LESSON MAKER PRO

Boxes in Action

Find how much a box holds and how much covers it.

GRADE 7 · MT.7.G.5

MT.7.G.5 "Solve geometrical problems including problems in context that involve area, volume, and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms..."

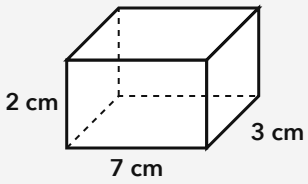
NAME _____ DATE _____

INSIDE OR OUTSIDE?

A rectangular prism's volume tells how much space is inside it: volume = l × w × h. Its surface area tells how much covers all six faces: surface area = 2(lw + lh + wh). Write volume in cubic units and surface area in square units.

WORKED EXAMPLE

What is the surface area of the rectangular prism shown?

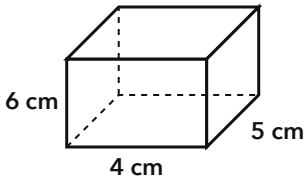


1. Find the areas of three different faces: 7 × 3 = 21, 7 × 2 = 14, and 3 × 2 = 6.
2. Each face has a matching face, so add and double: 2(21 + 14 + 6) = 82.

Answer: 82 cm²

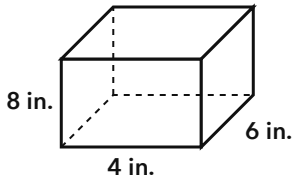
PRACTICE 6 problems

1 How many cubic centimeters can the prism shown hold?



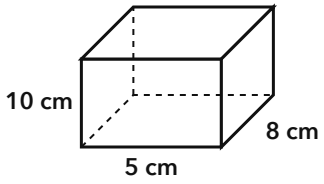
ANSWER _____

2 How many square inches of paper cover all six faces of the prism shown?



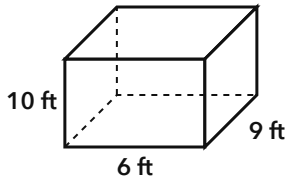
ANSWER _____

3 Find the volume of the prism shown.



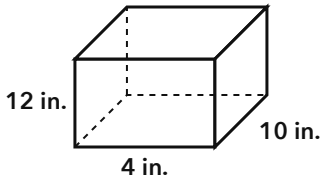
ANSWER _____

4 Find the surface area of the prism shown.



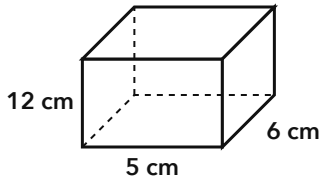
ANSWER _____

5 A box has the dimensions shown. How much space is inside it?



ANSWER _____

6 Find the surface area of the prism shown. Why do you count each different face area twice?

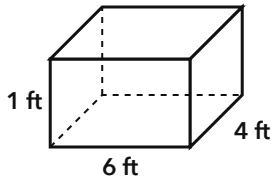


ANSWER _____

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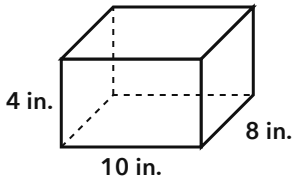
APPLY IT Show your work

1 On the Flathead Reservation, home to the Confederated Salish and Kootenai Tribes, a youth group fills the rectangular garden bed shown with soil. How many cubic feet of soil does it need?



ANSWER _____

2 For a youth art fair in Browning, on the Blackfeet Reservation, a student covers all six faces of the display box shown with colored paper. How many square inches of paper are needed?



ANSWER _____

CHALLENGE One step up

Boxes A and B both hold the same amount. Which box needs less cardboard to cover all six faces, and by how many square centimeters? Show how you know.

BOX DIMENSIONS

Box	Length (cm)	Width (cm)	Height (cm)
A	4	6	10
B	5	6	8

WORK SPACE AND ANSWER

Boxes in Action

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	How many cubic centimeters can the prism shown hold?	**120 cm^3**
2	How many square inches of paper cover all six faces of the prism shown?	**208 $in.^2$**
3	Find the volume of the prism shown.	**400 cm^3**
4	Find the surface area of the prism shown.	**408 ft^2**
5	A box has the dimensions shown. How much space is inside it?	**480 $in.^3$**
6	Find the surface area of the prism shown. Why do you count each different face area twice?	**324 cm^2. Each face has an opposite face with the same area.**

PART 2 · APPLY IT

1. **24 ft^3** Multiply the bed's length, width, and depth: $6 \times 4 \times 1 = 24$ ft^3.
2. **304 $in.^2$** Find the three face areas and double their sum: $2(10 \times 8 + 10 \times 4 + 8 \times 4) = 304$ $in.^2$.

CHALLENGE

Box B needs 12 cm^2 less cardboard. Box A: $2(4 \times 6 + 4 \times 10 + 6 \times 10) = 248$ cm^2. Box B: $2(5 \times 6 + 5 \times 8 + 6 \times 8) = 236$ cm^2.

Accept equivalent calculations with correct square or cubic units. In the challenge, each box has a volume of 240 cm^3, but their surface areas differ.