LESSON MAKER PRO

Volume in Action

Use solid models to measure real objects.

HIGH SCHOOL · HSG-MG.A

CCSS.Math.Content.HSG-MG.A "Apply geometric concepts in modeling situations"

NAME _____ DATE _____

CHOOSE THE SOLID

Match the object to a geometric solid, then use its volume formula. For a prism, use V=Bh. For a cylinder, use $V=\pi r^2 h$, and for a pyramid or cone, use V=1/3Bh. State volume in cubic units and keep π exact unless told otherwise.

WORKED EXAMPLE

A storage crate is modeled by a rectangular prism that is 11 inches long, 5 inches wide, and 2 inches high. Find its volume.

1. Use the prism formula: V=lwh.
2. Substitute: V=11 x 5 x 2.
3. Multiply: V=110.

Answer: 110 cubic inches

PRACTICE 6 problems

1 A sneaker display box is modeled by a rectangular prism that is 8 inches long, 6 inches wide, and 1 inch deep. Find its volume.

ANSWER _____

2 A cylindrical Bluetooth speaker has a radius of 3 inches and a height of 10 inches. Find its volume.

ANSWER _____

3 A cube-shaped storage bin has side length 9 inches. Find its volume.

ANSWER _____

4 A rectangular stage riser is 12 feet long, 6 feet wide, and 1 foot high. Find its volume.

ANSWER _____

5 A square pyramid award has a base with side length 8 centimeters and a height of 9 centimeters. Find its volume.

ANSWER _____

6 A cone-shaped sports marker has a radius of 6 centimeters and a height of 10 centimeters. Find its volume.

ANSWER _____

APPLY IT Show your work

1 The environmental club builds a rectangular planter for a school garden. Its inside dimensions are 9 feet by 6 feet by 1 foot. Soil comes in bags that each hold 1/3 cubic foot. How many bags of soil are needed to fill the planter?

WORK SPACE

ANSWER _____

2 A robotics team fills a solid cylindrical counterweight mold with metal. The mold has radius 3 centimeters and height 8 centimeters. The metal has a density of 6 grams per cubic centimeter. What is the mass of the counterweight?

WORK SPACE

ANSWER _____

CHALLENGE One step up

The inside of a reusable water bottle is modeled by a cylinder with radius 3 centimeters and height 9 centimeters, plus a hemispherical bottom with the same radius. Use $V_{\text{hemisphere}} = \frac{2}{3}\pi r^3$. Find the bottle's capacity and explain why the two volumes are added.

WORK SPACE AND ANSWER

ANSWER KEY

Volume in Action

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A sneaker display box is modeled by a rectangular prism that is 8 inches long, 6 inches wide, and 1 inch deep. Find its volume.	**48 cubic inches**
2	A cylindrical Bluetooth speaker has a radius of 3 inches and a height of 10 inches. Find its volume.	**90π cubic inches**
3	A cube-shaped storage bin has side length 9 inches. Find its volume.	**729 cubic inches**
4	A rectangular stage riser is 12 feet long, 6 feet wide, and 1 foot high. Find its volume.	**72 cubic feet**
5	A square pyramid award has a base with side length 8 centimeters and a height of 9 centimeters. Find its volume.	**192 cubic centimeters**
6	A cone-shaped sports marker has a radius of 6 centimeters and a height of 10 centimeters. Find its volume.	**120π cubic centimeters**

PART 2 · APPLY IT

1. **162 bags** The planter holds 9 x 6 x 1 = 54 cubic feet of soil. Divide 54 by 1/3 to get 162 bags.
2. **432π grams** The mold's volume is π x 3^2 x 8 = 72π cubic centimeters. Multiply by 6 grams per cubic centimeter to get 432π grams.

CHALLENGE

99π cubic centimeters. The cylinder holds 81π cubic centimeters and the hemispherical bottom holds 18π cubic centimeters, so their volumes are added because they are two non-overlapping parts of the bottle.

Accept equivalent exact forms that use π and include appropriate cubic units. For the challenge, accept a correct explanation that the cylinder and hemisphere are separate, non-overlapping parts of one container.