

Geometry: Pre-Algebra

Stage 1 Desired Results		
ESTABLISHED GOALS: <i>Competencies:</i> - Students will demonstrate the ability to reason with definitions, theorems, and algebraic models to create conjectures and prove statements about two- and three- dimensional figures. - Students will demonstrate the ability to model with geometric formulas in order to solve problems involving two- and three- dimensional objects. - Students will demonstrate the ability to reason with the definitions and theorems of geometry in order to create conjectures and prove statements about congruence and similarity. - Students will demonstrate the ability to model real world problems by building and analyzing the appropriate expression, equation, or function. - Students will demonstrate the ability to analyze and summarize text and integrate knowledge to make meaning of discipline-specific materials. - Students will demonstrate the ability to produce coherent and supported writing in order to communicate effectively for a range of discipline-specific tasks, purposes, and audiences. - Students will demonstrate the ability to speak purposefully and effectively by strategically making decisions about content, language use, and discourse style. <u>Content Standards:</u> 7.G.A.2 - Draw (freehand, with ruler and protractor, and with technology) geometric shapes with given conditions. Focus on constructing triangles from three measures of angles or sides, noticing when the conditions determine a unique triangle, more than one triangle, or no triangle. 7.G.A.3 - Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids. 7.G.B.4 - Know the formulas for the area and circumference of a circle and use them to solve problems; give an informal derivation of the relationship between the circumference and area of a circle. 7.G.B.5 - Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure. 7.G.B.6 - Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. 8.G.A.1.A - Lines are taken to lines, and line segments to line segments of the same length. 8.G.A.1.B - Angles are taken to angles of the same measure. 8.G.A.1.C - Parallel lines are taken to parallel lines. 8.G.A. 2 - Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent	Transfer Students will be able to independently use their learning to reason with geometric principles to effectively and efficiently use resources as well as utilize spatial reasoning to manipulate and create objects and drawings.	
	Meaning ENDURING UNDERSTANDINGS: Students will understand that... - in order to justify a conclusion, evidence and reasoning must be provided. - purposeful manipulation can be used to meet the needs of a situation. - algebraic formulas can be used to solve for unknown values in two- or three- dimensional figures. - scale drawings can be used to create workable models. ESSENTIAL QUESTIONS - When dealing with a set of parameters, how would you determine if a unique solution is possible? - What consequences can result from manipulation?	
	Acquisition Students will know... - that theorems and properties can be used to describe angles, polygons, and three-dimensional figures. - that angle relationships are formed when parallel lines are cut by a transversal. - Volume of a cone: $V = \frac{1}{3}\pi r^2 h$ - Volume of a cylinder: $V = \pi r^2 h$ - Volume of a sphere: $V = \frac{4}{3}\pi r^3$ - that performing rotations, reflections, and translations on a geometric figure result in images congruent to the pre-images. - that dilations result in an image similar to the pre-image. - what effect a transformation has on a geometric figure. - how rigid transformations and dilations are the same and different. - that proportional reasoning can be used to solve problems related to similar and congruent figures. - that the dimensions of a scaled model or a scaled Students will be skilled at... - using proportional reasoning to solve problems that involve maps and scaled drawings. - using freehand, ruler, protractor and technology to draw geometric shapes with given conditions. - constructing triangles from measures of angles or sides. - identifying and describing supplementary, complementary, vertical, and adjacent angles. - using understandings of supplementary, complementary, vertical and adjacent angles to write and solve equations. - using their knowledge of area and circumference of a circle to solve problems. - calculating the area, surface area, and volume of two and three-dimensional figures. - describing the resulting face shape made from cuts that are parallel or perpendicular to the base of right rectangular prisms and pyramids. - using their knowledge of area, surface area and volume to solve problems involving two and three-	

figures, describe a sequence that exhibits the congruence between them. 8.G.A.3 - Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. 8.G.A.4 - Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them. 8.G.A.5 - Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so. 8.G.C.9 - Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning. 7.G.A.1 - Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.	<i>drawing must be proportional to the original.</i> <i>that shapes are defined by their properties.</i> vocabulary: plane sections, inscribed, protractor, pi, Π, Scale, Scale Factor, Scalene, Isosceles, Equilateral, Acute, Right, obtuse, equiangular, isosceles trapezoid, triangle inequality theorem, sum of angles theorem, intersecting lines, parallel, perpendicular, vertex, complement, supplement, vertical, adjacent, radius, diameter, circumference, surface area, cross-sections, right rectangular pyramid, triangular prisms congruent figures, similar figures, corresponding, preimage, image, line of reflection, rigid motion, rotation, center of rotation, transformation, translation, vertex, dilations, scale factor, indirect measure, alternate interior angles, alternate exterior angles, converse, corresponding angles, equiangular, interior angles, remote interior angles, exterior angles, parallel, transversal, deductive reasoning, inductive reasoning, proof, theorem, legs, hypotenuse, diagonal, converse, inverse relationship, perfect squares, square root, distance formula, cone, cylinder, sphere, slant height, composite solids, hemisphere, similar solids, polyhedron, lateral area	<i>dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.</i> <i>utilizing a compass, protractor, and ruler to create transformations of geometric lines and figures.</i> <i>describing the effect of a transformation on a pre-image (original) and image.</i> <i>comparing angles, line segments, and parallel lines of a pre-image and image.</i> <i>identify a transformation from one image to another.</i> <i>using technology (i.e. Gizmo or Geogebra) to construct rigid transformations to prove geometric properties.</i> <i>performing dilations, rotations, reflections, and translations on geometric figures.</i> <i>identifying the scale factor of a dilation.</i> <i>proving similarity between figures in a dilation.</i> <i>writing proportions to model a real world problem.</i> <i>constructing two parallel lines with a transversal to identify alternate interior, exterior, corresponding, vertical, and adjacent angles.</i> <i>measuring missing angles in a transversal.</i> <i>describing the relationships between angles.</i> <i>constructing a proof for a geometric argument.</i> <i>proving that the interior angles of a triangle add up to 180 degrees.</i> <i>using geometric attributes to represent and compare objects.</i> <i>applying appropriate formulas for volumes of cones, cylinders, and spheres to solve real-world and mathematical problems.</i> <i>comparing and contrasting characteristics of cones, cylinders, and spheres and their formulas.</i>
Content Area Literacy Standards - RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. - RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 6-8 texts and topics</i>. - RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually.	21st Century Skills <i>reason effectively</i> <i>use systems thinking</i> <i>solve problems</i> <i>communicate clearly</i> <i>access and evaluate information</i>	

Stage 2 - Evidence	
<i>Evaluative Criteria</i>	<i>Assessment Evidence</i>
	PERFORMANCE TASK(S):
	OTHER EVIDENCE:

Stage 3 – Learning Plan	
Summary of Key Learning Events and Instruction	
<i>Language Arts Integration</i>	<i>Mathematics Integration</i>
1.OA.1 Use	1.OA.1 Use
<i>Technology Integration</i>	<i>District Materials</i>
1.OA.1 Use	