Same Volume, Different Shape

What You Need

- Recording Sheet

Check Understanding

Describe three different arrangements of unit cubes for a prism with a volume of 24 cubic units. Sketch each prism.

What You Do

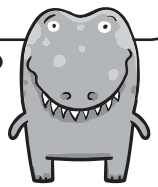
1. Take turns. Look at the *Prism 1* column on the **Recording Sheet.**
2. Choose a prism and tell its volume. Explain why you think this volume is correct.
3. If your partner agrees, write the volume in the *Volume* column on the **Recording Sheet.**
4. In the *Prism 2* column, sketch another prism (in pencil) with different dimensions that has the same volume. Tell its volume and why you think the volume is correct.
5. Your partner checks your work. Make changes if needed.
6. Continue until the **Recording Sheet** is complete.

I built a rectangular prism that has 3 rows of 6 unit cubes, and 2 layers:

$(3 \times 6) \times 2 = 36$

To build a different prism with the same volume, I can:

- Change the order of the factors: $(2 \times 3) \times 6 = 36$
- Use other factors of 36: 1, 2, 3, 4, 6, 9, 16, 18, 36
  $(2 \times 2) \times 9 = 36$



Go Further!

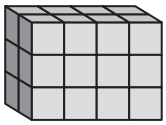
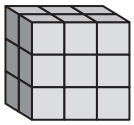
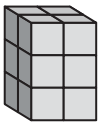
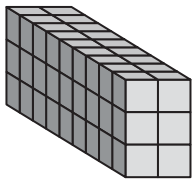
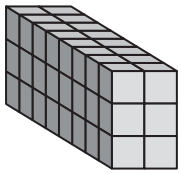
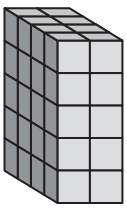
Show all the ways you can think of to represent a rectangular prism with a volume of 21 cubic feet. Exchange papers with your partner to check each other's answers.

Center Activity 5.41 ★★ Recording Sheet

Partner A _____

Partner B _____

Same Volume, Different Shape

Prism 1	Volume (cubic units)	Prism 2
	_____	
	_____	
	_____	
	_____	
	_____	
	_____	

Center Activity 5.42 ★★

Find the Prism

What You Need

- unit cubes
- 6 game markers in one color
- 6 game markers in a different color
- Game Board

Check Understanding

A rectangular prism is measured in inches. The expression $(4 \times 4) \times 5$ represents its volume. Use unit cubes to build the prism. Tell its volume and explain how you got your answer.

What You Do

1. Takes turns. Choose a letter.
2. Read the expression next to that letter in the table. Evaluate the expression.
3. Find a prism on the **Game Board** with the same volume as your answer to number 2.
4. Your partner builds the prism with unit cubes to check your work.
5. If you are correct, cover that prism with your game marker. If you are incorrect, your partner covers that prism with his or her game marker.
6. Each partner takes four turns. The player with the greater number of game markers wins.

A	20×4
B	$10 + 10 + 10$
C	$(3 \times 2) \times 8$
D	$6 + 6 + 6$
E	$(2 \times 2) \times 6$
F	10×6
G	$12 + 12 + 12$
H	$(13 \times 2) \times 2$
I	8×3

Go Further!

