



3

Over 1.6 million one-inch-square glass tiles cover the walls of the Outer Bay exhibit in Monterey, California. What is an estimate for the volume of the main viewing window of this exhibit? You will find out in Lesson 14-6.



Review What You Know!

Vocabulary

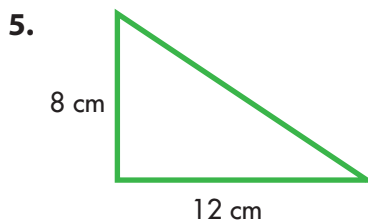
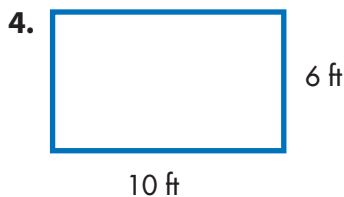
Choose the best term from the box.

- quadrilateral
- square
- triangle

1. A polygon with only 3 sides is a ? .
2. Every rectangle is a ? .
3. A rectangle with all sides the same length is a ? .

Area

Find the area of each figure.



Multiplication

Find each product.

6. $10 \times 8 \times 5$
7. $20 \times 40 \times 5$
8. $15 \times 15 \times 15$
9. $\frac{1}{2} \times 10 \times 8$

Geometry

10. **Writing to Explain** How are parallel lines different from intersecting lines?

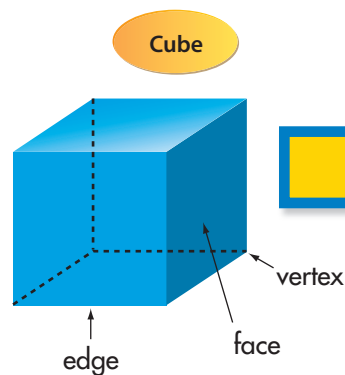


MG 3.6, Grade 4
Visualize, describe, and make models of geometric solids (e.g., prisms, pyramids) in terms of the number and shape of faces, edges, and vertices; interpret two-dimensional representations of three-dimensional objects; and draw patterns (of faces) for a solid that, when cut and folded, will make a model of the solid.

Solids

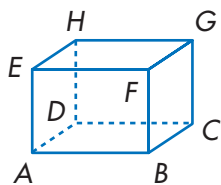
What is a solid figure?

A **solid figure** has 3 dimensions and takes up space. One solid is the **cube**. It has 6 **flat surfaces** or **faces**. All the faces are squares. Each pair of faces intersects in a segment called an **edge**, and each pair of edges intersects at a point called the **vertex**. The plural of vertex is vertices.



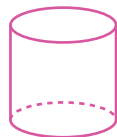
Other Examples

Some solid figures have curved surfaces, while others have all flat surfaces.



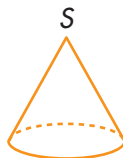
Prism

Solid with two congruent parallel bases and faces that are parallelograms.



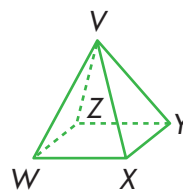
Cylinder

Solid with two circular bases that are congruent and parallel.



Cone

Solid with one circular base. The points on this circle are joined to one point outside the base.



Pyramid

Solid with a base that is a polygon. The edges of the base are joined to a point outside the base.

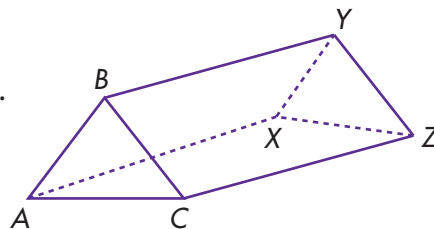
Naming the parts of a solid

Name the vertices, edges, and faces of the triangular prism.

Vertices: $A, B, C, X, Y,$ and Z

Edges: $\overline{AB}, \overline{AC}, \overline{BC}, \overline{XY}, \overline{XZ}, \overline{YZ}, \overline{AX}, \overline{BY},$ and \overline{CZ}

Faces: triangles ABC and XYZ , quadrilaterals $ABYX, CBYZ,$ and $AXZC$



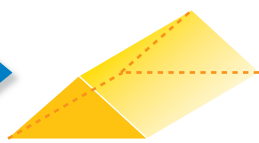
Explain It

- How many faces, vertices, and edges are there in the triangular prism above?
- Name other objects in the real world that have similar shapes to the solids described above.

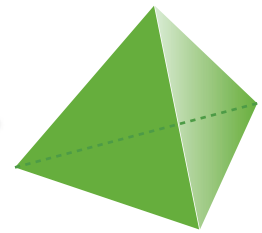
Rectangular prism



Triangular prism



Triangular pyramid

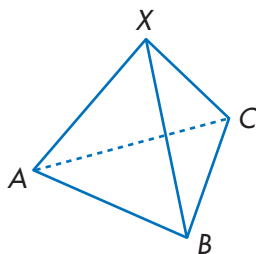


Guided Practice*

Do you know HOW?

For 1 through 3, use the solid at the right.

1. Name the vertices.
2. Name the faces.
3. Name the edges.



Do you UNDERSTAND?

4. What is the name of the solid figure at the left?
5. Which of the solid figures in Other Examples have curved surfaces?
6. How many faces does a triangular prism have?

Independent Practice

For 7 through 9, tell which solid figure each object resembles.

7.



8.

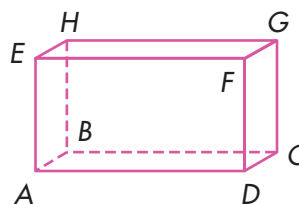


9.



For 10 through 12, use the drawing to the right.


10. Name the faces.
11. Name the vertices.
12. Name the edges.





*For another example, see Set A on page 338.


13. Which of the following decimals is equivalent to 12.45?
- A 12.0045
 - B 12.0450
 - C 12.4500
 - D 124.5000
15. Luke's tent weighs $6\frac{1}{2}$ pounds. His fishing tackle weighs $5\frac{1}{2}$ pounds. What is the total weight of both items?
17. One week, Mary worked for 29 hours. She earned \$6 per hour. How much did Mary earn for the time she worked?
19. Before Andy went shopping, he added \$5 he had earned to the money that was already in his wallet. He bought a backpack for \$19 and a headset for \$12. After he paid for the items, Andy had \$8.25 left. How much money did Andy have to begin with?
21. Tori gates are often found in Japan, where they originate. What kinds of solids can you find in a Tori gate?



