LESSON MAKER PRO

Cube Count Quest

Find volume by counting equal layers of unit cubes.

GRADE 5 · NY-5.MD.4

NY-5.MD.4 "Measure volumes by counting unit cubes, using cubic cm, cubic in., cubic ft., and improvised units."

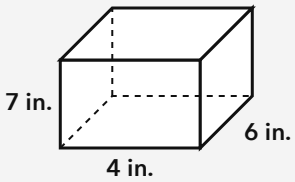
NAME _____ DATE _____

COUNT THE LAYERS

Volume tells how much space a solid takes up. Count the unit cubes in one layer, then multiply by the number of equal layers. Write the answer in cubic units.

WORKED EXAMPLE

What is the volume of the rectangular prism shown, 4 inches long, 6 inches wide, and 7 inches high?

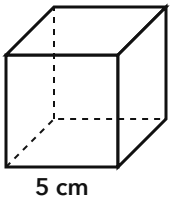


1. One layer has 4 × 6 = 24 unit cubes.
2. There are 7 equal layers.
3. 24 × 7 = 168.

Answer: 168 in^3

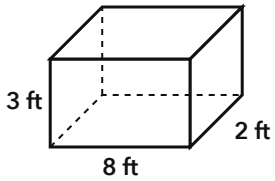
PRACTICE 6 problems

1 The cube shown has side length 5 cm. What is its volume?



ANSWER _____

2 The rectangular prism shown is 8 ft long, 2 ft wide, and 3 ft high. What is its volume?



ANSWER _____

3 A model has 5 equal layers. Each layer has 2 rows of 9 unit snap-cubes. What is the volume in cubic snap-cubes?

ANSWER _____

4 A rectangular prism is 9 in. long, 3 in. wide, and 2 in. high. What is its volume?

ANSWER _____

5 A box is 8 cm long, 3 cm wide, and 5 cm high. What is its volume?

ANSWER _____

6 Prism A has dimensions 3 cm by 3 cm by 8 cm. Prism B has dimensions 2 cm by 9 cm by 5 cm. Which prism has the greater volume, and how many more cubic centimeters does it hold?

ANSWER _____

_____

APPLY IT Show your work

1 Jalen is building a rectangular display space for mini game figures. The space is 8 cm long, 5 cm wide, and 3 cm high. What is the volume of the display space?

WORK SPACE

ANSWER _____

2 The school gardening club fills a rectangular raised bed with soil. The bed is 9 ft long, 2 ft wide, and 3 ft deep. What volume of soil can the bed hold?

WORK SPACE

ANSWER _____

3 Your teacher gives you a small prism made of identical unit cubes. Take it apart one layer at a time and count the cubes in each layer. Record the cubes per layer, the number of layers, and the total volume in cubic units. Rebuild the prism and explain how your counts connect to multiplication.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A rectangular prism is built from 120 one-inch unit cubes. Its base has 5 rows of 8 cubes. How many layers does the prism have? Explain your reasoning.

WORK SPACE AND ANSWER

ANSWER KEY # Cube Count Quest

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	The cube shown has side length 5 cm. What is its volume?	**125 cm^3**
2	The rectangular prism shown is 8 ft long, 2 ft wide, and 3 ft high. What is its volume?	**48 ft^3**
3	A model has 5 equal layers. Each layer has 2 rows of 9 unit snap-cubes. What is the volume in cubic snap-cubes?	**90 cubic snap-cubes**
4	A rectangular prism is 9 in. long, 3 in. wide, and 2 in. high. What is its volume?	**54 in^3**
5	A box is 8 cm long, 3 cm wide, and 5 cm high. What is its volume?	**120 cm^3**
6	Prism A has dimensions 3 cm by 3 cm by 8 cm. Prism B has dimensions 2 cm by 9 cm by 5 cm. Which prism has the greater volume, and how many more cubic centimeters does it hold?	**Prism B, 18 cm^3 more**

PART 2 · APPLY IT

1. **120 cm^3** Multiply the cubes in one layer, 8 × 5 = 40. Then multiply by 3 layers: 40 × 3 = 120.
2. **54 ft^3** Multiply the three dimensions: 9 × 2 × 3 = 54 cubic feet.
3. **6 cubes per layer; 2 layers; 12 cubic units. 6 × 2 = 12.** Before class, prepare for each learner or pair a prism of identical cube blocks: each layer has 2 rows of 3 cubes, and there are 2 complete layers. Keep the total unmarked. Have learners actually separate/count both layers and rebuild. Check 6 counted cubes in each layer and 2 layers, giving 12 unit cubes and volume 12 cubic units; explanation must refer to the actual counted model.

CHALLENGE

The base has 5 × 8 = 40 cubes. 120 ÷ 40 = 3, so the prism has 3 layers.

Require cubic units for all volume answers. For the challenge, accept any correct explanation that finds 40 cubes in each layer and divides 120 by 40. Apply 3 needs the prepared twelve-cube model described above. Observe actual systematic cube counting/rebuilding; arithmetic from a supplied total alone is incomplete.