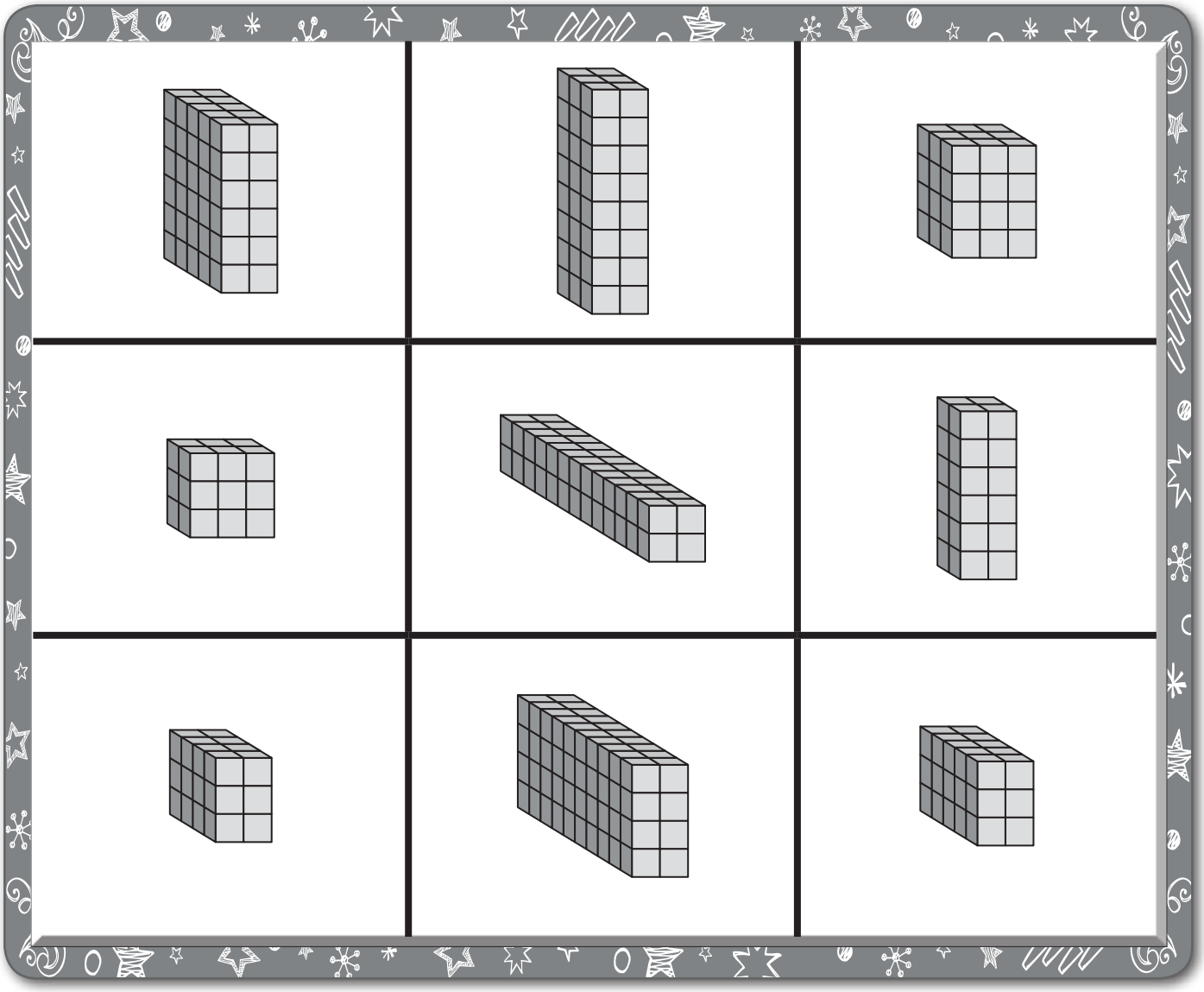
Find the prism on the **Game Board** that is not covered with a game marker. Use unit cubes to build the prism. If each unit cube represents 1 cubic centimeter, what is the volume of the prism? Write two different expressions that show how to find that volume.

Center Activity 5.42 ★★ Game Board

Partner A _____

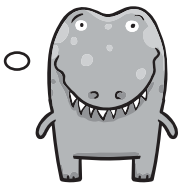
Partner B _____

Find the Prism



Think! Does the expression represent:

- adding the number of cubes in each layer?
- multiplying the number of rows by cubes per row by number of layers?
- multiplying the number of cubes per layer by the number of layers?



Center Activity 5.43 ★★

Use Volume Vocabulary

What You Need

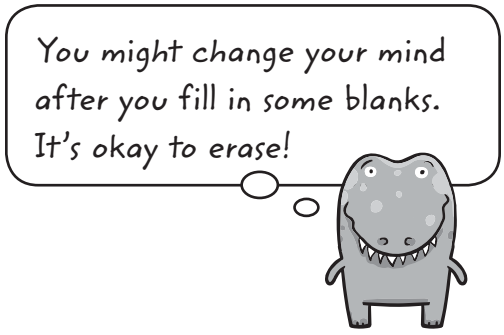
- Recording Sheet

Check Understanding

A crate is 8 feet long and 4 feet wide. Its height is 5 feet. Find its volume. Use volume vocabulary to tell your method.

What You Do

1. Read the problem on the **Recording Sheet.** Think about how to solve it.
2. Read the paragraphs that tell how to solve the problem.
3. Use words and numbers from the word bank and number bank to fill in the blanks. You may use some numbers more than once.
4. Take turns. After you fill in a blank, your partner fills in the next one.
5. When all the blanks are filled in, read the paragraphs aloud. Do they make sense?
6. Fix any mistakes if you need to.



Go Further!

The area of the base of a rectangular prism and the volume of a rectangular prism are measured in different units. Write one or two sentences about why this is true. Use at least three of the words in the box below.