14. Which of the following solids has a curved surface?
- A Pyramid
 - B Cube
 - C Prism
 - D Cone
16. **Reasoning** A certain kind of prism has 9 edges and 5 faces. What kind of prism is it?
18. Wei made two square pyramids and glued the congruent bases together. How many faces does her figure have?
20. Which of the following is NOT a rectangular prism?
- A 

B 

C 

D 
22. **Algebra** Fillmore Park had 75 spruce trees. Volunteers planted 39 more trees. Solve $75 + 39 = t$ to find the total number of spruce trees there are in the park now.

23. Draw a picture of a pyramid that has a pentagon as its base.
24. An airplane has 37 rows of seats, and there are 3 seats on each side of the center aisle. How many passengers can this plane hold if all the seats are occupied?

Algebra Connections

Shape Patterns

Look at the shapes below. Can you identify a pattern?



The pattern is 1 rectangle, 1 circle, 1 square, and 1 circle.

In **1** through **6**, name the shape asked for in each pattern.

1. What is the 13th shape?



2. What is the 20th shape?



3. What is the 50th shape?



5. What is 11th shape?



Example:

Name the 10th shape in the pattern at left.

Think How many shapes before the pattern repeats itself?

The pattern of 1 rectangle, 1 circle, 1 square, 1 circle repeats after 4 shapes.

$$4 + 4 + 2 = 10$$

The 2nd shape in the pattern is a circle, so the 10th shape is also a circle.

4. What is the 28th shape?



6. What is the 50th shape?



In **7** through **12**, continue each pattern for two more figures.





MG 3.6, Grade 4
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Relating Shapes and Solids

How can you use a two-dimensional shape to represent a three-dimensional solid?

A **net** is a plane figure which, when folded, gives a solid figure.

How can you draw a net for this solid figure?

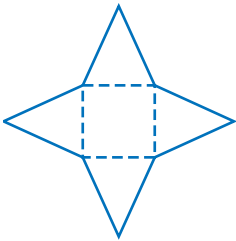


Guided Practice*

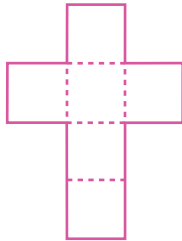
Do you know HOW?

Predict what solid each net will make.

1.



2.



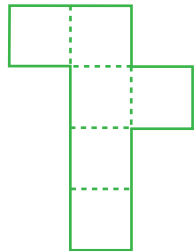
Do you UNDERSTAND?

- Writing to Explain** How did you make your predictions in Exercises 1 and 2?
- A solid may have different nets. Draw a different net for the solid you identified in Exercise 2.

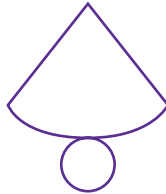
Independent Practice

For 5 through 7, predict what solid each net will make.

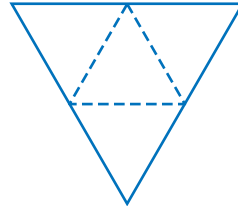
5.



6.



7.



In 8 and 9, draw a net for each solid.

8.



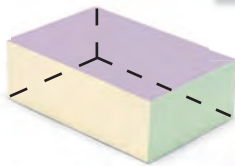
9.



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Step 1

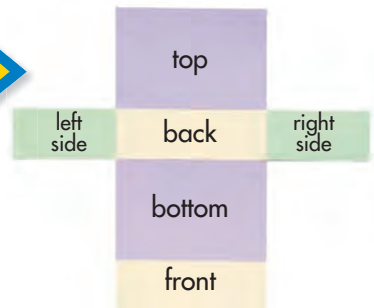
Imagine making cuts along some edges of a solid and opening it into a plane.

**Step 2**

Open up the box along the edges.

**Step 3**

Unfold the box and lay it flat—this is the net for the box.

**Problem Solving**

- 10.** A net has 4 large rectangles and 2 small rectangles. What solid figure might it make?
- A** Rectangular prism
B Square pyramid
C Triangular prism
D Rectangular pyramid
- 11.** Molly spent \$120 on two items. One cost \$10 more than the other. Which shows the correct cost for each?
- A** \$60, \$50
B \$50, \$60
C \$60, \$70
D \$55, \$65
- 12. Strategy Focus** When some rock music is played unamplified its sound has been measured at 62 decibels. Sound for amplified music can be measured at 124 decibels. Draw a picture and write an equation to find the difference between the number of decibels measured.
- 13.** One company offers customers an Internet coupon to get a \$2 discount on their Web site. If the value of the coupons downloaded so far is \$6,000, how many coupons have been downloaded?
- 14. Algebra** Diane is thinking of a number. She doubles it and adds 10. Her result is 50. Which equation could you use to find Diane's number?
- A** $(2 \times n) - 10 = 50$
B $2 \times 10n = 50$
C $2 \times n = 50$
D $(2 \times n) + 10 = 50$
- 15.** In what fraction of the days was the temperature between 30°F and 40°F? In what fraction was the temperature greater than 40°F?

For **15**, use the table below.

Temperature							
Day	1	2	3	4	5	6	7
Temperature °F	34°	45°	37°	39°	48°	29°	36°

Lesson 14-3



MG 1.2 Construct a cube and rectangular box from two-dimensional patterns and use these patterns to compute the surface area for these objects. Also **MG 1.0**

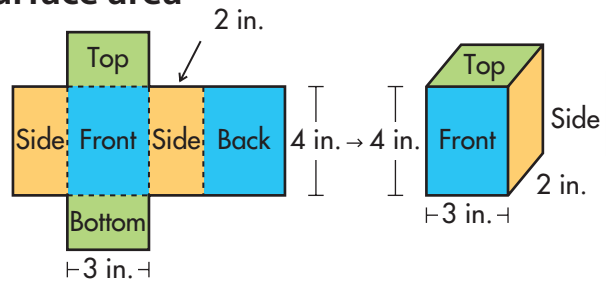
Surface Area

Hands-On
grid paper



How can you find the surface area of a rectangular prism?

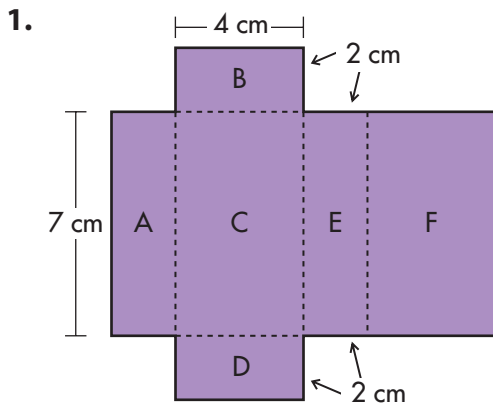
Remember that a net is a plane figure which when folded gives a solid figure. The **surface area (SA)** of a rectangular prism is the sum of the area of all its faces.



