limited to square roots).

- **OPERATIONS ON RATIONAL AND IRRATIONAL NUMBERS**

- MGSE9-12.N.RN.3: Use properties of rational and irrational numbers Explain why the sum or product of rational numbers is rational; why the sum of a rational number and an irrational number is irrational; and why the product of a nonzero rational number and an irrational number is irrational.

Unit 2: Expressions and Equations

- **FORMULATING AND SIMPLIFYING ALGEBRAIC EXPRESSIONS**

- MGSE9-12.A.SSE.1a: Interpret the structure of expressions Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors, and coefficients, in context.

- **LITERAL EQUATIONS**

- MGSE9-12.A.CED.4: Create equations that describe numbers or relationships Rearrange formulas to highlight a quantity of interest using the same reasoning as in solving equations.

Unit 3: Functions

- **FUNCTIONS AND RELATIONS**

- MGSE9-12.F.IF.4: Interpret functions that arise in applications in terms of the context Using tables, graphs, and verbal descriptions, interpret the key characteristics of a function which models the relationship between two quantities. Sketch a graph showing key features including: intercepts; interval where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior.

- **DOMAIN AND RANGE**

- MGSE9-12.F.IF.5: Interpret functions that arise in applications in terms of the context Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.

Unit 4: Sequences

- **SEQUENCES**

- MGSE9-12.F.BF.1a: Build a function that models a relationship between two quantities Write a function that describes a relationship between two quantities. Determine an explicit expression and the recursive process (steps for calculation) from context.

- **ARITHMETIC AND GEOMETRIC SEQUENCES**

- MGSE9-12.F.BF.1a: Build a function that models a relationship between two quantities Write a function that describes a relationship between two quantities. Determine an explicit expression and the recursive process (steps for calculation) from context.

Unit 5: Operations on Polynomials

- **ADDITION AND SUBTRACTION OF POLYNOMIALS**

- MGSE9-12.A.APR.1: Perform arithmetic operations on polynomials Add, subtract, and multiply polynomials; understand that polynomials form a system analogous to the integers in that they are closed under these operations.

- **MULTIPLICATION OF POLYNOMIALS**

- MGSE9-12.A.APR.1: Perform arithmetic operations on polynomials Add, subtract, and multiply polynomials; understand that polynomials form a system analogous to the integers in that they are closed under these operations.

Unit 6: Factoring

- **FACTORING QUADRATIC TRINOMIALS**

- MGSE9-12.A.SSE.2: Interpret the structure of expressions Use the structure of an expression to rewrite it in different equivalent forms.
- MGSE9-12.A.REI.4b: Solve equations and inequalities in one variable Solve quadratic equations in one variable. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, factoring, completing the square, and the quadratic formula, as appropriate to the initial form of the equation (limit to real number solutions).
- **FACTORIZING SPECIAL CASES**
 - MGSE9-12.A.SSE.2: Interpret the structure of expressions Use the structure of an expression to rewrite it in different equivalent forms.
 - MGSE9-12.A.SSE.1b: Interpret the structure of expressions Interpret expressions that represent a quantity in terms of its context. Given situations which utilize formulas or expressions with multiple terms and/or factors, interpret the meaning (in context) of individual terms or factors.

Unit 7: Graphs of Quadratic Functions

- **QUADRATIC FUNCTIONS**

- MGSE9-12.F.IF.4: Interpret functions that arise in applications in terms of the context Using tables, graphs, and verbal descriptions, interpret the key characteristics of a function which models the relationship between two quantities. Sketch a graph showing key features including: intercepts; interval where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior.
- MGSE9-12.A.SSE.1b: Interpret the structure of expressions Interpret expressions that represent a quantity in terms of its context. Given situations which utilize formulas or expressions with multiple terms and/or factors, interpret the meaning (in context) of individual terms or factors.

