

UbD: Geometry - Similarity

Time Frame: 16 Lessons	Unit 3: Similarity	Course Name: Geometry
Stage 1: Desired Results		
Established Goal(s)	Transferable Skills	
<p>Standards Addressed:</p> <p>HSA-CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law $V = IR$ to highlight resistance R.</p> <p>HSG-C.A.1 Prove that all circles are similar.</p> <p>HSG-CO.A.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).</p> <p>HSG-CO.C.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.</p> <p>HSG-MG.A.3 Apply geometric methods to solve design problems</p>	<p><i>Students will be able to independently use their learning to...</i></p> <ul style="list-style-type: none"> ● understand similarity in terms of similarity transformations ● prove theorems involving similarity ● apply mathematical knowledge, skill, and reasoning to solve real-world problems. ● develop clear and effective communication. ● increase self-direction. ● develop creative and practical problem-solving. ● develop informed and integrative thinking. 	
Meaning		
<p>Understandings <i>Students will understand that..</i></p> <ul style="list-style-type: none"> ● transformations can be used to understand similarity. ● they can prove theorems involving similarity. ● math is a continuum, Algebra is needed for Geometry, and math concepts will build on themselves as we develop our mathematical understandings. 	<p>Essential Questions</p> <ul style="list-style-type: none"> ● How are similar triangles used in solving problems in everyday life? ● What mathematical tools do I have to solve right triangles? 	

UbD: Geometry - Similarity

Acquisition	
<p>HSG-SRT.A.1 Verify experimentally the properties of dilations given by a center and a scale factor: a. 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. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.</p> <p>HSG-SRT.A.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.</p> <p>HSG-SRT.A.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.</p> <p>HSG-SRT.B.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.</p> <p>HSG-SRT.B.5 Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.</p> <p>HSG-SRT.A.1 Verify experimentally the properties of dilations given by a center and a scale factor: a. A dilation takes a line not passing through the</p>	<p><i>Students will know...</i></p> <ul style="list-style-type: none"> ● how to dilate a figure given a scale factor and center. ● how to calculate the lengths of parts of a scaled drawing. ● that when figures are dilated by a scale factor of k, all lengths in the figure are multiplied by k. ● how to explain what happens to lines and angles in a dilation. ● how to explain why the segment connecting the midpoints of two sides of a triangle is parallel to the third side and half the length of the third side. ● how to write similarity statements. I know the definition of similarity. ● the relationships between corresponding sides and angles in similar triangles. ● how to critique proofs that use similarity. I can write proofs using the definition of similarity. ● how to explain why the Angle-Angle Triangle Similarity Theorem works. ● how to explain why the Side-Angle-Side and Side-Side-Side Triangle Similarity Theorems work. ● how to explain why a segment parallel to one side of a triangle divides the other sides proportionally. ● how to find scale factors and use them to solve problems. ● how to find similar triangles formed by the altitude to the hypotenuse in a right triangle. ● how to prove the Pythagorean Theorem. ● how to solve problems involving similar right triangles. <p><i>Students will be able to...</i></p> <ul style="list-style-type: none"> ● create scale drawings ● measure dilations ● dilate lines and angles ● split triangle sides with dilation in multiple ways ● connect similarity and transformations ● reason about the similarity with transformations ● determine if figures are similar ● know the conditions for triangle similarity ● practice with proportional relationships ● use the Pythagorean Theorem and similarity to solve problems. ● prove the Pythagorean Theorem in several ways ● find all the unknown values in triangles ● define and use geometry-specific vocabulary words that were introduced in this unit. <p>Mathematical Practices:</p> <ul style="list-style-type: none"> ● make sense of problems and persevere in solving them. ● reason abstractly and quantitatively. ● construct viable arguments and critique the reasoning of others. ● model with mathematics. ● use appropriate tools strategically. ● attend to precision. ● look for and make use of structure. ● look for and express regularity in repeated reasoning.

UbD: Geometry - Similarity

center of the dilation to a parallel line, and leaves a line passing through the center unchanged. b. The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

HSG-SRT.A.3 Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

- how to solve and interpret problems involving similar right triangles.
- how to define and correctly use the glossary terms: scale factor, similar and altitude.