Guided Practice*

Do you know HOW?

Copy the following net on grid paper. Make each rectangle the size shown by the labels. Then cut out the net and fold it to make a rectangular prism.

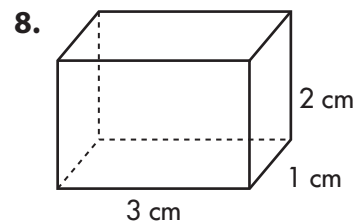
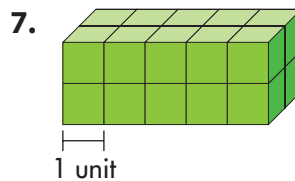
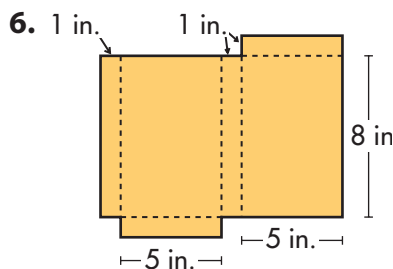


Do you UNDERSTAND?

- List the congruent faces in the net in Exercise 1.
- Find the surface area of the solid you built in Exercise 1.
- For which type of rectangular prism could you find the surface area by finding the area of 1 face and multiplying by 6?
- What is the surface area of a cube with an edge that measures 3 cm?

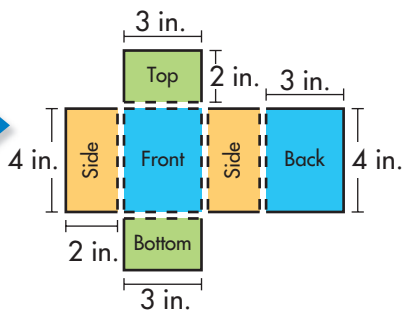
Independent Practice

In 6 through 8, find the surface area of each solid.



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Notice that the solid figure has 6 faces that are rectangles.



Add the areas of all the faces to find the surface area (SA).

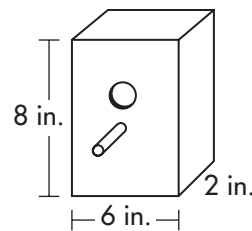
$$\begin{aligned}
 SA &= (4 \times 2) + (4 \times 2) + (4 \times 3) + (4 \times 3) + (3 \times 2) + (3 \times 2) \\
 &= 8 + 8 + 12 + 12 + 6 + 6 \\
 &= 52 \text{ square inches (in}^2\text{)}
 \end{aligned}$$

The surface area of the rectangular prism is 52 in².

Problem Solving

Use the drawing at the right to answer **9** through **11**.

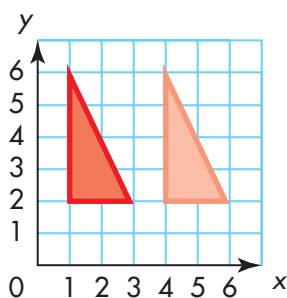
- 9.** Draw a net to represent Mylah's birdhouse. Find the surface area.



- 10.** If Mylah buys paint to cover 76 square inches, will she have enough paint to cover the surface area of the birdhouse? Explain.

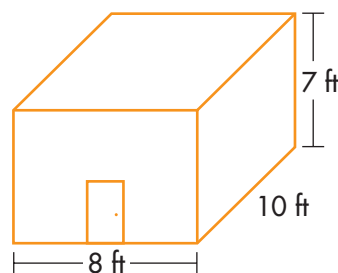
- 11. Writing to Explain** If Mylah puts a ribbon around the base of the birdhouse, would she need to find the perimeter or the area of the base?

- 12.** What transformation is shown below?



- 13.** Morgan received a parcel that was 4 ft by 2 ft by 3 ft. Kenley received a parcel that was 3 ft by 1 ft by 5 ft. Whose package had the greater surface area? Explain.

- 14.** The Pueblo tribe of New Mexico lived in houses that looked like boxes stacked on top of one another. What would the surface area of the outer walls and roof of a pueblo house be if it had the dimensions shown at the right?



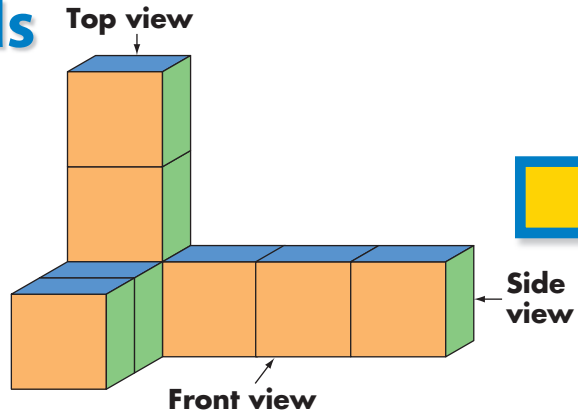


MG 2.3 Visualize and draw two-dimensional views of three-dimensional objects made from rectangular solids.

Views of Solids

How can you get information about a solid by viewing it from different perspectives?

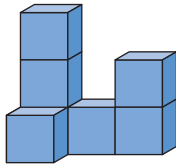
What do the different views of this stack of cubes look like?



Guided Practice*

Do you know HOW?

1. Sketch the front, top and side views of the solid figure below.

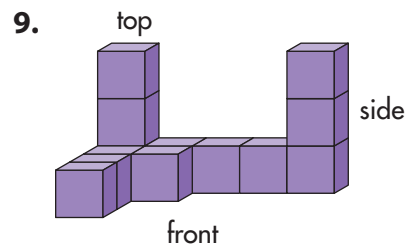
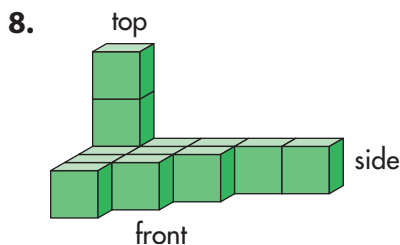
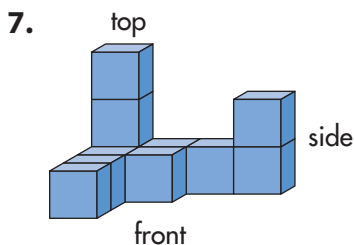
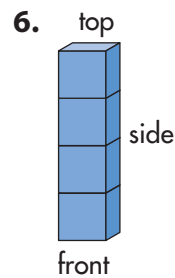
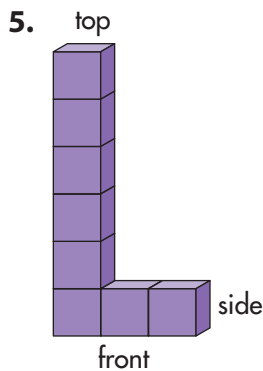
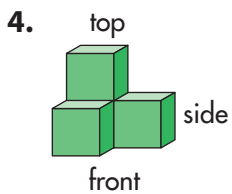


