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

KutaSoftware

CK-12

Quizlet

Albert I/O

Desmos

Problem-Attic

Classkick