

Cube Stack Power

Find volume by counting equal layers.

GRADE 5 • 5.MG.2.d

5.MG.2.d "Investigate and develop a formula for determining the volume of rectangular prisms using concrete objects."

NAME _____

DATE _____

BUILD THE VOLUME RULE

A rectangular prism is made of equal layers of unit cubes. Multiply the length, width, and height to find how many unit cubes fill the prism. Volume = length x width x height.

WORKED EXAMPLE

A rectangular prism is 7 unit cubes long, 3 unit cubes wide, and 2 unit cubes high. What is its volume?

1. One layer has $7 \times 3 = 21$ unit cubes.
2. The prism has 2 equal layers.
3. $21 \times 2 = 42$ unit cubes.

Answer: 42 cubic units

PRACTICE 6 problems

- 1** A cube-built prism has 4 layers. Each layer has 5 rows of 6 unit cubes. What is the volume?

ANSWER _____

- 2** A rectangular prism is 8 cm long, 9 cm wide, and 1 cm high. What is the volume?

ANSWER _____

- 3** A prism has 10 unit cubes in each row, 5 rows in each layer, and 4 layers. What is the volume?

ANSWER _____

- 4** A rectangular prism is 12 m long, 4 m wide, and 5 m high. What is the volume?

ANSWER _____

- 5** A rectangular prism is 6 cm long, 11 cm wide, and 4 cm high. What is the volume?

ANSWER _____

- 6** A rectangular prism is 9 in. long, 5 in. wide, and 5 in. high. What is the volume?

ANSWER _____

APPLY IT Show your work

- 1** Maya is making a storage box for game tokens. The inside of the box is 13 cm long, 4 cm wide, and 6 cm high. How much space is inside the box?

WORK SPACE

ANSWER _____

- 2** The student council packs prize pencils in a rectangular box that is 14 in. long, 5 in. wide, and 4 in. high. What is the volume of the box?

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A builder has Box A, which is 9 unit cubes long, 4 unit cubes wide, and 6 unit cubes high. Box B is 8 unit cubes long, 5 unit cubes wide, and 5 unit cubes high. Which box holds more unit cubes, and how many more does it hold? Show your reasoning.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A cube-built prism has 4 layers. Each layer has 5 rows of 6 unit cubes. What is the volume?	120 cubic units
2	A rectangular prism is 8 cm long, 9 cm wide, and 1 cm high. What is the volume?	72 cubic centimeters
3	A prism has 10 unit cubes in each row, 5 rows in each layer, and 4 layers. What is the volume?	200 cubic units
4	A rectangular prism is 12 m long, 4 m wide, and 5 m high. What is the volume?	240 cubic meters
5	A rectangular prism is 6 cm long, 11 cm wide, and 4 cm high. What is the volume?	264 cubic centimeters
6	A rectangular prism is 9 in. long, 5 in. wide, and 5 in. high. What is the volume?	225 cubic inches

PART 2 • APPLY IT

1. **312 cubic centimeters** Multiply the three inside dimensions: $13 \times 4 \times 6 = 312$. The box holds 312 cubic centimeters.
2. **280 cubic inches** Multiply the dimensions: $14 \times 5 \times 4 = 280$. The volume is 280 cubic inches.

CHALLENGE

Box A holds 16 more cubic units. Box A has 216 cubic units, and Box B has 200 cubic units.

Accept correct multiplication in any order and answers that include the correct cubic unit. For the challenge, accept a clear comparison using 216 and 200, with a difference of 16.