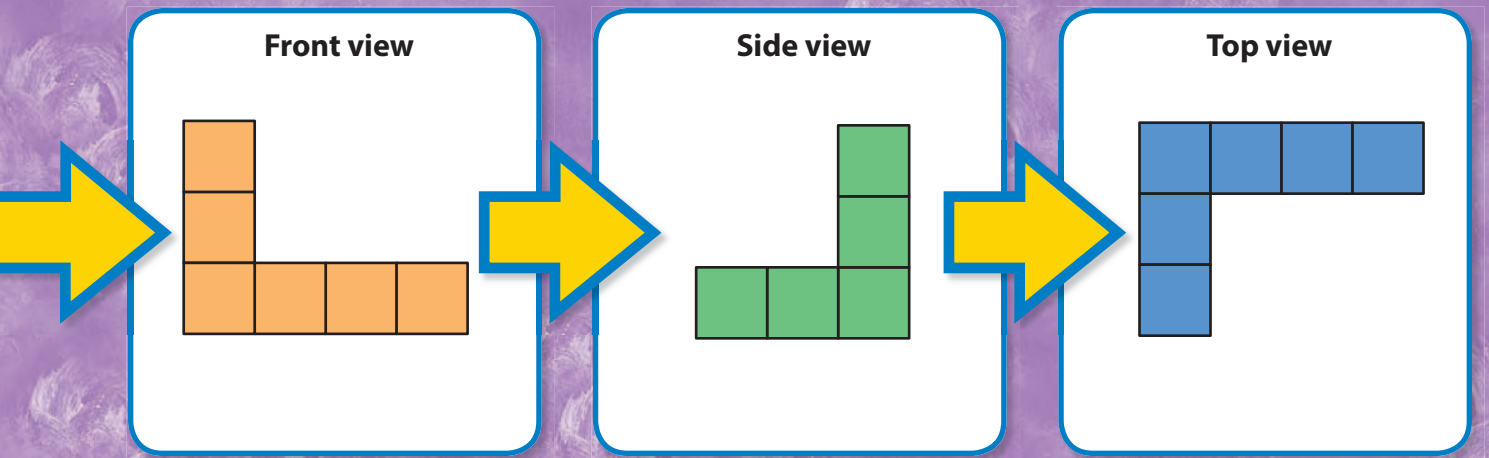
Do you UNDERSTAND?

2. How many blocks are not visible in the diagram at the left?
3. Draw what the bottom view looks like.

Independent Practice

In 4 through 9, draw front, side, and top views of each stack of unit blocks.





Problem Solving

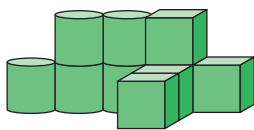
10. Beth, Toby, Juan, and Patricia walked 6 miles to raise money. Beth and Patricia each raised \$3.50 for each mile walked. Toby raised \$3 for each mile walked, and Juan raised \$22 in all. Who raised the most money?

A Beth C Juan
 B Toby D Patricia

11. Hina bought 21 stickers and 7 rope bracelets. She wants to make small gift packs for her friends. Each gift pack has 3 stickers and 1 rope bracelet. Stickers cost \$1.50 each, and bracelets cost \$2 each. How much does it cost Hina to make each gift pack?

A \$45.50 C \$3.50
 B \$6.50 D None of the above

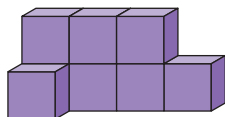
12. Draw the front, side, and top view of this stack of cubes and cylinders.



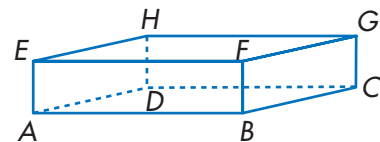
13. A bag contains 5 red marbles, 1 green marble, and 1 yellow marble. If you choose one marble, describe the chance of drawing a red marble.

A Certain C Likely
 B Impossible D Unlikely

14. How many blocks are not visible from the top view?



15. In the figure below, which face is parallel to Face ABCD?



A BCGF C EFGH
 B ADHE D DCGH

16. If 10 cubes are stacked vertically, how many cubes are not visible from the top view?



MG 1.3 Understand the concept of volume and use the appropriate units in common measuring systems (i.e., cubic centimeter [cm³], cubic meter [m³], cubic inch [in³], cubic yard [yd³]) to compute the volume of rectangular solids. Also **MG 1.0, 1.4.**

Models and Volume

Hands-On
unit cubes

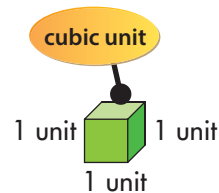
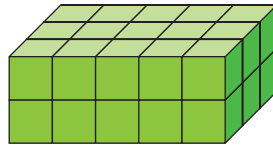


How can you measure space inside a solid figure?

Volume is the number of cubic units needed to fill a solid figure.

A **cubic unit** is the volume of a cube 1 unit on each edge.

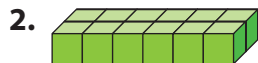
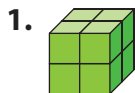
What is the volume of this solid?



Guided Practice*

Do you know HOW?

Use cubes to make a model of each rectangular prism. Find the volume by counting the number of cubes needed to make the model.

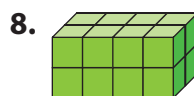
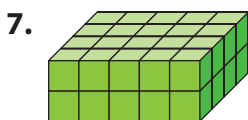
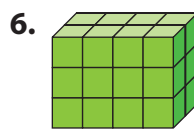
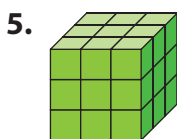


Do you UNDERSTAND?

3. Make a model of a rectangular prism with a base that is 3 cubes long by 3 cubes wide. The height of the prism is 2 cubes. Then draw a picture of your model.
4. If you add another layer to the top of the prism in Exercise 1, what is the new volume?

