

Geometry: Polygons

Stage 1 Desired Results			
ESTABLISHED GOALS: <i>Competencies:</i> - Students will demonstrate perseverance and strategic thinking by identifying the underlying meaning of a problem, planning a logical solution pathway, working through challenges, and verifying the reasonableness of their answers. - Students will demonstrate resourcefulness by evaluating and selecting the most effective tools to solve mathematical problems and deepen their understanding of concepts. - Students will demonstrate structural awareness by discerning patterns and functional relationships within complex mathematical concepts to simplify and solve problems. - Students will demonstrate the ability to notice repetitive calculations or patterns, evaluate the reasonableness of results, and formulate general methods, formulas, or shortcuts while maintaining oversight of the process. - 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. Content Standards: - G.CO.11 Prove theorems about parallelograms - G.SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. - G.GPE.4 Use coordinates to prove simple geometric theorems algebraically - G.GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles - 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.MG.1 Use geometric shapes, their measures, and their properties to describe objects - MP2 Reason abstractly and quantitatively. - MP3 Construct viable arguments and critique the reasoning of others. - MP5 Use appropriate tools strategically. - MP7 Look for and make use of structure. - MP8 Look for and express regularity in repeated reasoning.	Transfer		
	Students will be able to independently use their learning to make determinations about an object based on how it is categorized.		
	Meaning		
	ENDURING UNDERSTANDINGS Students will understand that... - quadrilaterals inherit their properties from a hierarchy of other quadrilaterals. - the area formulas for a triangle and rectangle can be applied to find the area formulas for all quadrilaterals.	ESSENTIAL QUESTIONS When is it appropriate to make a generalization about a group?	
	Acquisition		
Students will know... - that if a quadrilateral is a parallelogram, then its - opposite sides are congruent. - consecutive angles are supplementary. - opposite angles are congruent. - diagonals bisect each other. - that if both pairs of opposite sides of a quadrilateral are congruent, then the quadrilateral is a parallelogram. - that if an angle of a quadrilateral is supplementary to both of its consecutive angles, then the quadrilateral is a parallelogram. - that if both pairs of opposite angles of a quadrilateral are congruent, then the quadrilateral is a parallelogram. - that if the diagonals of a quadrilateral bisect each other, then the quadrilateral is a parallelogram. - that if one pair of opposite sides of a quadrilateral is both congruent and parallel, then the quadrilateral is a parallelogram. - that if a parallelogram is a rhombus, then - its diagonals are perpendicular. - each diagonal bisects a pair of opposite angles.	Students will be skilled at... - determining angle measures using diagonals. - writing coordinate proofs using slope and distance formulas to prove sides/diagonals congruent/parallel/perpendicular. - writing proofs using properties of polygons and special parallelograms. - applying formulas to find area of parallelograms, triangles, trapezoids, rhombuses, kites, and regular polygons. - using trigonometric ratios to find area of regular polygons and any triangle. - using area and perimeter ratios of similar figures to determine unknown values.		

	• <i>that if a parallelogram is a rectangle, then its diagonals are congruent.</i> • <i>that if the diagonals of a parallelogram are perpendicular, then the parallelogram is a rhombus.</i> • <i>that if one diagonal of a parallelogram bisects a pair of opposite angles, then the parallelogram is a rhombus.</i> • <i>that if the diagonals of a parallelogram are congruent, then the parallelogram is a rectangle.</i> • <i>that if a quadrilateral is a trapezoid, then the</i> - o <i>midsegment is parallel to the bases.</i> - o <i>length of the midsegment is half the sum of the lengths of the bases.</i> • <i>that if a quadrilateral is an isosceles trapezoid, then</i> - o <i>each pair of base angles is congruent.</i> - o <i>its diagonals are congruent.</i> • <i>that if a quadrilateral is a kite, then its diagonals are perpendicular.</i> • <i>the area formulas for rectangles, parallelograms, triangles, trapezoids, rhombuses, kites, and regular polygons.</i> • <i>the ratios for the perimeters and areas of similar figures.</i> • <i>the following theorems:</i> - o <i>Polygon Angle-Sum Theorem and its corollary</i> - o <i>Polygon Exterior Angle-Sum Theorem</i> <i><u>vocabulary:</u> equiangular polygon, equilateral polygon, regular polygon, consecutive angles, rectangle, rhombus, trapezoid, isosceles trapezoid, kite, coordinate proof, apothem</i>	
Content Area Literacy Standards		21st Century Skills
• RST.9-10.3 Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. • RST.9-10.4 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 9-10 texts and topics</i>. • RST.9-10.7 Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.		• <i>reason effectively</i> • <i>make judgements and decisions</i> • <i>solve problems</i> • <i>communicate clearly</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	