

Dear Family,

In this module, *Volume*, students will draw on their knowledge of finding volume of prisms to develop understanding of how to find the volume of cylinders, cones, and spheres. They use this understanding to find missing dimensions and the volume of composite figures.

What Did Students Learn Previously?

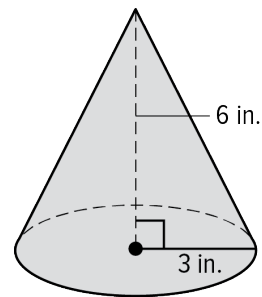
In previous grades, students learned how to find the volume of prisms and pyramids. For example, the volume of a rectangular prism can be found by multiplying the length, width, and height of the prism, represented by the formula, $V = lwh$. So, the volume of a rectangular prism with a length of 4.5 cm, a width of 2.25 cm, and a height of 7 cm has a volume of 70.875 cm^3 .

What Will Students Learn in This Module?

Volume of Cylinders, Cones, and Spheres

- Students will use formulas to find the volume of cylinders, cones, and spheres.
- The volume of a cylinder can be found by multiplying the area of the circular base and the height, represented by the formula $V = \pi r^2 h$, where r is the radius and h is the height.
- The volume of a cone is one-third the volume of a cylinder with the same base area and height. So, the formula for the volume of a cone is $V = \frac{1}{3} \pi r^2 h$.
- The formula for the volume of a sphere with radius r is $V = \frac{4}{3} \pi r^3$.
- For example, to find the **volume** of the figure at the right, use the formula for the **volume** of a **cone**,

$$V = \frac{1}{3} \pi r^2 h = \frac{1}{3} \pi (3^2)(6) = 18\pi \text{ in}^3 \approx 56.55 \text{ in}^3.$$

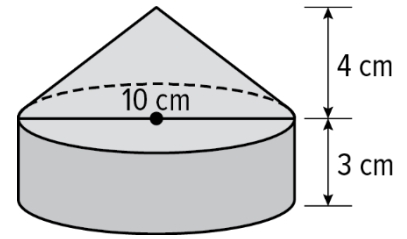


Missing Dimensions

- Students will use the volume formulas of cylinders, cones, and spheres to find missing dimensions of these solids, given the volume.

- **Composite Solids** Students will understand how deconstructing composite **solids** will allow them to find their volume.
- For Example, to find the **volume** of the figure at the right, use the formulas for the **volume** of a **cone** and the formula for the volume of a cylinder.

$$\text{Volume}_{\text{solid}} = \text{Volume}_{\text{cone}} + \text{Volume}_{\text{cylinder}}$$



What Vocabulary Terms Will Students Use?

Term	Definition
composite solid	An object made up of more than one solid.
cone	A three-dimensional figure with one circular base connected by a curved surface to a single point.
cylinder	A three-dimensional figure with two parallel congruent circular bases connected by a curved surface.
hemisphere	One of two congruent halves of a sphere.
sphere	The set of all points in space that are a given distance, known as the radius, from a given point, known as the center.
volume	The measure of the space occupied by a solid. Standard units of measure are cubic units such as in^3 or ft^3 .

How You Can Provide Support

- Support your child's understanding of volume by asking them to solve problems involving volume in everyday life.
 - Containers:* Ask your child to find the dimensions for a cylinder, cone, or sphere that holds approximately the same volume as a given rectangular prism. For example, what is the radius and height of a cylinder that would hold the contents of a box of cereal?
 - Sports:* Have your child compare the volumes of balls from two different sports. For example, how much greater is the volume of a basketball, with a radius of 9.55 inches, than a soccer ball, with a radius of 8.65 inches?
- Encourage your child to have a positive, growth-oriented attitude towards mathematics and their learning.
 - Encourage them to ask questions – both at home and in class. Sometimes, an answer to a question will generate more questions. That's how you know they are learning!
 - Encourage your child to embrace challenges and remind them that every challenge is an opportunity to learn something new.
 - Celebrate successes – both small and large.
- Contact me to arrange a time to discuss the specifics of your child's performance and how we can work together to help them succeed in this module.

Sincerely,

(Teacher's Name)

(Email/Phone)