

Module 5: Applying Powers

TOPIC 2: VOLUME OF CURVED FIGURES

In this topic, students solve real-world and mathematical problems involving volume of cylinders, cones, and spheres. Students explore each figure in turn and determine the formula for the volume of each, they practice applying each formula, and then they solve problems requiring the use of multiple volume formulas. Students use the formulas for cylinders, cones, and spheres to determine volumes of composite figures and to compare volumes of two figures.

Where have we been?

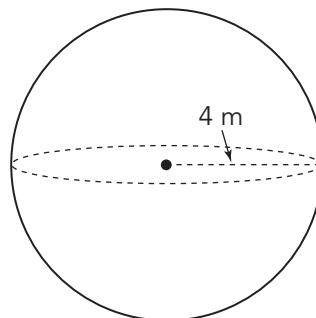
As early as first grade, students learned about right cylinders and cones, and in grades 6 and 7, they learned to calculate volumes of prisms and pyramids and areas and circumferences of circles.

Where are we going?

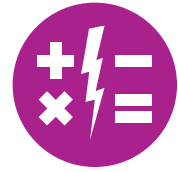
This topic opens the door for students to engage in geometric design and to model real-world situations. As students study polynomial functions in high school, volumes of three-dimensional figures are applications that can be used to develop understanding of graphical characteristics and creating equations.

The Volume of a Sphere

A sphere is made up of all the points that are the same distance in three dimensions from a center point. The radius of a sphere, shown here as 4 meters, is the only measure you need to determine its volume. The volume of a sphere is given by the formula $V = \frac{4}{3}\pi r^3$.



Myth: Some students are “right-brain” learners while other students are “left-brain” learners.



As you probably know, the brain is divided into two hemispheres: the left and the right. Some categorize people by their preferred or dominant mode of thinking. “Right-brain” thinkers are considered to be more intuitive, creative, and imaginative. “Left-brain” thinkers are more logical, verbal, and mathematical.

The brain can also be broken down into lobes. The occipital lobe can be found in back of the brain, and it is responsible for processing visual information. The temporal lobes, which sit above your ears, process language and sensory information. A band across the top of your head is the parietal lobe, and it controls movement. Finally, the frontal lobe is where planning and learning occurs. Another way to think about the brain is from the back to the front, where information goes from highly concrete to abstract.

Why don’t we claim that some people are “back of the brain” thinkers who are highly concrete; whereas, others are “frontal thinkers” who are more abstract? The reason is that the brain is a highly interconnected organ. Each lobe hands off information to be processed by other lobes, and they are constantly talking to each other. All of us are whole-brain thinkers!

#mathmythbusted

Talking Points

You can further support your student’s learning by asking questions about the work they do in class or at home. Your student is learning about the volume of cylinders, cones, and spheres.

Questions to Ask

- Does your answer make sense? Why?
- Can you show me the strategy you used to solve this problem? Do you know another way to solve it?
- Does your answer make sense? How do you know?

Key Terms

cone

A cone is a three-dimensional object with a circular or oval base and one vertex.

great circle

A great circle is the circumference of the sphere at the sphere’s widest part.