LESSON MAKER PRO

Volume Build Lab

Measure the space inside three-dimensional solids.

HIGH SCHOOL · MA.912.GR.4

MA.912.GR.4 "Use geometric measurement and dimensions to solve problems."

NAME _____ DATE _____

VOLUME FROM DIMENSIONS

Volume measures the space inside a solid. For a prism or cylinder, multiply the area of the base by the height: V = Bh. For a pyramid or cone, use one third of the matching prism or cylinder volume, and for a sphere use V = 4/3 pi r^3.

WORKED EXAMPLE

Find the volume of a rectangular prism that is 17 cm long, 19 cm wide, and 13 cm high.

1. Use V = lwh.
2. V = 17 x 19 x 13.
3. V = 4199 cm^3.

Answer: 4199 cm^3

PRACTICE 6 problems

1 Find the volume of a rectangular prism that is 8 cm by 9 cm by 2 cm.

ANSWER _____

2 A triangular prism has a triangular base with base 10 cm and altitude 12 cm. The prism is 3 cm long. Find its volume.

ANSWER _____

3 Find the volume of a cylinder with radius 5 cm and height 8 cm. Leave pi in your answer.

ANSWER _____

4 Find the volume of a cone with radius 9 cm and height 10 cm. Leave pi in your answer.

ANSWER _____

5 Find the volume of a square pyramid with base side length 12 cm and height 14 cm.

ANSWER _____

6 Find the volume of a sphere with radius 3 cm. Leave pi in your answer.

ANSWER _____

APPLY IT Show your work

1 A game design club makes a rectangular prize box that is 15 cm long, 18 cm wide, and 20 cm high. How much space can the box hold?

WORK SPACE

ANSWER _____

2 For a theater set, a student builds a solid cone-shaped prop with radius 8 cm and height 15 cm. How much material does the prop contain? Leave pi in your answer.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A solid rectangular display block measures 20 cm by 16 cm by 12 cm. A cylindrical hole with radius 3 cm is drilled completely through the 12 cm height. Find the remaining volume of the block. Leave pi in your answer.

WORK SPACE AND ANSWER

ANSWER KEY

Volume Build Lab

HIGH SCHOOL · MA.912.GR.4

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the volume of a rectangular prism that is 8 cm by 9 cm by 2 cm.	**144 cm^3**
2	A triangular prism has a triangular base with base 10 cm and altitude 12 cm. The prism is 3 cm long. Find its volume.	**180 cm^3**
3	Find the volume of a cylinder with radius 5 cm and height 8 cm. Leave pi in your answer.	**200pi cm^3**
4	Find the volume of a cone with radius 9 cm and height 10 cm. Leave pi in your answer.	**270pi cm^3**
5	Find the volume of a square pyramid with base side length 12 cm and height 14 cm.	**672 cm^3**
6	Find the volume of a sphere with radius 3 cm. Leave pi in your answer.	**36pi cm^3**

PART 2 · APPLY IT

1. **5400 cm^3** Use V = lwh. Multiply 15 x 18 x 20 to find the box's volume.
2. **320pi cm^3** Use V = 1/3 pi r^2h. Substitute the radius and height, then simplify.

CHALLENGE

3840 - 108pi cm^3

Accept equivalent exact expressions, such as 12(320 - 9pi) cm^3 for the challenge. Require cubic units and leave pi exact when pi appears.