Unit D - *Geometry*

Overview

In Grade 7, students used facts about supplementary, complementary, vertical, and adjacent angles to find the measures of unknown angles. This unit extends that knowledge to angle relationships that are formed when two parallel lines are cut by a transversal and why the exterior angles of a triangle is the sum of the two remote interior angles of the triangle. Students also learn and use the Pythagorean Theorem and are shown an informal proof of the theorem to build understanding. Finally, students work with three dimensional shapes and use volume formulas to solve problems in context.

21st Century Capacities: Synthesizing, Product Creation

Stage 1 - Desired Results

ESTABLISHED GOALS/ STANDARDS

MP 1 Make sense sense of problems and persevere in solving them
MP4 Model with Mathematics
MP7 Look for and make use of structure

CC. 8.G.5 Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles. *For example, arrange three copies of the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transversals why this is so.*

CC. 8.G.6 Explain a proof of the Pythagorean Theorem and its converse.

Transfer:

Students will be able to independently use their learning in new situations to...

1. Certain aspects of geometric shapes can be modeled with algebraic expressions/expression.
2. Make sense of a problem, initiate a plan, execute it, and evaluate the reasonableness of the solution. (Synthesizing)
3. Justify reasoning using clear and appropriate mathematical language. (Product Creation)

Meaning:

UNDERSTANDINGS: *Students will understand that:*

1. Effective problem solvers work to make sense of the problem before trying to solve it.
2. Mathematicians represent and analyze mathematical situations and structures using algebraic symbols to communicate thinking.
3. Mathematicians analyze characteristics and properties of geometric shapes to develop mathematical arguments about geometric relationships.

ESSENTIAL QUESTIONS: *Students will explore & address these recurring questions:*

A. How can I use what I know to help me find what is missing?
B. How can the information on a diagram be represented by an equation?

	Acquisition:	
CC. 8.G.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. **CC. 8.G.8** Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. **CC. 8.G.9** Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	*Students will know…* 1. That the transversal of two or more parallel lines form angles that are either congruent or supplements 2. The Pythagorean Theorem 3. The three angles of a triangle have a sum of 180 degrees 4. The exterior angle of a triangle is equal to the sum of the remote interior angles 5. The formula for the volume of a cylinder, cone and sphere 6. Vocabulary: parallel, transversal, supplementary, complementary, adjacent, vertical, exterior angle, sphere, prism, cylinder, scalene, isosceles, equilateral	*Students will be skilled at…* 1. Naming angles 2. Determining the angle measurements of all the angles formed by two parallel lines that have a transversal 3. Solving problems involving supplementary, vertical, and complementary angle 4. Finding angles formed by parallel lines and a transversal. 5. Solve for a missing side of triangles using the Pythagorean Theorem 6. Solve for the missing angle in a triangle 7. Solve for missing angles in a triangle that involve an exterior angle 8. Finding the distance between two points on the coordinate plane using the Pythagorean Theorem 9. Finding and using the volume of cylinders, cones and spheres 10. Using the converse of the Pythagorean Theorem