Independent Practice

In **5** through **8**, find the number of cubes needed to make each rectangular prism. You can use unit cubes or you can count the cubes by looking at the drawing.

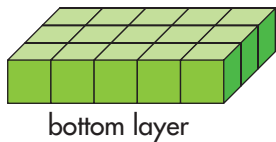


9. How many cubes would it take to make a model of a rectangular prism that is 4 units long by 3 units wide by 3 units high?



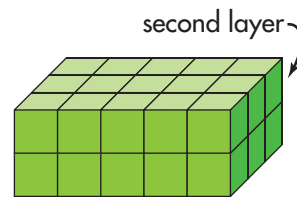
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Use cubic units to make a model.



Count the number of cubes.
There are 15 cubes in the bottom layer

There are two layers.



Multiply the volume of the bottom layer by 2.
The volume of the prism is 2×15 or 30 cubic units.

Problem Solving

For **10** through **13**, use the table at the right.

Compare the volumes of the prisms.
Write $<$, $>$, or $=$ for each \bigcirc .

10. Prism A \bigcirc Prism B

11. Prism B \bigcirc Prism C

12. If you added another layer of unit cubes on top of Prism A, what would its volume be?

14. Number Sense A jaguar is 80 inches long. A school's jaguar mascot is 7 feet tall. Is the mascot longer or shorter than a real jaguar?

16. Think About the Process One carton of books weighs 8.4 kg. Ramon put a book weighing 1.2 kg into the carton and removed 2 books weighing 1.1 kg each. Which number sentence could be used to find the final weight of the carton?

- A** $8.4 + 1.2 + 2.2$ **C** $(8.4 + 1.2) \times 2 - 1.1$
B $8.4 + 1.2 - (2 \times 1.1)$ **D** $8.4 + 1.2 + 2(1.1)$

Prism	Model
A	
B	
C	

13. If you put Prism C on top of Prism A, what would the volume of the new solid be?

15. Reasoning Ms. Kellson's storage closet is 3 feet long, 3 feet wide, and 7 feet high. Can she fit 67 boxes that are 1-foot cubes in her closet? Explain your answer.



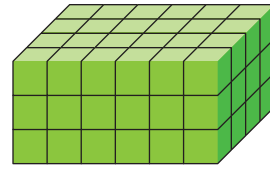
MG 1.3 Understand the concept of volume and use the appropriate units in common measuring systems (i.e., cubic centimeter [cm³], cubic meter [m³], cubic inch [in.³], cubic yard [yd³]) to compute the volume of rectangular solids. Also **MG 1.4**

Volume

How do you use a formula to find the volume of a rectangular prism?

Remember that volume is the number of cubic units (units)³ needed to fill a solid figure.

The volume of the rectangular prism at the right is 72 cubic units.



Another Example

How can you find the volume of a rectangular prism when the area of the base is given?

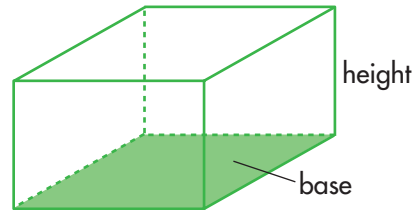
If a rectangular prism has a base area B and a height h , use this formula:

Volume = base \times height

$$V = B \times h$$



Base area is the same as $l \times w$



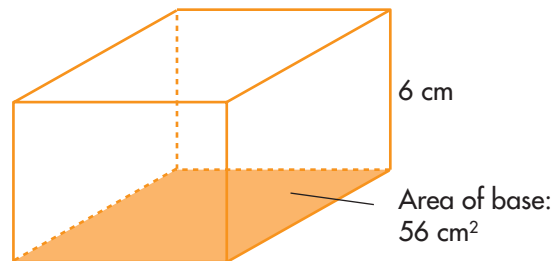
Find the volume of a rectangular prism with a base area of 56 cm² and a height of 6 cm.

$$V = B \times h$$

$$V = 56 \times 6$$

$$V = 336 \text{ cm}^3$$

The volume of the rectangular prism is 336 cm³.



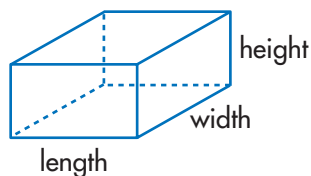
Explain It

1. How is counting cubes related to the formulas for finding volume?
2. How do you know which formula for volume to use?

If the measurements of a rectangular prism are given in length l , width w , and height h , then use this formula to find volume V :

Volume = (length \times width) \times height

$$V = (\ell \times w) \times h$$

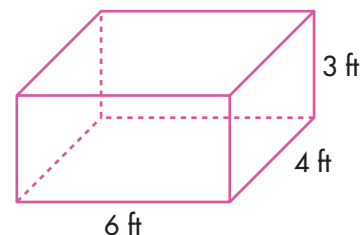


Use the formula to find the volume of the rectangular prism.

$$V = (\ell \times w) \times h$$

$$V = (6 \times 4) \times 3$$

$$V = 72 \text{ ft}^3$$



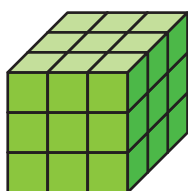
The volume of the rectangular prism is 72 ft³.

Guided Practice*

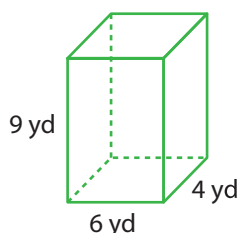
Do you know HOW?

In 1 through 3, find the volume of each rectangular prism.

1.



2.



3. Base area: 26 m²
height: 4 m

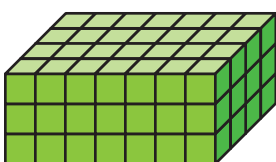
Do you UNDERSTAND?

- In the example above, could you first multiply the height by the width?
- A cereal box measures 6 in. by 10 in. by 2 in. Draw a rectangular prism and label it. What is the volume of the figure you drew?
- Writing to Explain** How can you use different methods to find the volumes of the prisms in Exercises 1–3?

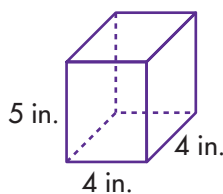
Independent Practice

In 7 through 12, find the volume of each rectangular prism.

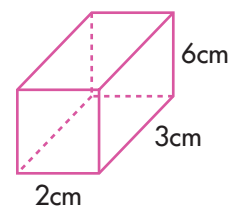
7.



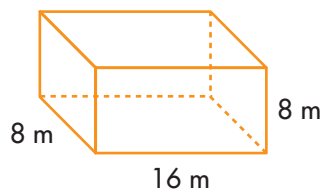
8.