- **ANALYZING GRAPHS OF QUADRATIC FUNCTIONS**

- MGSE9-12.F.IF.5: Interpret functions that arise in applications in terms of the context Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
- MGSE9-12.F.IF.4: Interpret functions that arise in applications in terms of the context Using tables, graphs, and verbal descriptions, interpret the key characteristics of a function which models the relationship between two quantities. Sketch a graph showing key features including: intercepts; interval where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior.
- MGSE9-12.A.REI.4b: Solve equations and inequalities in one variable Solve quadratic equations in one variable. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, factoring, completing the square, and the quadratic formula, as appropriate to the initial form of the equation (limit to real number solutions).

- **REPRESENTATIONS OF QUADRATIC FUNCTIONS**

- MGSE9-12.A.REI.4a: Solve equations and inequalities in one variable Solve quadratic equations in one variable. Use the method of completing the square to transform any quadratic equation

in into an equation of the form $() =$ that has the same solutions. Derive the quadratic formula from $+ + = 0$.

- MGSE9-12.F.IF.4: Interpret functions that arise in applications in terms of the context Using tables, graphs, and verbal descriptions, interpret the key characteristics of a function which models the relationship between two quantities. Sketch a graph showing key features including: intercepts; interval where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior.
- MGSE9-12.F.IF.8a: Analyze functions using different representations Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
- MGSE9-12.A.CED.2: Create equations that describe numbers or relationships Create quadratic equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

Unit 8: Solving Quadratic Functions

• SOLVING QUADRATIC EQUATIONS BY FACTORING

- MGSE9-12.A.SSE.3a: Write expressions in equivalent forms to solve problems Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. Factor any quadratic expression to reveal the zeros of the function defined by the expression.
- MGSE9-12.A.REI.4b: Solve equations and inequalities in one variable Solve quadratic equations in one variable. Solve quadratic equations by inspection (e.g., for $= 49$), taking square roots, factoring, completing the square, and the quadratic formula, as appropriate to the initial form of the equation (limit to real number solutions).
- MGSE9-12.F.IF.8a: Analyze functions using different representations Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
- MGSE9-12.A.CED.1: Create equations that describe numbers or relationships Create equations and inequalities in one variable and use them to solve problems. Include equations arising from quadratic functions.

• COMPLETING THE SQUARE

- MGSE9-12.A.REI.4b: Solve equations and inequalities in one variable Solve quadratic equations in one variable. Solve quadratic equations by inspection (e.g., for $= 49$), taking square roots, factoring, completing the square, and the quadratic formula, as appropriate to the initial form of the equation (limit to real number solutions).

- MGSE9-12.A.REI.4a: Solve equations and inequalities in one variable Solve quadratic equations in one variable. Use the method of completing the square to transform any quadratic equation in one variable into an equation of the form $(x + p) = q$ that has the same solutions. Derive the quadratic formula from $x^2 + bx + c = 0$.
- MGSE9-12.A.SSE.3b: Write expressions in equivalent forms to solve problems Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function defined by the expression.
- MGSE9-12.F.IF.8a: Analyze functions using different representations Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.

• **QUADRATIC FORMULA**

- MGSE9-12.A.REI.4b: Solve equations and inequalities in one variable Solve quadratic equations in one variable. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, factoring, completing the square, and the quadratic formula, as appropriate to the initial form of the equation (limit to real number solutions).
- MGSE9-12.F.IF.4: Interpret functions that arise in applications in terms of the context Using tables, graphs, and verbal descriptions, interpret the key characteristics of a function which models the relationship between two quantities. Sketch a graph showing key features including: intercepts; interval where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior.

Unit 9: Transformations on Parent Functions

• **QUADRATIC PARENT FUNCTION**

- MGSE9-12.F.IF.5: Interpret functions that arise in applications in terms of the context Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.

• **TRANSFORMATIONS OF THE QUADRATIC PARENT FUNCTION**

- MGSE9-12.F.BF.3: Build new functions from existing functions Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $f(x) - k$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

Unit 10: Working with Functions

• **LINEAR VERSUS NONLINEAR FUNCTIONS**

- MGSE9-12.F.LE.3: Construct and compare linear, quadratic, and exponential models and solve problems Observe using graphs and tables that a quantity increasing exponentially eventually

exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

- MGSE9-12.F.IF.6: Interpret functions that arise in applications in terms of the context Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.
- MGSE9-12.F.IF.7a: Analyze functions using different representations Graph functions expressed algebraically and show key features of the graph both by hand and by using technology. Graph quadratic functions and show intercepts, maxima, and minima (as determined by the function or by context).
- MGSE9-12.F.IF.4: Interpret functions that arise in applications in terms of the context Using tables, graphs, and verbal descriptions, interpret the key characteristics of a function which models the relationship between two quantities. Sketch a graph showing key features including: intercepts; interval where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior.

