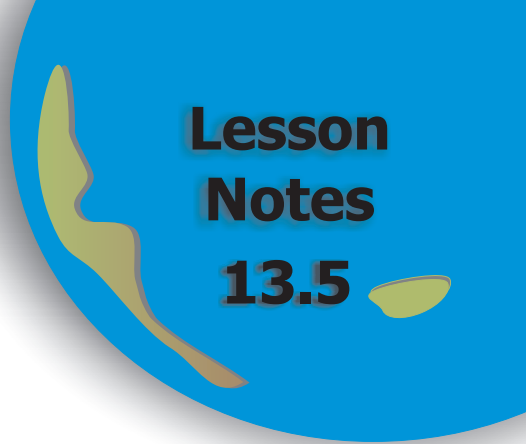


NAME _____

Module 13 Perimeter, Area, and Volume
Lesson 5 Volume: Prisms, Cylinders, and Spheres



Lesson Objectives

- Model the differences between covering the faces (surface area/nets) and filling the interior (volume).
- Derive and use formulas for the volume of prisms, cylinders, and spheres and justify using geometric models and common materials.
- Use cubic units to find the volume of prisms, cylinders, and spheres.
- Demonstrate understanding of when to use linear units to describe perimeter, square units to describe area or surface units, and cubic units to describe volume, in real-world situations.
- Compare and contrast the differences among linear units, square units, and cubic units.

Subtopic 1

Volume of a Rectangular Prism

1 Find the volume of wood in this toy block that is a cube with a length of three centimeters.

$$\begin{aligned} V &= e^3 \\ V &= (3 \text{ cm})^3 \\ V &= 27 \text{ cm}^3 \end{aligned}$$



3 cm

2 Find the volume of the lunch box.

$$\begin{aligned} V &= lwh \\ V &= 8 \text{ in.} \times 4 \text{ in.} \times 7 \text{ in.} \\ V &= 32 \text{ in.}^2 \times 7 \text{ in.} \\ V &= 224 \text{ in.}^3 \end{aligned}$$



7 in.

8 in.

4 in.

The lunchbox volume is 224 cubic inches.

Subtopic 2 Volume of Cylinder and Sphere

Volume of a Cylinder

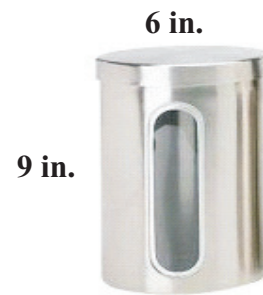
$$V = \pi r^2 h$$

Volume of a Sphere

$$V = \frac{4}{3} \pi r^3$$

- 3** Find the volume of a food canister with a diameter of six inches and a height of nine inches.

$$\begin{aligned} V &= \pi r^2 h \\ V &= 3.14 \times (3 \text{ in.})^2 \times (9 \text{ in.}) \\ V &\approx 254.34 \text{ in.}^3 \end{aligned}$$



- 4** The radius of Earth's first artificial satellite, Sputnik I, was 29 centimeters. Find the volume of Sputnik I by multiplying with a calculator and by rounding the final answer to the nearest integer.

$$\begin{aligned} V &= \frac{4}{3} \pi r^3 \\ V &= \frac{4}{3} \times (3.14) \times (29 \text{ cm})^3 \\ V &\approx 102,108.6133 \text{ cm}^3 \end{aligned}$$

Sputnik I's volume was about 102,109 cm³.

