TOPIC: TRIANGLES

GEOMETRY
STANDARD G.8

The student will solve real-world problems involving right triangles by using the Pythagorean Theorem and its converse, properties of special right triangles, and right triangle trigonometry.

ESSENTIAL UNDERSTANDINGS	ESSENTIAL KNOWLEDGE AND SKILLS
• The Pythagorean Theorem is essential for solving problems involving right triangles. • Many historical and algebraic proofs of the Pythagorean Theorem exist. • The relationships between the sides and angles of right triangles are useful in many applied fields. • Some practical problems can be solved by choosing an efficient representation of the problem. • Another formula for the area of a triangle is $A = \frac{1}{2}ab\sin C$. • The ratios of side lengths in similar right triangles (adjacent/hypotenuse or opposite/hypotenuse) are independent of the scale factor and depend only on the angle the hypotenuse makes with the adjacent side, thus justifying the definition and calculation of trigonometric functions using the ratios of side lengths for similar right triangles.	**The student will use problem solving, mathematical communication, mathematical reasoning, connections, and representations to** • Determine whether a triangle formed with three given lengths is a right triangle. • Solve for missing lengths in geometric figures, using properties of 45°-45°-90° triangles. • Solve for missing lengths in geometric figures, using properties of 30°-60°-90° triangles. • Solve problems involving right triangles, using sine, cosine, and tangent ratios. • Solve real-world problems, using right triangle trigonometry and properties of right triangles. • Explain and use the relationship between the sine and cosine of complementary angles.[†] [†]Revised March 2011