• **MULTIPLE REPRESENTATIONS OF FUNCTIONS**

- MGSE9-12.F.IF.9: Analyze functions using different representations Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

Unit 11: Points, Lines, and Angles

• **PARALLEL LINES AND ANGLE RELATIONSHIPS**

- MGSE9-12.G.CO.9: Prove geometric theorems Prove theorems about lines and angles.

• **PERPENDICULAR BISECTOR AND ANGLE BISECTOR THEOREMS**

- MGSE9-12.G.CO.9: Prove geometric theorems Prove theorems about lines and angles.

Unit 12: Coordinate Geometry

• **CONJECTURES IN COORDINATE GEOMETRY**

- MGSE9-12.G.CO.10: Prove geometric theorems Prove theorems about triangles.
- MGSE9-12.G.GPE.4: Use coordinates to prove simple geometric theorems algebraically Use coordinates to prove simple geometric theorems algebraically.

• **TRANSFORMATIONS ON THE COORDINATE PLANE**

- MGSE9-12.G.SRT.1a: Understand similarity in terms of similarity transformations Verify experimentally the properties of dilations given by a center and a scale factor. The dilation of a line not passing through the center of the dilation results in a parallel line and leaves a line passing through the center unchanged.
- MGSE9-12.G.SRT.1b: Understand similarity in terms of similarity transformations Verify experimentally the properties of dilations given by a center and a scale factor. The dilation of a line segment is longer or shorter according to the ratio given by the scale factor.

• **DILATIONS, TRANSLATIONS, ROTATIONS, AND REFLECTIONS**

- MGSE9-12.G.SRT.1a: Understand similarity in terms of similarity transformations Verify experimentally the properties of dilations given by a center and a scale factor. The dilation of a line not passing through the center of the dilation results in a parallel line and leaves a line passing through the center unchanged.
- MGSE9-12.G.SRT.1b: Understand similarity in terms of similarity transformations Verify experimentally the properties of dilations given by a center and a scale factor. The dilation of a line segment is longer or shorter according to the ratio given by the scale factor.

Unit 13: Triangles and Transformations

• TRIANGLES AND CONGRUENCE TRANSFORMATIONS

- MGSE9-12.G.CO.6: Understand congruence in terms of rigid motions 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.
- MGSE9-12.G.CO.7: Understand congruence in terms of rigid motions 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.
- MGSE9-12.G.SRT.5: Prove theorems involving similarity Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
- MGSE9-12.G.CO.8: Understand congruence in terms of rigid motions Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

• TRIANGLES AND SIMILARITY TRANSFORMATIONS

- MGSE9-12.G.SRT.2: Understand similarity in terms of similarity transformations Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain, using similarity transformations, the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.
- MGSE9-12.G.SRT.3: Understand similarity in terms of similarity transformations Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.
- MGSE9-12.G.SRT.5: Prove theorems involving similarity Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
- MGSE9-12.G.CO.10: Prove geometric theorems Prove theorems about triangles.
- MGSE9-12.G.SRT.4: Prove theorems involving similarity Prove theorems about triangles.

Unit 14: Congruence and Similarity of Other Polygons

• CONGRUENCE OF OTHER POLYGONS

- MGSE9-12.G.CO.6: Understand congruence in terms of rigid motions 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.
- **SIMILARITY OF OTHER POLYGONS**
- MGSE9-12.G.SRT.2: Understand similarity in terms of similarity transformations Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain, using similarity transformations, the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

Unit 15: Triangles

- **TRIANGLE ANGLE THEOREMS**
- MGSE9-12.G.CO.10: Prove geometric theorems Prove theorems about triangles.
- **MEDIANS AND ALTITUDES OF TRIANGLES**
- MGSE9-12.G.CO.10: Prove geometric theorems Prove theorems about triangles.

