

07 Surface Area and Volume

Content Area: **Mathematics**
Course(s):
Time Period: **Week1**
Length: **1 Week**
Status: **Published**

Stage 1: Desired Results

Unit Overview/ Rationale

Standards & Indicators

Common Core: Mathematics, Common Core: Grade 8, Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics.
5. Use appropriate tools strategically.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

MA.7.7.G.A.3

Describe the two-dimensional figures that result from slicing three-dimensional figures, as in plane sections of right rectangular prisms and right rectangular pyramids.

MA.7.7.G.B.6

Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

Big Ideas - Students will understand that...

-Volume and surface area of three-dimensional objects can be used to solve real world and mathematical problems.

-Through the use of diagrams and nets, students relate the dimensions of three-dimensional figures to their faces, bases, and curved surfaces to justify formulas and surface area.

-Shapes that result from slicing three-dimensional figures can be described as two-dimensional figures.

Essential Questions - What provocative questions will foster inquiry and transfer of learning

-Why is it important to know how to find the volume and surface area of three-dimensional figures?

-How is the volume of a triangular prism related to the volume of a rectangular prism?

-How do two-dimensional shapes that make up a cross section relate to the three-dimensional shapes from which they originated?

Content - Students will know...

Key concepts:

Bases, center of sphere, cone, cross section, cube, cubic unit, cylinder, edge, face, height, net, prism, pyramid, sphere, surface area, three-dimensional figure, vertex, volume

Skills - Students will be able to...

-Identify three-dimensional solids, such as prisms, cylinders, and pyramids.

-Find the surface area and volume of prisms and cylinders.

-Identify cross sections of real-world three-dimensional solids.

Stage 2: Assessment Evidence

Assessment

Stage 3: Learning Plan

Learning Activities

Activities: Students will classify and draw three-dimensional figures.

Formative Assessment: Teacher observation of student work in small-group and independent practice.

Closure: Students will be asked to name a figure given a drawing or description. Students will be asked to draw a three-dimensional figure.

Example: Name the three-dimensional figure that has one circular base and one vertex.

Sample Solution: Cone

Activities: Students will find the surface areas of prisms and cylinders using nets.

Formative Assessment: Teacher observation of student work in small-group and independent practice.

Closure: Students will be asked to find the surface area of a prism or cylinder, draw a net and find the area of the net.

Example: Find the surface area of a cylinder with a base with a diameter of 14 yds. and a height of 10 yds.

Sample Solution:

Surface area = 747.7 sq yards

Activities: Students will find the volumes of prisms and cylinders.

Formative Assessment: Teacher observation of student work in small-group and independent practice.

Closure: Students will be asked to find the volume of a prism, using the formula $V=Bh$. Students will be asked to find the volume of a cylinder, using the formula $V=\pi r^2h$.

Example: Find the volume for a cylinder with a base with a diameter of 4m and a height of 9m.

Sample Solution: $V=113.1$ cubic meters

Activities: Students will describe the cross sections that result from slicing three-dimensional figures.

Formative Assessment: Teacher observation of student work in small-group and independent practice.

Closure: Students will be asked to describe the cross-sections that they see after slicing through a three-dimensional object.

Example: Describe the cross-section resulting from slicing a cylinder vertically and horizontally.

Sample Solution: Slicing a cylinder parallel to its height results in a rectangle; perpendicular to the height results in a circle.

Resources

Prentice Hall

Course 2

Mathematics Common Core

C2013, Unit 7