

## Unit E - Applications of Trigonometric Functions

### Overview

This unit will cover solving right and oblique triangles using Trigonometry. Right triangles will be solved using right triangle trigonometry and oblique triangles will be solved using the Law of Sines or the Law of Cosines. Students will apply these concepts to “real world” problems. Area will also be covered in this unit.

**21<sup>st</sup> Century Capacities:** Analyzing, Synthesizing

### Stage 1 - Desired Results

<p><b>ESTABLISHED GOALS/ STANDARDS</b></p> <p><b>MP 1</b> Make sense sense of problems and persevere in solving them  <b>MP2</b> Reason abstractly and quantitatively  <b>MP3</b> Construct viable arguments and critique the reasoning of others  <b>MP4</b> Model with Mathematics  <b>MP5</b> Use appropriate tools strategically  <b>MP6</b> Attend to precision</p> <p>CCSS.MATH.CONTENT.HSN.Q.A.1                  Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.</p> <p>CCSS.MATH.CONTENT.HSN.Q.A.2                  Define appropriate quantities for the purpose of descriptive modeling.</p>	<p style="text-align: center;"><b>Transfer:</b></p> <p><i>Students will be able to independently use their learning in new situations to...</i></p> <ol style="list-style-type: none"> <li>1. Draw conclusions about graphs, shapes, equations, or objects. (Analyze)</li> <li>2. Demonstrate fluency with math facts, computation and concepts.</li> <li>3. Make sense of a problem, initiate a plan, execute it, and evaluate the reasonableness of the solution. (Analyze)</li> <li>4. Apply familiar mathematical concepts to a new problem or apply a new concept to rework a familiar problem. (Synthesize)</li> </ol> <p style="text-align: center;"><b>Meaning:</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 50%; vertical-align: top; padding: 5px;"> <p><b>UNDERSTANDINGS:</b> <i>Students will understand that:</i></p> <ol style="list-style-type: none"> <li>1. Mathematicians identify relevant tools, strategies, relationships, and/or information in order to draw conclusions.</li> <li>2. Mathematicians create dependable arguments by calculating efficiently and accurately.</li> <li>3. Mathematicians apply the mathematics they know to solve problems occurring in everyday life.</li> </ol> </td> <td style="width: 50%; vertical-align: top; padding: 5px;"> <p><b>ESSENTIAL QUESTIONS:</b> <i>Students will explore &amp; address these recurring questions:</i></p> <ol style="list-style-type: none"> <li>A. Does this solution make sense?</li> <li>B. How can I break a problem down into manageable parts?</li> <li>C. What math tools/models/strategies can I use to solve the problem?</li> <li>D. What is the most efficient way to solve this problem?</li> <li>E. How does classifying bring clarity?</li> </ol> </td> </tr> </table>	<p><b>UNDERSTANDINGS:</b> <i>Students will understand that:</i></p> <ol style="list-style-type: none"> <li>1. Mathematicians identify relevant tools, strategies, relationships, and/or information in order to draw conclusions.</li> <li>2. Mathematicians create dependable arguments by calculating efficiently and accurately.</li> <li>3. Mathematicians apply the mathematics they know to solve problems occurring in everyday life.</li> </ol>	<p><b>ESSENTIAL QUESTIONS:</b> <i>Students will explore &amp; address these recurring questions:</i></p> <ol style="list-style-type: none"> <li>A. Does this solution make sense?</li> <li>B. How can I break a problem down into manageable parts?</li> <li>C. What math tools/models/strategies can I use to solve the problem?</li> <li>D. What is the most efficient way to solve this problem?</li> <li>E. How does classifying bring clarity?</li> </ol>
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## Pre-Calculus Level 2 Curriculum

<p>CCSS.MATH.CONTENT.HSN.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.</p>	<p>4. Mathematicians analyze characteristics and properties of geometric shapes to develop mathematical arguments about geometric relationships.</p>	
<b>Acquisition:</b>		
<p>CCSS.MATH.CONTENT.HSA.SSE.A.1 Interpret expressions that represent a quantity in terms of its context.*</p> <p>CCSS.MATH.CONTENT.HSG.SRT.C.8 Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.*</p>	<p><i>Students will know...</i></p> <ol style="list-style-type: none"> <li>1. Several Pythagorean Triplets</li> <li>2. The relationship within special right triangles (45-45-90 and 30-60-90)</li> <li>3. SohCahToa</li> <li>4. The Law of Sines</li> <li>5. The Law of Cosines</li> <li>6. Hero's or Heron's Formula for area of a triangle</li> <li>7. <math>A = 0.5ab \sin(C)</math></li> <li>8. Vocabulary: oblique, ambiguous, elevation, depression,</li> </ol>	<p><i>Students will be skilled at...</i></p> <ol style="list-style-type: none"> <li>1. Solving right triangles using Trigonometry</li> <li>2. Solving application problems using right triangle Trigonometry</li> <li>3. Solving triangles using the Law of Sines including AAS, ASA and SSA cases</li> <li>4. Determine whether there are 0,1, or 2 triangles for a given set of measurements</li> <li>5. Solving oblique triangle applications with Law of Sines and Law of Cosines</li> <li>6. Solving triangles using the Law of Cosines including SAS and SSS cases</li> <li>7. Solving application problems involving area of triangles</li> </ol>