Unit 16: Triangle Bisectors and Constructions

- **TRIANGLE BISECTORS**
- MGSE9-12.G.SRT.5: Prove theorems involving similarity Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
- MGSE9-12.G.SRT.4: Prove theorems involving similarity Prove theorems about triangles.
- MGSE9-12.G.C.3: Understand and apply theorems about circles Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
- **CONSTRUCTIONS**
- MGSE9-12.G.CO.12: Make geometric constructions Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).
- MGSE9-12.G.CO.13: Make geometric constructions Construct an equilateral triangle, a square, and a regular hexagon, each inscribed in a circle.
- MGSE9-12.G.C.4: Understand and apply theorems about circles Construct a tangent line from a point outside a given circle to the circle.

Unit 17: Quadrilaterals

- **PARALLELOGRAMS AND RECTANGLES**
- MGSE9-12.G.CO.11: Prove geometric theorems Prove theorems about parallelograms.
- **SQUARES AND RHOMBI**
- MGSE9-12.G.CO.11: Prove geometric theorems Prove theorems about parallelograms.

Unit 18: Pythagorean Theorem

• PYTHAGOREAN THEOREM

- MGSE9-12.G.SRT.8: Define trigonometric ratios and solve problems involving right triangles Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
- MGSE9-12.G.CO.10: Prove geometric theorems Prove theorems about triangles.
- MGSE9-12.G.SRT.4: Prove theorems involving similarity Prove theorems about triangles.

Unit 19: Triangles and Trigonometry

• TRIGONOMETRIC RATIOS

- MGSE9-12.G.SRT.7: Define trigonometric ratios and solve problems involving right triangles Explain and use the relationship between the sine and cosine of complementary angles.
- MGSE9-12.G.SRT.6: Define trigonometric ratios and solve problems involving right triangles Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
- MGSE9-12.G.SRT.8: Define trigonometric ratios and solve problems involving right triangles Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

• LAWS OF SINE AND COSINE

- MGSE9-12.G.SRT.8: Define trigonometric ratios and solve problems involving right triangles Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

Unit 20: Radians and the Unit Circle

• RADIANS AND THE UNIT CIRCLE

- MGSE9-12.G.C.5: Find arc lengths and areas of sectors of circles Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.
- MGSE9-12.G.SRT.8: Define trigonometric ratios and solve problems involving right triangles Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

Unit 21: Circles and Congruent Circles

• CIRCLE BASICS

- MGSE9-12.G.C.2: Understand and apply theorems about circles Identify and describe relationships among inscribed angles, radii, chords, tangents, and secants. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.

- **CONGRUENT AND SIMILAR CIRCLES**

- MGSE9-12.G.C.1: Understand and apply theorems about circles Understand that all circles are similar.

- **CIRCLES**

- MGSE9-12.G.GPE.1: Translate between the geometric description and the equation for a conic section Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

Unit 22: Circles and Angles

- **CENTRAL ANGLES, INSCRIBED ANGLES, AND CHORDS**

- MGSE9-12.G.C.2: Understand and apply theorems about circles Identify and describe relationships among inscribed angles, radii, chords, tangents, and secants. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.
- MGSE9-12.G.C.3: Understand and apply theorems about circles Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
- MGSE9-12.G.CO.9: Prove geometric theorems Prove theorems about lines and angles.

- **SECANTS, ANGLES, AND INTERCEPTED ARCS**

- MGSE9-12.G.CO.9: Prove geometric theorems Prove theorems about lines and angles.
- MGSE9-12.G.C.3: Understand and apply theorems about circles Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
- MGSE9-12.G.C.2: Understand and apply theorems about circles Identify and describe relationships among inscribed angles, radii, chords, tangents, and secants. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.

- **TANGENTS, ANGLES, AND INTERCEPTED ARCS**

- MGSE9-12.G.CO.9: Prove geometric theorems Prove theorems about lines and angles.
- MGSE9-12.G.C.3: Understand and apply theorems about circles Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.
- MGSE9-12.G.C.2: Understand and apply theorems about circles Identify and describe relationships among inscribed angles, radii, chords, tangents, and secants. Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a

diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.

