LESSON MAKER PRO

Build Volume Power

Use prism and cube dimensions to find volume.

GRADE 5 · TEKS 5.4.G

5.4.G "use concrete objects and pictorial models to develop the formulas for the volume of a rectangular prism, including the special form for a cube (V = l x w x h, V = s x s x s, and V = Bh); and"

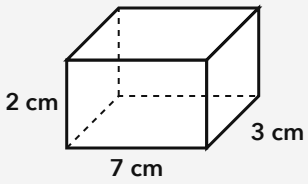
NAME _____ DATE _____

VOLUME RULES

Volume tells how many cubic units fill a solid. For a rectangular prism, multiply length x width x height, or multiply the base area B by the height. For a cube, multiply the side length three times: V = s x s x s.

WORKED EXAMPLE

Find the volume of the rectangular prism: length 7 cm, width 3 cm, height 2 cm.

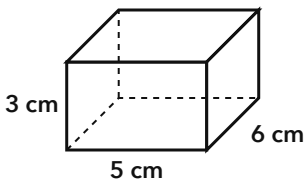


1. V = l x w x h
2. V = 7 x 3 x 2
3. V = 21 x 2 = 42

Answer: 42 cm^3

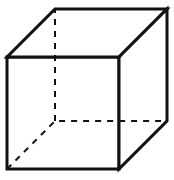
PRACTICE 6 problems

1 Find the volume of the rectangular prism: length 5 cm, width 6 cm, height 3 cm.



ANSWER _____

2 Find the volume of the cube. Each edge is 8 mm.



ANSWER _____

3 A rectangular prism has a base area of 24 cm^2 and a height of 5 cm. Find its volume.

ANSWER _____

4 Find the volume of a rectangular prism with a length of 9 m, a width of 2 m, and a height of 7 m.

ANSWER _____

5 A cube has side lengths of 6 in. Find its volume.

ANSWER _____

6 A rectangular prism has a base area of 35 ft^2 and a height of 4 ft. Find its volume.

ANSWER _____

APPLY IT Show your work

1 A pet club is filling a rectangular fish tank for a classroom display. The tank is 12 in long, 5 in wide, and 4 in high. How many cubic inches of water can the tank hold when it is full?

WORK SPACE

ANSWER _____

2 A game store packs dice in a cube-shaped display box. Each edge of the box is 7 cm long. What is the volume of the box?

WORK SPACE

ANSWER _____

3 Use 12 teacher-supplied unit cubes. Build one rectangular layer 3 units long and 2 units wide, then build a second identical layer above it. On separate paper draw a top-view 3-by-2 grid and a side view showing the two layers. Count cubes per layer and total cubes. Explain why $V = B \times h = l \times w \times h$ for any rectangular prism filled by equal unit cubes. Rebuild 8 cubes into a 2-by-2-by-2 cube; draw its layers and explain why equal edges give $V = s \times s \times s$.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Mia says that a rectangular prism measuring 3 cm by 4 cm by 10 cm has the same volume as a rectangular prism measuring 2 cm by 5 cm by 12 cm. Is Mia correct? Show both volume calculations and explain.

WORK SPACE AND ANSWER

ANSWER KEY

Build Volume Power

GRADE 5 · TEKS 5.4.G

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the volume of the rectangular prism: length 5 cm, width 6 cm, height 3 cm.	**90 cm^3**
2	Find the volume of the cube. Each edge is 8 mm.	**512 mm^3**
3	A rectangular prism has a base area of 24 cm^2 and a height of 5 cm. Find its volume.	**120 cm^3**
4	Find the volume of a rectangular prism with a length of 9 m, a width of 2 m, and a height of 7 m.	**126 m^3**
5	A cube has side lengths of 6 in. Find its volume.	**216 in^3**
6	A rectangular prism has a base area of 35 ft^2 and a height of 4 ft. Find its volume.	**140 ft^3**

PART 2 · APPLY IT

1. **240 in^3** Multiply the three dimensions: 12 x 5 x 4 = 240. The tank holds 240 cubic inches.
2. **343 cm^3** Because the box is a cube, multiply the side length three times: 7 x 7 x 7 = 343.
3. **6 cubes per layer × 2 layers = 12 cubic units. The cube has 4 cubes per layer × 2 layers = 8 cubic units.** Observe building and corresponding layer drawings. Require the general reasoning: each layer has l × w unit cubes, base area B = l × w, and h layers give V = Bh = lwh. For a cube l = w = h = s, so V = s × s × s. Numerical substitution alone is insufficient.

CHALLENGE

Yes. 3 x 4 x 10 = 120 cm^3, and 2 x 5 x 12 = 120 cm^3. Both rectangular prisms have a volume of 120 cm^3.

Accept V = B x h or V = l x w x h when either form fits the given information. Accept correct volume calculations with cubic units, including cm^3, m^3, in^3, or ft^3.