

High School Algebra Playlist: Finding the Volume of a Sphere

Aligns with [CCSS.Math.Content.HSG.GMD.A.2](#): Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.

Related Standards

- [CCSS.Math.Content.HSG.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. *Use dissection arguments, Cavalieri's principle, and informal limit arguments.*

PREVIEW



Objectives

In this module, you will learn and practice the following skills:

- find the formula for the volume of a sphere
- see how Cavalieri's Principle can be applied to find formulas for volume

Let's get started!

Key Terms

- **Cavalieri's Principle** states that solids with the same height and cross-sections have the same volume.

PREVIEW



Finding the Volume of a Sphere

([CCSS.Math.Content.HSG.GMD.A.2](#))

Give an informal argument using Cavalieri's principle for the formulas for the volume of a sphere and other solid figures.

Cavalieri's Principle states that solids with the same height and cross-sections have the same volume.

If your students...

Confused about Cavalieri's principle:

Point out to students that Cavalieri's principle can be used to find volume formulas for figures that have the same height. When comparing a prism and cylinder, the bases and cross-sections have different shapes, but the areas of each are the same. When comparing the prism/cylinders and pyramids/cones, the bases have the same area, but the areas of the cross-sections of pyramids/cones vary based on the height. The volume of a sphere is developed by comparing the volume of a hemisphere and a cylinder enclosing a cone, all with the same height. The cross-sections of the hemisphere are circles with the same area as the discs formed between the cylinder and cone. If students struggle, go through the interactive videos as a class:

WATCH: **Cavalieri's principle** (3D)

<https://schoolyourself.org/learn/geometry/cavalieri-3d>

WATCH: Sphere volume

<https://schoolyourself.org/learn/geometry/sphere-volume>