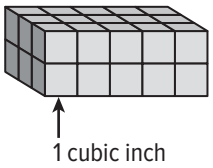
2-dimensional		3-dimensional	cubic units
plane	rectangle	solid	square units

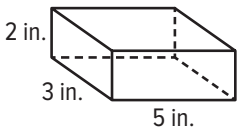
Partner A _____

Partner B _____

Use Volume Vocabulary

The figures show a *model* and a *diagram* of a small box. Will counting the unit cubes that fill the figure and the volume formula give the same volume?





The model is a _____ made of 1-inch _____. Its _____ is a rectangle made of _____ rows of _____ unit cubes, for a total of _____ unit cubes. The model has _____ layers. The _____ of the model is: *area of the base* × _____, or (_____ × _____) × _____ = _____ cubic inches.

The diagram shows the _____ of the box as: _____ = 5 in., _____ = 3 in., _____ = 2 in.

You can use the _____ $l \times w \times h$ to find the volume: _____ × _____ × _____ = _____ cubic inches. Both ways give the same volume.

Word Bank
area
base
dimensions
formula
height
length
rectangular prism
unit cubes
width
volume

Number Bank
2
3
5
15
30

Center Activity 5.44 ★★

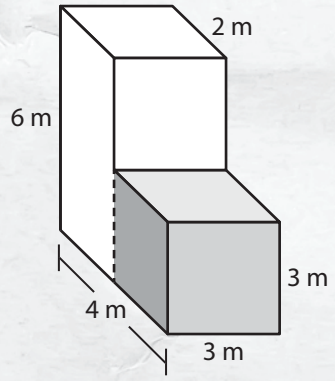
Volume of Composite Figures

What You Need

- a colored pencil in one color
- a colored pencil in a different color
- Recording Sheet

Check Understanding

Find the volume of the composite figure by breaking the figure apart into two rectangular prisms.



What You Do

1. Take turns. Partner A chooses a composite figure on the **Recording Sheet.**
2. Partner A draws a dashed line on the composite figure to form two rectangular prisms.
3. Both partners find the volume of the composite figure using the two prisms made.
4. Compare your answers. If the answers are different, work together to find the correct volume.
5. Repeat for all the figures on the **Recording Sheet.**

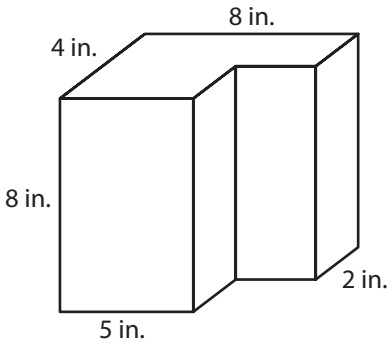
Go Further!

Choose a composite figure from the **Recording Sheet.** Find the volume by breaking the figure apart in a different way. Compare this volume to the volume shown on the **Recording Sheet.**

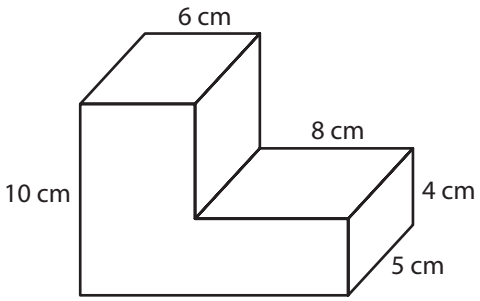
Partner A _____

Partner B _____

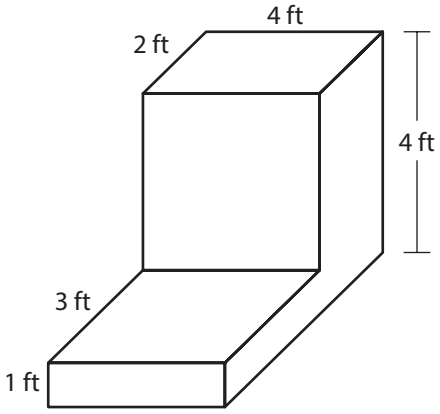
Volume of Composite Figures



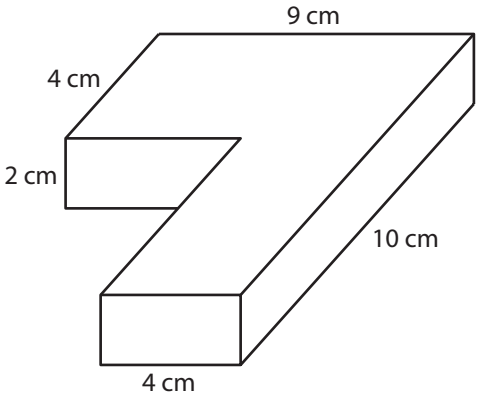
Volume = _____



Volume = _____



Volume = _____



Volume = _____

I can find the volume of these composite figures by breaking them apart into rectangular prisms. There may be more than one way to break apart the composite figures.