LESSON MAKER PRO

Cube Space Quest

Find volume by counting packed unit cubes.

GRADE 5 · 5.MD.C.3b

CCSS.Math.Content.5.MD.C.3b "A solid figure which can be packed without gaps or overlaps using n unit cubes is said to have a volume of n cubic units."

NAME _____ DATE _____

COUNT CUBES BY LAYERS

Volume tells how many unit cubes fill a solid with no gaps or overlaps. Count the cubes in one layer, then multiply by the number of equal layers.

WORKED EXAMPLE

A prism has 5 rows of 6 unit cubes in each layer and 2 equal layers. What is its volume?

1. Cubes in one layer: 5 x 6 = 30.
2. Multiply by the layers: 30 x 2 = 60.
3. The solid contains 60 unit cubes.

Answer: 60 cubic units

PRACTICE 6 problems

1 A solid has 4 layers. Each layer has 3 rows of 3 unit cubes. What is its volume?

ANSWER _____

2 A rectangular prism is 7 cubes long, 4 cubes wide, and 4 cubes high. What is its volume?

ANSWER _____

3 A flat solid is 8 cubes long and 3 cubes wide. It is 1 cube high. What is its volume?

ANSWER _____

4 A solid has 9 equal layers with 7 unit cubes in each layer. What is its volume?

ANSWER _____

5 A solid has 11 rows of 4 unit cubes. It is 1 cube high. What is its volume?

ANSWER _____

6 A cube-shaped solid is 7 cubes long, 7 cubes wide, and 7 cubes high. What is its volume?

ANSWER _____

APPLY IT Show your work

1 At a game design club, Maya builds a rectangular display from unit cubes. It is 8 cubes long, 4 cubes wide, and 3 cubes high. How many unit cubes are in Maya's display?

WORK SPACE

ANSWER _____

2 A robotics team builds a rectangular practice platform from unit cubes. The platform is 9 cubes long, 7 cubes wide, and 4 cubes high. What is the volume of the platform?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A unit-cube display has 4 full layers. Each full layer is 7 cubes long and 8 cubes wide. On top is a partial layer that is 7 cubes long and 3 cubes wide. What is the volume of the display? Explain how you counted the cubes.

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_____

ANSWER KEY

Cube Space Quest

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	A solid has 4 layers. Each layer has 3 rows of 3 unit cubes. What is its volume?	**36 cubic units**
2	A rectangular prism is 7 cubes long, 4 cubes wide, and 4 cubes high. What is its volume?	**112 cubic units**
3	A flat solid is 8 cubes long and 3 cubes wide. It is 1 cube high. What is its volume?	**24 cubic units**
4	A solid has 9 equal layers with 7 unit cubes in each layer. What is its volume?	**63 cubic units**
5	A solid has 11 rows of 4 unit cubes. It is 1 cube high. What is its volume?	**44 cubic units**
6	A cube-shaped solid is 7 cubes long, 7 cubes wide, and 7 cubes high. What is its volume?	**343 cubic units**

PART 2 · APPLY IT

1. **96 cubic units** There are 8 x 4 = 32 cubes in each layer. Multiply 32 x 3 to get 96 unit cubes.
2. **252 cubic units** One layer has 9 x 7 = 63 unit cubes. Multiply 63 x 4 to get 252 cubic units.

CHALLENGE

245 cubic units. The 4 full layers have 4 x 7 x 8 = 224 cubes, and the partial top layer has 7 x 3 = 21 cubes. Then 224 + 21 = 245.

Accept answers stated as cubic units or unit cubes. For the challenge, accept any clear explanation that counts the full layers and the partial top layer separately, then adds them.