

Geometry: Triangles

Stage 1 Desired Results		
ESTABLISHED GOALS: <u>Competencies:</u> - Students will demonstrate the ability to solve problems involving one- two- and three-dimensional objects by applying algebraic models and geometric formulas. - Students will demonstrate the ability to reason with definitions, properties, and theorems of geometry to create conjectures and to prove or analyze statements. - 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> - 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.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.13 Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle. - G.SRT.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures. - G.SRT.7 Explain and use the relationship between the sine and cosine of complementary angles. - 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.8 Use trigonometric ratios and the Pythagorean Theorem to	Transfer	
	Students will be able to independently use their learning to identify the relevant information required to draw a valid conclusion.	
	Meaning	
	ENDURING UNDERSTANDINGS Students will understand that... - triangles are the basic building blocks of polygons. - relationships between the components of triangles can be used to determine the measures of other components.	ESSENTIAL QUESTIONS How do you know when you have enough relevant information?
	Acquisition	
	Students will know... - that if a line bisects the vertex angle of an isosceles triangle, then the line is also the perpendicular bisector of the base. - that if two sides of a triangle are not congruent, then the larger angle lies opposite the longer side. - that if two angles of a triangle are not congruent, then the longer side lies opposite the larger angle. - that if the square of the length of the longest side of a triangle is greater (less) than the sum of the squares of the lengths of the other two sides, then the triangle is obtuse (acute). - that corresponding parts of congruent triangles are congruent. (CPCTC) - the following theorems, postulates, ratios, and properties: - Third Angles Theorem - Triangle Congruence Postulates/Theorem 45-45-90 Triangle Theorem 30-60-90 Triangle Theorem - Trigonometric ratios - Hypotenuse-Leg (HL) Theorem - Triangle Midsegment Theorem - Perpendicular Bisector Theorem and its converse - Angle Bisector Theorem and its converse - Concurrency Theorems	Students will be skilled at... - labeling diagrams. - applying properties of a triangle midsegment, perpendicular bisector, and angle bisector. - proving triangles congruent using SSS, SAS, ASA, AAS, and HL congruence theorems/postulates. - creating points of concurrency along with inscribed and circumscribed circles. - applying the properties of the points and lines of concurrency. - proving conclusions using indirect reasoning and proof. - applying the inequality properties of an individual triangle. - applying the inequality properties of two triangles. - using Pythagorean Theorem to solve for the missing side of a triangle. - classifying triangles as acute, obtuse, or right using the Pythagorean Theorem and its converse. - applying the properties of special right triangles to find missing side lengths. - identifying the relationships and properties

solve right triangles in applied problems. • MP2 Reason abstractly and quantitatively. • MP3 Construct viable arguments and critique the reasoning of others. • MP4 Model with mathematics. • MP7 Look for and make use of structure. • MP8 Look for and express regularity in repeated reasoning.	○ <i>Isosceles Triangle Theorem, its converse, and its corollaries</i> ○ <i>Comparison Property of Inequality</i> ○ <i>Corollary to Triangle Exterior Angle Theorem</i> ○ <i>Triangle Inequality Theorem</i> ○ <i>The Hinge Theorem (SAS Inequality Theorem) and its converse (SSS Inequality)</i> ○ <i>Pythagorean Theorem and its converse</i> <u>vocabulary:</u> congruent figures, congruent triangles, corollary, triangle, midsegment, concurrent, points of concurrency, circumcenter, circumscribed about, incenter, inscribed in, median, centroid, altitude, orthocenter, Pythagorean triple, sine, cosine, tangent, angle of elevation, angle of depression, corresponding parts	within overlapping triangles. • <i>applying trigonometric properties to find missing angle and side measures of right triangles.</i> • <i>applying coordinate geometry to find relationships within triangles.</i>
Content Area Literacy Standards		21st Century Skills
• RST.9-10.1 Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions. • 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>use systems thinking</i> • <i>access and evaluate information</i> • <i>use and manage information</i> • <i>think creatively</i>

Stage 2 - Evidence	
Evaluative Criteria	Assessment Evidence
	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	