

# UbD: Geometry - Right Triangle Trigonometry

Time Frame: 11 Lessons	Unit 4: Right Triangle Trigonometry	Course Name: Geometry
<b>Stage 1: Desired Results</b>		
<b>Established Goal(s)</b>	<b>Transferable Skills</b>	
<p><b>Standards Addressed:</b></p> <p><b>HSG-GMD.A.1</b> 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.</p> <p><b>HSG-MG.A.3</b> Apply geometric methods to solve design problems</p> <p><b>HSG-SRT.B.5</b> Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.</p> <p><b>HSG-SRT.C.6</b> 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.</p> <p><b>HSG-SRT.C.7</b> Explain and use the relationship between the sine and cosine of complementary angles.</p> <p><b>HSG-SRT.C.8</b> Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.</p> <p><b>HSN-Q.A.2</b> Define appropriate quantities for the purpose of descriptive modeling.</p> <p><b>HSN-Q.A.3</b> Choose a level of accuracy appropriate to limitations on</p>	<p><i>Students will be able to independently use their learning to...</i></p> <ul style="list-style-type: none"> <li>● <b>define trigonometric ratios and solve problems involving right triangles.</b></li> <li>● <b>apply trigonometry to general triangles.</b></li> <li>● <b>apply mathematical knowledge, skill, and reasoning to solve real-world problems.</b></li> <li>● develop clear and effective communication.</li> <li>● increase self-direction.</li> <li>● develop creative and practical problem-solving.</li> <li>● develop informed and integrative thinking..</li> </ul>	
	<b>Meaning</b>	
	<p><b>Understandings</b></p> <p><i>Students will understand that...</i></p> <ul style="list-style-type: none"> <li>● <i>they can define trigonometric ratios and solve problems involving right triangles.</i></li> <li>● <i>they can apply trigonometry to general triangles.</i></li> <li>● math is a continuum, Algebra is needed for Geometry, and math concepts will build on themselves as we develop our mathematical understandings.</li> </ul>	<p><b>Essential Questions</b></p> <ul style="list-style-type: none"> <li>● How can we use trigonometry to solve real-world problems involving right triangles?</li> <li>● How might trigonometry be used in land surveying or navigation?</li> </ul>
<b>Acquisition</b>		

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measurement when reporting quantities.

*Students will know..*

- that one acute angle in a right triangle determines the ratio of the side lengths.
- how to find the side lengths of triangles with 45 45 and 90° angles.
- how to find the side lengths of triangles with 30 60 and 90° angles.
- how to build a ratio of side lengths of right triangles.
- how to use table ratios of sidelines of right triangles to estimate unknown side lengths.
- how to use cosine sine and tangent to find side lengths of right triangles.
- how to use cosine sine and tangent to find the height of an object.
- how to explain why  $\sin(A)=\cos(90-A)$
- how to use arc cosine arc sign and arc tangent to find measures in right triangles.
- how to use trigonometry to solve problems
- how to define and correctly use the glossary terms: complementary, cosine, sine, tangent, trigonometric ratio, arccosine, arcsine, and arctangent.

*Students will be able to..*

- use angles to determine steepness.
- relate 45°, 45°, and 90° triangles to half a square.
- relate half of an equilateral triangle to a 30°, 60°, and 90° triangle.
- work with ratios in right triangles.
- work with trigonometric ratios.
- apply ratios and right triangles.
- relate sine and cosine in the same right triangle
- use trigonometric ratios to find angles.
- solve problems with trigonometry.
- use trigonometry to approximate pi.
- define and use geometry-specific vocabulary words that were introduced in this unit.

Mathematical Practices:

- 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.