Unit	Standards	Enduring Understandings & Essential Questions	Learning Targets
Opening Unit (Important 8th Grade CCSS relating to Geometry)	See 8th grade CCSS	Review 8th grade concepts.	*I can define the basic geometric terms. *I can idendtify different geometric figures. *I can use Pythagorean Theorem to find the length of the third side of a right triangle. *I can determine if pairs of angles are complementary or supplementary. *I can use parallel lines to determine congruent relationships.
Quadrilaterals & Deductive Reasoning	G.CO.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc. G.CO.11 Prove theorems about parallelograms. Theorems include: opposite sides are congruent,opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.	*Provide students with an opportunity to use their prior knowledge of the coordinate plane and quadrilaterals too begin to make conjectures. *Provide students with an opportunity to explore inductive and deductive reasoning, conditional statements (ie. statement, converse and bi-	*I can recognize and use properties of quadrilaterals * I can construct quadrilaterals using a variety of tools * I can differentiate between inductive and deductive reasoning

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	G.CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.	conditional), definitions as bi-conditional statements, transitivity of conditional statements (direct proof), and the deductive system. *Provide students with an opportunity to explore proof on a coordinate system.	* I can write conditional statements including the converse and bi-conditional * I understand a definition as a bi-conditional statement * I can prove properties of quadrilaterals on a coordinate system
	G.GPE.4 Use coordinates to prove simple geometric theorems algebraically. For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).		
	G.GPE.5 Prove the slope criteria for parallel and perpendicular lines and uses them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).		
	G.GPE7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.		
Transformations	G.CO.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).	*Provide students with an opportunity to explore composites of reflections over two parallel lines and connecting the image to translations. Students further explore the slide of the translation, Pythagorean Theorem, and distance between two points on a coordinate plane. *Provide students with an	* I understand and use the relationship between the Pythagorean Theorem and the Distance Formula. * I can recognize and give properties of reflections, rotations, translations, glide reflections and dilation.
	G.CO.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.		

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	G.CO.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.	opportunity to explore composites of reflections over two intersecting lines and connecting the image to rotations. *Provide students with an opportunity to explore dilations using and connecting the images to similarity. *Provide students an opportunity to prove triangles similar using SSS, SAS, and AA. *Provide students with an opportunity to discover the trigonometric ratios using dilations. *Provide students with an opportunity to solve problems using trigonometric ratios and right triangles.	* I can find the image of a figure using reflections, rotations, translations, glide reflections and dilation. * I can find the image of a figure under composition of isometries. * I can find the image of figure under given dilation and recognize the similarity of the figures. * I can identify the center and magnitude under a given dilation. * I can prove triangles similar by SSS, SAS and AA. * I can use the sine and cosine to find coordinates on the unit circle. * I can recognize right triangle trigonometric ratios as a dilation of the unit circle. * I can use trigonometric ratios to solve problems in context.
	G.CO.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.		
	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.		
	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.		
	G.CO.8 Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.		
	G.CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.		
	G.SRT.1a A 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. G.SRT.1b The dilation of a line segment is longer or shorter in the ratio given by the scale factor.		

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	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 the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.		
	G.SRT.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.		
	G.SRT.4 Prove theorems about triangles. Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.		
	G.SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.		
	G.SRT.6 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.		
	G.SRT.7 Explain and use the relationship between the sine and cosine of complementary angles.		
	G.SRT.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.		
Polygons and Circles	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.	*Provide students with an opportunity to explore triangle congruence, decide on valid conjectures, and use congruent triangles in proofs.	* I can identify and use perpendicular bisectors, altitudes, medians, and angles bisectors in triangles.

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	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.	*Provide students with an opportunity to explore relationships in triangles: perpendicular bisectors, altitudes, medians, and angle bisectors. *Provide students with an opportunity to explore perimeter and area of regular and irregular polygons. Make connections to previous work on bases and related altitudes. Develop multiple area formulas, including area of triangle = ½absinC. * Provide students an opportunity to develop formulas for the interior and exterior angles of regular polygons and the sums of interior and exterior angles. *Provide students with an opportunity to investigate properties of circles and relationships within a circle. Solve problems using circumference and area of circles.	* I can identify bases and their corresponding altitudes in triangles and parallelograms. * I can calculate perimeter and area of regular and irregular polygons. * I can calculate circumference and area of circles. * I can solve problems using Law of Sines and/or using Law of Cosines. * I can use formulas to calculate the measures of the interior and exterior angles of regular polygons and their sums. * I can test for triangle congruence using SSS, SAS, ASA, AAS, and HL.
	G.CO.8 Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.		
	G.CO.9 Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.		
	G.CO.10 Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.		
	G.CO.12. Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.		
	G.CO.13 Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.		
	G.C.1 Prove that all circles are similar.		

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	G.C.2 Identify and describe relationships among inscribed angles, radii, and chords. 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.		
	G.C.3 Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.		
	G.C.5 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.		
	G.SRT.9 Derive the formula A = 1/2 ab sin(C) for the area of a triangle by drawing an auxiliary line from a vertex perpendicular to the opposite side.		
	G.SRT.10 Prove the Laws of Sines and Cosines and use them to solve problems.		
	G.SRT.11. Understand and apply the Law of Sines and the Law of Cosines to find unknown measurements in right and non-right triangles (e.g., surveying problems, resultant forces).		
	G.GPE.1 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.		
	G.GMD.1 Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.		

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	G.MG.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).*		
	G.MG.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).*		
	G.MG.3 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).*		
Three-Dimensional Shapes	G.GMD.1 Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. Use dissection arguments, Cavalieri's principle, and informal limit arguments.	*Provide students with an opportunity to explore irregular three-dimensional shapes by subdividing into known three-dimensional shapes in order to calculate the volume. *Provide students with an opportunity to explore volume and surface area of prisms and pyramids using nets. Include cross-sections and two-dimensional views. *Provide students with an opportunity to explore volume and surface area of cylinders and cones and relating them to prisms and pyramids. Include cross-sections and two-dimensional views. *Provide students an opportunity to	* I can explore relationships among classes of three-dimensional geometric objects, makes and test conjectures about them, and solve problems involving them. * I can solve multistep problems involving surface area and volume. * I can draw two-dimensional models for three-dimensional figures. * I can establish the validity of geometric conjectures using deduction and critique arguments made by
	G.GMD.3 Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.		
	G.GMD.4 Identify the shapes of two-dimensional cross-sections of three dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.		
	G.MG.1 Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).*		
	G.MG.2 Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).*		

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	G.MG.3 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).*	explore surface area and volume of spheres.	others.
Probability and Statistics	S.CP.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").	* Understand independence and conditional probability and use them to interpret data. *Use the rules of probability to compute probabilities of compound events in a uniform probability model.	*I can identify unions, intersections and complements of sets. *I can apply the addition rule. *I can construct and interpret two way frequency tables of data.
	S.CP.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.		
	S.CP.3 Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B.		
	S.CP.4 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. For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.		

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	S.CP.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.		
	S.CP.6 Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model.		
	S.CP.7 Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.		