

Everyday Cylinder Models

Use cylindrical models to estimate the volume of real objects.

HIGH SCHOOL • HSG-MG.A.1

CCSS.Math.Content.HSG-MG.A.1 "Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder)."

NAME _____

DATE _____

MODEL WITH A CYLINDER

When an object has two matching circular ends and straight sides, model it as a cylinder. Find the radius, which is half the diameter, then use $V = \pi r^2 h$. A model gives an estimate, so write volume in cubic units.

WORKED EXAMPLE

A solid wax cylinder has a diameter of 14 cm and a height of 9 cm. What is its volume?

1. $r = 14/2 = 7$ cm

2. $V = \pi(7)^2(9)$

3. $V = 441\pi \text{ cm}^3$

Answer: $441\pi \text{ cm}^3$

PRACTICE 6 problems

- 1** A pencil holder is modeled as a cylinder with a radius of 3 cm and a height of 11 cm. Find its volume.

ANSWER _____

- 2** A candle is modeled as a cylinder with a diameter of 12 cm and a height of 5 cm. Find its volume.

ANSWER _____

- 3** A metal can is modeled as a cylinder with a diameter of 10 cm and a height of 8 cm. Find its volume.

ANSWER _____

- 4** A solid wooden dowel is modeled as a cylinder with a radius of 4 cm and a height of 15 cm. Find its volume.

ANSWER _____

- 5** A glue stick is modeled as a cylinder with a diameter of 2 cm and a height of 18 cm. Find its volume.

ANSWER _____

- 6** A cylindrical storage tube has a diameter of 16 cm and a height of 3 cm. Find its volume.

ANSWER _____

APPLY IT Show your work

- 1** A reusable water bottle has an inside diameter of 6 cm and an inside height of 20 cm. Model the inside as a cylinder. What is its capacity in cubic centimeters?

WORK SPACE

ANSWER _____

- 2** The drama club makes a solid cylindrical stage pillar from foam. The pillar has a diameter of 10 cm and a height of 30 cm. How much foam is needed, in cubic centimeters?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Two Bluetooth speakers are modeled as solid cylinders. Speaker A has a diameter of 6 cm and a height of 18 cm. Speaker B has a diameter of 8 cm and a height of 10 cm. Which speaker model has the greater volume, and by how much?

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A pencil holder is modeled as a cylinder with a radius of 3 cm and a height of 11 cm. Find its volume.	$99\pi \text{ cm}^3$
2	A candle is modeled as a cylinder with a diameter of 12 cm and a height of 5 cm. Find its volume.	$180\pi \text{ cm}^3$
3	A metal can is modeled as a cylinder with a diameter of 10 cm and a height of 8 cm. Find its volume.	$200\pi \text{ cm}^3$
4	A solid wooden dowel is modeled as a cylinder with a radius of 4 cm and a height of 15 cm. Find its volume.	$240\pi \text{ cm}^3$
5	A glue stick is modeled as a cylinder with a diameter of 2 cm and a height of 18 cm. Find its volume.	$18\pi \text{ cm}^3$
6	A cylindrical storage tube has a diameter of 16 cm and a height of 3 cm. Find its volume.	$192\pi \text{ cm}^3$

PART 2 • APPLY IT

- $180\pi \text{ cm}^3$** The radius is 3 cm. Use $V = \pi(3)^2(20)$ to get $180\pi \text{ cm}^3$.
- $750\pi \text{ cm}^3$** The radius is 5 cm. Use $V = \pi(5)^2(30)$ to get $750\pi \text{ cm}^3$.

CHALLENGE

Speaker A has the greater volume by $2\pi \text{ cm}^3$. Speaker A: $\pi(3)^2(18) = 162\pi \text{ cm}^3$. Speaker B: $\pi(4)^2(10) = 160\pi \text{ cm}^3$.

Accept equivalent exact forms, such as $\pi(3)^2(11)$, if they simplify to the stated volume. Require students to halve a given diameter and use cubic units.