9.



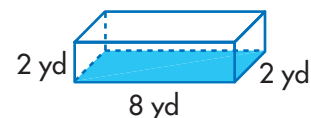
10.



11.



12.



Animated Glossary
www.pearsonsuccessnet.com

*For another example, see Set E on page 339.

Independent Practice

For **13** through **15**, find the volume of each rectangular prism.

13. Length: 8 in., width: 7 in., height: 5 in.

14. Base area: 100 ft² height: 17 ft

15. Base area: 72 yd² height: 8 yd

Problem Solving

For **16** through **18**, use the information below.

Sixty-four students are planning a field trip to the Art Museum. Each student will pay \$9. Each van can hold 7 students and 1 driver.

16. How much money will be collected if all the students attend?

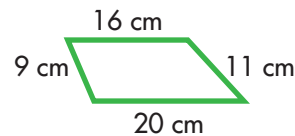
17. How many vans will be needed if all the students travel to the museum?

18. The school pays each driver \$50 to drive the van. If the round trip takes 4 hours, how much does each driver make per hour?

19. A refrigerator measures 6 feet tall, 4 feet wide, and 3 feet deep. What is the volume of the refrigerator?

20. Only 3 students per event can win medals at the track meet. If 9 students are competing, what fraction of the students will win a medal?

21. What is the perimeter of this figure?



22. Algebra Last week 22 people worked a total of 1,100 hours. Each person worked the same number of hours. Which equation demonstrates this situation?

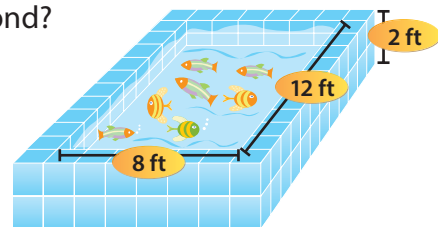
23. Writing to Explain Harry is in line at the store. He has 3 items that cost \$5.95, \$4.25, and \$1.05. Explain how Harry can add the cost of the items mentally before he pays for them.

A $1,100h = 22$ **C** $h \div 1,100 = 22$

B $22 \div h = 1,100$ **D** $22h = 1,100$

24. Estimation The Outer Bay exhibit in Monterey, California, has a viewing window that is 56.5 feet long, 17 feet tall, and 13 inches thick. Estimate its volume in cubic feet. HINT: 13 inches is about 1 foot.

25. Think About the Process Which of the following expressions could be used to find the volume of this indoor fish pond?



A $2 \times (8 \times 12 \times 2)$ **C** $(12 \times 8) + 2$

B 8×12 **D** $(12 \times 8) \times 2$



Find each quotient. Simplify if possible.

1. $4\frac{1}{2} \div 1\frac{1}{4}$

2. $2\frac{1}{2} \div 1\frac{1}{2}$

3. $3\frac{1}{6} \div 2\frac{2}{3}$

4. $2\frac{2}{5} \div 1\frac{1}{3}$

5. $7\frac{1}{2} \div \frac{1}{4}$

6. $6\frac{3}{4} \div 9$

Find each sum. Simplify if possible.

7.
$$\begin{array}{r} 2\frac{1}{2} \\ + 1\frac{3}{10} \\ \hline \end{array}$$

8.
$$\begin{array}{r} 4\frac{3}{4} \\ + 2\frac{1}{12} \\ \hline \end{array}$$

9.
$$\begin{array}{r} 1\frac{2}{3} \\ + 1\frac{5}{6} \\ \hline \end{array}$$

10.
$$\begin{array}{r} 2\frac{1}{4} \\ + 3\frac{3}{8} \\ \hline \end{array}$$

11.
$$\begin{array}{r} \frac{11}{12} \\ + 3\frac{1}{3} \\ \hline \end{array}$$

Find each difference. Simplify if possible.

12. $\frac{5}{6} - \frac{2}{3}$

13. $\frac{7}{10} - \frac{1}{2}$

14. $\frac{1}{4} - \frac{1}{6}$

15. $\frac{4}{9} - \frac{1}{3}$

16. $\frac{3}{4} - \frac{1}{12}$

Error Search Find each answer that is not correct. Write it correctly and explain the error.

17. $4\frac{1}{2} \div 2\frac{1}{6} = 2\frac{1}{13}$

18. $3\frac{5}{6} + 2\frac{2}{3} = 5\frac{1}{2}$

19. $\frac{8}{9} - \frac{1}{3} = \frac{7}{6}$

Number Sense

Estimating and Reasoning Write whether each statement is true or false. Explain your reasoning.

20. The product of 4 and $\frac{3}{5}$ is less than 4.

21. The sum of 14.84 and 13.96 is greater than 27 but less than 29.

22. The product of 20 and 4.89 is closer to 80 than 100.

23. The quotient of $32,480 \div 40$ is less than 800.

24. The product of 6.12 and 40.32 is greater than 240.

25. The sum of $7.97 + 4.25$ is 0.03 less than 12.25.

26. The quotient of $1.87 \div 3$ is closer to 0.7 than 0.6.



MR 1.2 Determine when and how to break a problem into simpler parts.
Also **MR 2.2, MG 2.4**

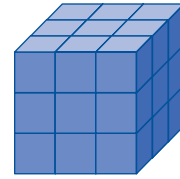
Problem Solving

Use Objects and Solve a Simpler Problem

Hands-On
cubes



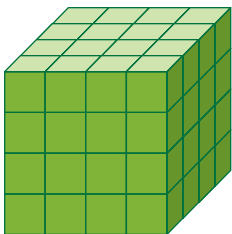
Shown at the right are 27 cubes that were glued together to form a larger cube. Then, all 6 faces of the larger cube were painted. How many of the 27 cubes have paint on 1 face? On 2 faces? Use cubes to make a model.



Guided Practice*

Do you know **HOW?**

1. Use cubes and the example of the simpler problem above to build a larger cube with 4 layers. Each layer will have 4 rows of 4 cubes. How many cubes will the larger cube contain?



