Unit #3: Right Triangles and Trigonometry

Content Area: **Mathematics**
Course(s): **Geometry**
Time Period: **Semester 2**
Length: **4 weeks**
Status: **Published**

Standards

MA.G-SRT.B.4	Prove theorems about triangles.
MA.G-SRT.B.5	Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.
MA.G-SRT.C	Define trigonometric ratios and solve problems involving right triangles
MA.G-SRT.C.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.
MA.G-SRT.C.8	Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.
MA.G-SRT.D	Apply trigonometry to general triangles
9-12.HS-PS4-1.5	Mathematical and computational thinking at the 9-12 level builds on K-8 and progresses to using algebraic thinking and analysis, a range of linear and nonlinear functions including trigonometric functions, exponentials and logarithms, and computational tools for statistical analysis to analyze, represent, and model data. Simple computational simulations are created and used based on mathematical models of basic assumptions.

Enduring Understandings

1. Trigonometric ratios are powerful tools for solving real-world problems.

2. Trigonometric ratios are based on right triangles and similarity.

3. The Pythagorean Theorem establishes an essential relationship between the sides of a right triangle.

Essential Questions

1. How can the Pythagorean Theorem and trigonometry be used to solve mathematical and real-world problems?

2. How can you use triangle similarity to prove the Pythagorean Theorem?

3. What should you do when you get stuck solving word problems?

4. What is the role of trigonometry in the real-world?

Knowledge and Skills

- Use the Pythagorean Theorem to find missing side lengths in right triangles
- Use altitude-on-hypotenuse theorems when an altitude is drawn to the hypotenuse
- Identify the ratio of side lengths in 30-60-90 and 45-45-90 triangles
- Explore the three basic trigonometry ratios
- Use trigonometry to find angle measures and triangle side lengths
- Apply trigonometry to word problems

Transfer Goals

Recognize and solve practical or theoretical problems involving Geometry, including those for which the solution approach is not obvious, by using mathematical reasoning and strategic thinking.

Insight into one simple skill unlocks applications along a host of other areas.

Resources

Informal Geometry, by Cox

Geometry for Enjoyment and Challenge, by Rhoad

Moises Geometry, by Moise

Khan Academy

PurpleMath

KutaSoftware

CK-12

Quizlet

Albert I/O

Desmos

Problem-Attic

Classkick