Unit 23: Circumference and Arc Length

• CIRCUMFERENCE AND ARC LENGTH

- MGSE9-12.G.GMD.1a: Explain volume formulas and use them to solve problems Give informal arguments for geometric formulas. Give informal arguments for the formulas of the circumference of a circle and area of a circle using dissection arguments and informal limit arguments.
- MGSE9-12.G.GMD.1b: Explain volume formulas and use them to solve problems Give informal arguments for geometric formulas. Give informal arguments for the formula of the volume of a cylinder, pyramid, and cone using Cavalieris principle.
- MGSE9-12.G.GMD.1b: Explain volume formulas and use them to solve problems Give informal arguments for geometric formulas. Give informal arguments for the formula of the volume of a cylinder, pyramid, and cone using Cavalieris principle.
- MGSE9-12.G.GMD.1b: Explain volume formulas and use them to solve problems Give informal arguments for geometric formulas. Give informal arguments for the formula of the volume of a cylinder, pyramid, and cone using Cavalieris principle.

Unit 24: Area of Circles and Sectors

• AREA OF CIRCLES AND SECTORS

- MGSE9-12.G.GMD.1a: Explain volume formulas and use them to solve problems Give informal arguments for geometric formulas. Give informal arguments for the formulas of the circumference of a circle and area of a circle using dissection arguments and informal limit arguments.
- MGSE9-12.G.GMD.1b: Explain volume formulas and use them to solve problems Give informal arguments for geometric formulas. Give informal arguments for the formula of the volume of a cylinder, pyramid, and cone using Cavalieris principle.
- MGSE9-12.G.C.5: Find arc lengths and areas of sectors of circles Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.
- MGSE9-12.G.GMD.1b: Explain volume formulas and use them to solve problems Give informal arguments for geometric formulas. Give informal arguments for the formula of the volume of a cylinder, pyramid, and cone using Cavalieris principle.
- MGSE9-12.G.GMD.1b: Explain volume formulas and use them to solve problems Give informal arguments for geometric formulas. Give informal arguments for the formula of the volume of a cylinder, pyramid, and cone using Cavalieris principle.

Unit 25: Surface Area

• SURFACE AREA AND VOLUME OF SPHERES

- MGSE9-12.G.GMD.2: Explain volume formulas and use them to solve problems Give an informal argument using Cavalieris principle for the formulas for the volume of a sphere and other solid figures.
- MGSE9-12.G.GMD.3: Explain volume formulas and use them to solve problems Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
- MGSE9-12.G.GMD.4: Visualize relationships between two-dimensional and three-dimensional objects Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.
- **SURFACE AREA OF COMPOSITE SOLIDS**
 - MGSE9-12.G.MG.1: Apply geometric concepts in modeling situations Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).
- **SURFACE AREA OF SIMILAR SOLIDS**
 - MGSE9-12.G.MG.1: Apply geometric concepts in modeling situations Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).

Unit 26: Volume 1

- **RELATING TWO-DIMENSIONAL FIGURES TO THREE-DIMENSIONAL SOLIDS**
 - MGSE9-12.G.GMD.4: Visualize relationships between two-dimensional and three-dimensional objects Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.
- **VOLUME OF PRISMS AND PYRAMIDS**
 - MGSE9-12.G.GMD.3: Explain volume formulas and use them to solve problems Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
 - MGSE9-12.G.GMD.4: Visualize relationships between two-dimensional and three-dimensional objects Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.
 - MGSE9-12.G.GMD.1a: Explain volume formulas and use them to solve problems Give informal arguments for geometric formulas. Give informal arguments for the formulas of the circumference of a circle and area of a circle using dissection arguments and informal limit arguments.
 - MGSE9-12.G.GMD.1b: Explain volume formulas and use them to solve problems Give informal arguments for geometric formulas. Give informal arguments for the formula of the volume of a cylinder, pyramid, and cone using Cavalieris principle.