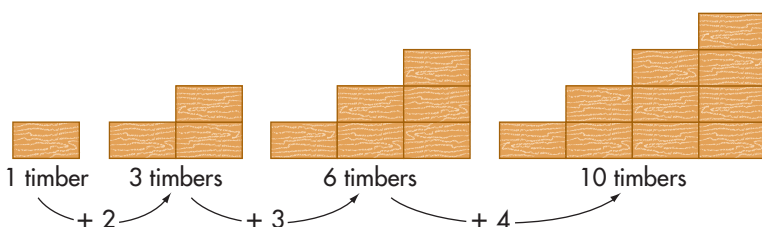
Do you **UNDERSTAND?**

2. Think of gluing the cubes together for the $4 \times 4 \times 4$ cube you made. Then, think of painting the outside faces. How many cubes will have paint on 1 side? On 2 sides? On 3 sides?
3. **Write a Problem** Write a real-world problem that involves using objects to help solve a simpler problem.

Independent Practice

In **4** through **8**, use objects to help you solve a simpler problem. Use the solution to help you solve the original problem.

4. Alicia uses wood timbers to build steps. The pattern is shown for 1, 2, 3, and 4 steps. How many timbers will she need to build 10 steps?



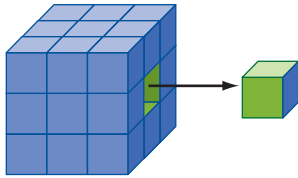
Stuck? Try this....

- What do I know?
- What am I asked to find?
- What diagram can I use to help understand the problem?
- Can I use addition, subtraction, multiplication, or division?
- Is all of my work correct?
- Did I answer the right question?
- Is my answer reasonable?

Plan and Solve

How many cubes have paint on 1 face?

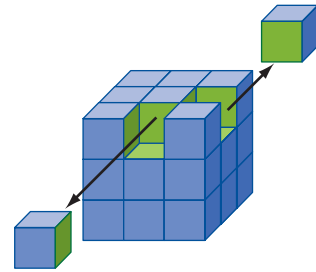
The center cube on each of the 6 faces of the larger cube has paint on 1 face.



Six of these cubes have paint on 1 face.

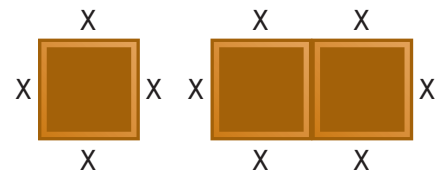
How many cubes have paint on 2 faces?

Only 1 cube on each of the 12 edges of the larger cube has paint on 2 faces.

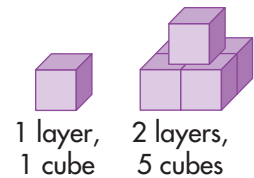


Twelve of these cubes have paint on 2 faces.

5. Four people can be seated at a table. If two tables are put together, six people can be seated. How many tables are needed to make a long table that will seat 20 people?

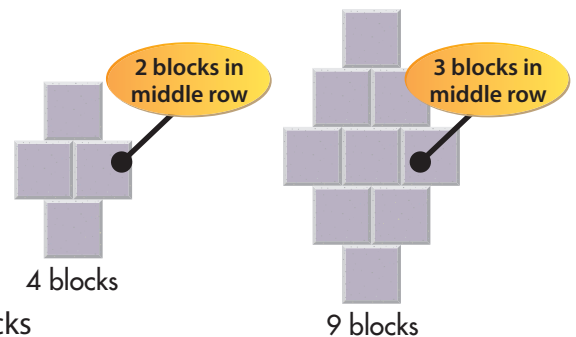


6. Jeremiah wants to make a display of CD boxes. He wants a single box on the top layer. Layers that are below the top layer must form a square, with each layer being 1 box wider than the layer above it. The display can only be 4 layers high. How many total boxes will be in the display? Use cubes.



7. Katherine is constructing a patio using the design shown at the right.

- How many total blocks will she need in order to have 5 blocks in the middle row?
- How many total blocks will she need in order to have 6 blocks in the middle row?
- What do you notice about the number of blocks in the middle row compared to the total number of blocks?



8. An artist wants to cut 1 flat sheet of copper into 16 equal pieces. Before he cuts, he will draw segments on the sheet of copper showing where to make the cuts. How many horizontal and vertical segments will he need to draw?

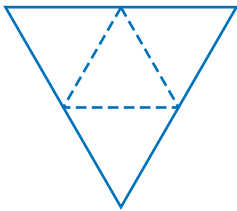
9. There are 24 balls in a large bin. Two out of every three are basketballs. The rest are footballs. How many basketballs are in the bin?



1. Which solid has two bases that are parallel, congruent circles? (14-1)

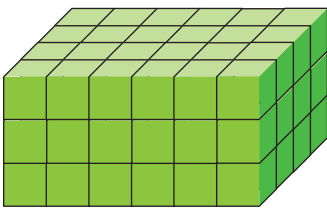
- A Cone
- B Pyramid
- C Cube
- D Cylinder

2. What solid can be made with the net shown? (14-2)



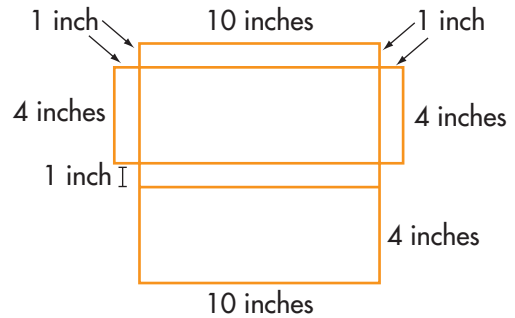
- A Triangular Pyramid
- B Triangular Prism
- C Rectangular Pyramid
- D Cube

3. Justin stacked boxes in a closet as shown. How many boxes are in the closet? (14-5)



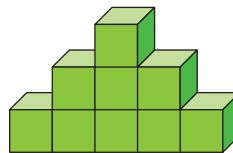
- A 18 boxes
- B 54 boxes
- C 72 boxes
- D 108 boxes

4. What is the surface area of the prism formed by the net shown? (14-3)



- A 44 in.²
- B 100 in.²
- C 108 in.²
- D 120 in.²

5. Nita stacked some crates to make a bookshelf as shown. Which of the following is the top view of the crates? (14-4)



- A
- B
- C
- D

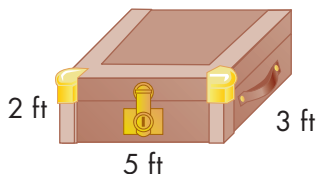
6. Todd's mother is setting up a business renting storage units. She is arranging the units in an L-shape. If she puts 3 units on each side of the L, she has 5 units in all, as shown. How many units does she have if she puts 8 units on each side of the L? (14-7)



