# Unit #5: Area and Extending to Three Dimensions

Content Area:	Mathematics
Course(s):	Geometry
Time Period:	Semester 2
Length:	7 weeks
Status:	Published

#### **Standards**

MA.K-12.6	Attend to precision.
MA.G-GPE.B	Use coordinates to prove simple geometric theorems algebraically
MA.G-GPE.B.7	Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.
MA.G-GMD.A	Explain volume formulas and use them to solve problems
MA.G-GMD.A.1	Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone.
MA.G-GMD.A.3	Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.
MA.G-GMD.B.4	Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.
MA.G-MG.A.1	Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).
MA.G-MG.A.2	Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

### **Enduring Understandings**

1. You can generate three-dimensional figures by rotating two-dimensional figures around a line.

- 2. You can model real-world objects with three-dimensional figures.
- 3. Visualization is an important element of working with three-dimensional figures.
- 4. Calculation of area is necessary in order to visualize the size of figures.

### **Essential Questions**

- 1. How are areas of various 2D shapes related to each other? How are they different?
- 2. How are surface areas and volumes of various 3D shapes related to each other? How are they different?
- 3. How are two-dimensional relationships connected to the properties of three-dimensional figures?

- 4. What mathematics applies to this situation?
- 5. How can you use geometry to solve design problems?

6. How can describing, classifying, and comparing properties of certain two and three-dimensional shapes be useful for solving geometric problems in our 3-D world?

## **Knowledge and Skills**

- Calculate area of various 2D shapes using correct formulas
- Find ratios of areas by applying properties of similar figures
- Calculate surface areas and volume of various 3D shapes using correct formulas
- Identify and apply cross sections of 3D shapes to solve for volume
- Relate and link 3D shapes to real-world objects

#### **Resources**

Informal Geometry, by Cox

Geometry for Enjoyment and Challenge, by Rhoad

Moises Geometry, by Moise

Khan Academy

PurpleMath

<u>KutaSoftware</u>

<u>CK-12</u>

<u>Quizlet</u>

<u>Albert I/O</u>

Desmos

Problem-Attic

Classkick