Unit 27: Volume 2

- **VOLUME OF CYLINDERS AND CONES**

- MGSE9-12.G.GMD.3: Explain volume formulas and use them to solve problems Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
- MGSE9-12.G.GMD.4: Visualize relationships between two-dimensional and three-dimensional objects Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.
- MGSE9-12.G.GMD.1a: Explain volume formulas and use them to solve problems Give informal arguments for geometric formulas. Give informal arguments for the formulas of the circumference of a circle and area of a circle using dissection arguments and informal limit arguments.
- MGSE9-12.G.GMD.1b: Explain volume formulas and use them to solve problems Give informal arguments for geometric formulas. Give informal arguments for the formula of the volume of a cylinder, pyramid, and cone using Cavalieris principle.
- **MODELING SITUATIONS WITH GEOMETRY**
 - MGSE9-12.G.MG.2: Apply geometric concepts in modeling situations Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).
 - MGSE9-12.G.MG.3: Apply geometric concepts in modeling situations Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

Unit 28: Volume of Similar and Composite Shapes

- **VOLUME OF COMPOSITE SOLIDS**
 - MGSE9-12.G.GMD.3: Explain volume formulas and use them to solve problems Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
- **VOLUME OF SIMILAR SOLIDS**
 - MGSE9-12.G.MG.1: Apply geometric concepts in modeling situations Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).

Unit 29: Statistics and Probability

- **SCATTERPLOTS AND MODELING**
 - MGSE9-12.S.ID.6a: Summarize, represent, and interpret data on two categorical and quantitative variables Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. Decide which type of function is most appropriate by observing graphed data, charted data, or by analysis of context to generate a viable (rough) function of best fit. Use this function to solve problems in context. Emphasize quadratic models.
- **INTRODUCTION TO PROBABILITY**

- MGSE9-12.S.CP.2: Understand independence and conditional probability and use them to interpret data Understand that if two events and are independent, the probability of and occurring together is the product of their probabilities, and that if the probability of two events and occurring together is the product of their probabilities, the two events are independent.
 - MGSE9-12.S.CP.1: Understand independence and conditional probability and use them to interpret data Describe categories of events as subsets of a sample space using unions, intersections, or complements of other events (or, and, not).
 - MGSE9-12.S.CP.7: Use the rules of probability to compute probabilities of compound events in a uniform probability model Apply the Addition Rule, $() = () + () ()$, and interpret the answers in context.
- **CONDITIONAL PROBABILITY**
 - MGSE9-12.S.CP.6: Use the rules of probability to compute probabilities of compound events in a uniform probability model Find the conditional probability of given as the fraction of s outcomes that also belong to , and interpret the answer in context.
 - MGSE9-12.S.CP.3: Understand independence and conditional probability and use them to interpret data Understand the conditional probability of given as $()/()$. Interpret independence of and in terms of conditional probability; that is, the conditional probability of given is the same as the probability of , and the conditional probability of given is the same as the probability of .
 - MGSE9-12.S.CP.4: Understand independence and conditional probability and use them to interpret data Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities.
 - MGSE9-12.S.CP.5: Understand independence and conditional probability and use them to interpret data Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations.
 - **GEOMETRIC PROBABILITIES**
 - MGSE9-12.S.CP.1: Understand independence and conditional probability and use them to interpret data Describe categories of events as subsets of a sample space using unions, intersections, or complements of other events (or, and, not).
 - MGSE9-12.S.CP.7: Use the rules of probability to compute probabilities of compound events in a uniform probability model Apply the Addition Rule, $() = () + () ()$, and interpret the answers in context.
 - MGSE9-12.S.CP.7: Use the rules of probability to compute probabilities of compound events in a uniform probability model Apply the Addition Rule, $() = () + () ()$, and interpret the answers in context.

Unit 30: Test-Taking Strategies

- **STUDY HABITS**

-
- **BEING PREPARED AND GETTING STARTED**
 - **WORDING IN TEST QUESTIONS**
 - **WORDING IN ANSWER CHOICES**
 - **QUESTIONS WITH PASSAGES AND VISUAL DATA**
 - **ESSAY AND SHORT ANSWER QUESTIONS**
 - **WORD PROBLEMS**
-