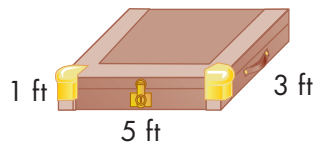
- A 13
- B 15
- C 16
- D 17

7. Which trunk has a volume of 30 cubic feet? (14-6)

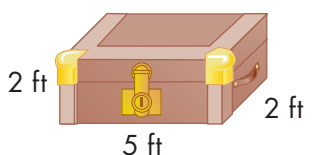
A



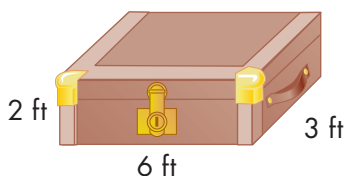
B



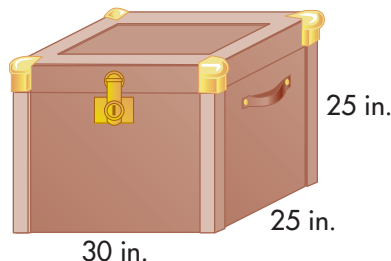
C



D

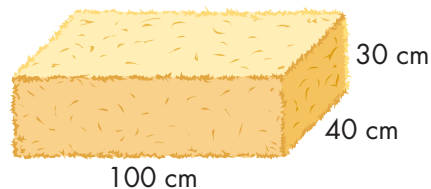


8. What is the surface area of the trunk shown? (14-3)



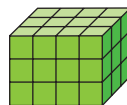
- A 320 in²
- B 3,000 in²
- C 4,250 in²
- D 18,750 in²

9. What is the volume of the bale of hay? (14-6)



- A 120,000 cm²
- B 120,000 cm³
- C 12,000 cm²
- D 12,000 cm³

10. The rectangular prism shown is made from boxes that are 1 cubic meter. What is the volume of the prism? (14-5)

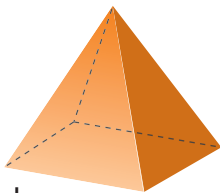


- A 9 m³
- B 12 m³
- C 21 m³
- D 36 m³

Reteaching

Set A, pages 318–320

Solids are classified by their shape and their faces, edges and vertices. What solid figure is represented at the right?

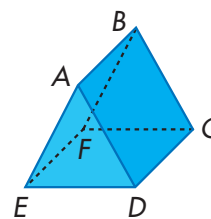


Faces: All triangles, except for the base. They have a common meeting point not on the base. Therefore, it is a pyramid.

Base: A square, so it is a square pyramid

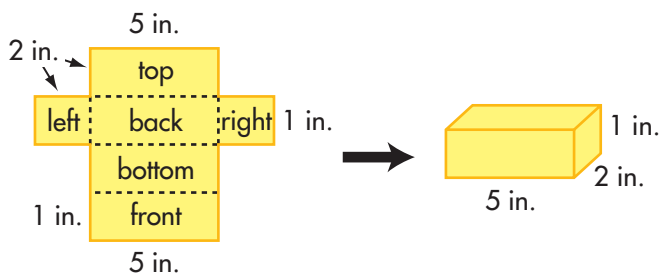
Remember A prism has two congruent parallel bases, but a pyramid has only one base.

1. Classify the solid. List the edges and vertices.



Set B, pages 322–325

A net is a plane figure which when folded gives a solid figure. The net below folds to make a rectangular prism.

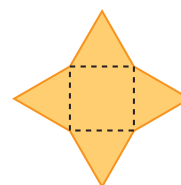


Find the surface area of the prism.

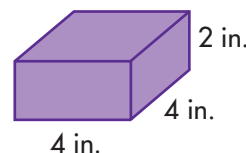
$$SA = (5 \times 2) + (5 \times 2) + (2 \times 1) + (2 \times 1) + (1 \times 5) + (1 \times 5) = 34 \text{ in}^2$$

Remember that surface area is always measured in square units, such as m^2 .

1. What figure will the net make?

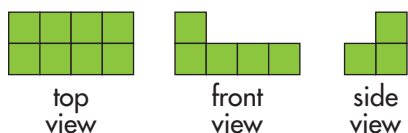
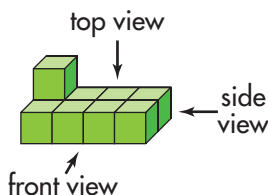


2. What is the surface area of the prism?



Set C, pages 326–327

Draw the front, top and side views of the solid made from stacked cubes.



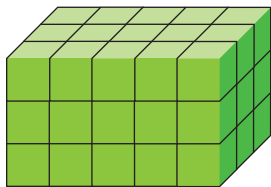
Remember to consider blocks hidden from your view.

1. Draw the front, top and side views of the stacked solid.



Set D, pages 328–329

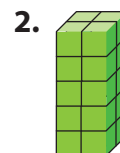
Find the number of cubes needed to make this rectangular prism.



There are 3 rows of 5 cubes in the bottom layer. There are 3 layers. So the total number of cubes is $3 \times 5 \times 3$ or 45. The volume is 45 in³.

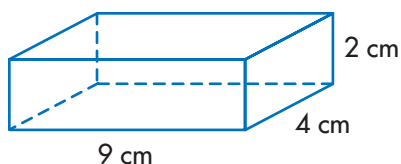
Remember that you can find the number of cubes in each layer and then multiply by the number of layers.

Find each volume. You can use cubes or use the drawing.



Set E, pages 330–332

Find the volume of this rectangular prism.



Volume = length \times width \times height.

$$V = l \times w \times h$$

$$V = 9 \text{ cm} \times 4 \text{ cm} \times 2 \text{ cm}$$

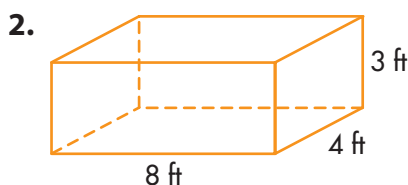
$$V = 72 \text{ cm}^3$$

The volume is 72 cm³.

Remember If you know the base area of a rectangular prism, use the formula $V = B \times h$, where B is the base area.

Find the volume of each rectangular prism.

1. Base area = 42 m²,
height = 3 meters



Set F, pages 334–335

To solve a simpler problem, follow these steps:

Step 1

Break apart or change problem into one that is simpler to solve.

Step 2

Use objects to solve the simpler problem.

Step 3

Use the answers to the simpler problem to solve the original problem.

Remember You can use objects to help you see a pattern or relationship between the simpler problem and the original problem.

1. After folding a piece of paper one time, there are two sections. How many sections are there after 2 folds? After 3 folds? If you fold the paper 5 times, how many sections would you have?