Essential Question How can you use a net to find the surface area of a prism?

Base

Lateral Face

Rectangular Prism

Base

Lateral Face
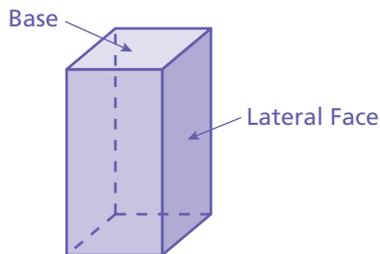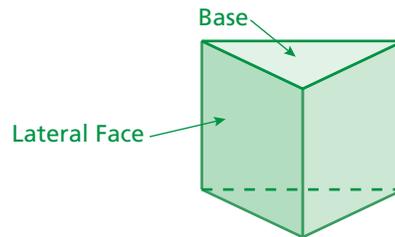
Triangular Prism

The **surface area** of a prism is the sum of the areas of all its faces. A two-dimensional representation of a solid is called a **net**.
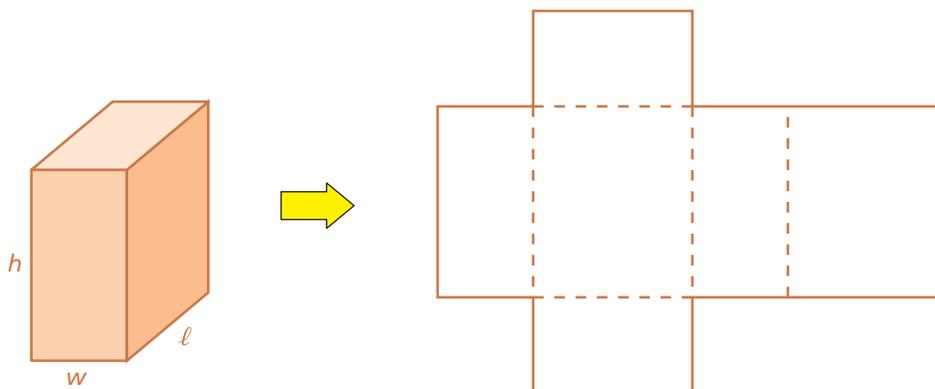
1 ACTIVITY: Surface Area of a Right Rectangular Prism

Work with a partner.

a. Use the net for the rectangular prism to find its surface area.

Net

Base

| Lateral Face | Lateral Face | Lateral Face | Lateral Face |

Base

6

5

3
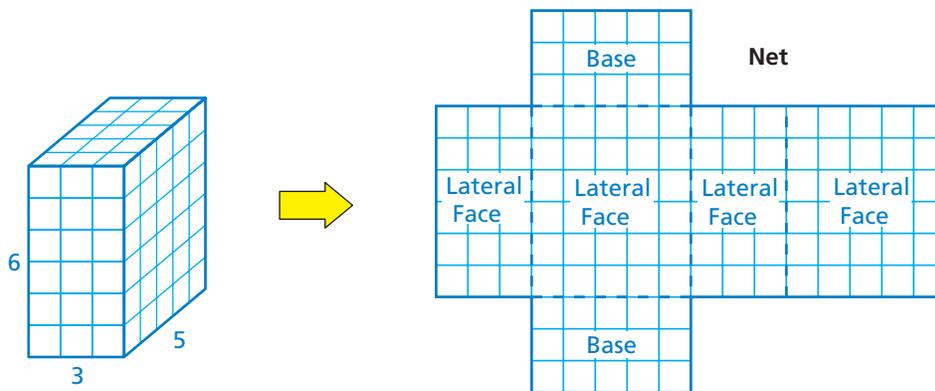
b. Copy the net for a rectangular prism. Label each side as h, w, or ℓ. Then use your drawing to write a formula for the surface area of a rectangular prism.

h

ℓ

w

Work with a partner. Find the surface area of the solid shown by the net. Copy the net, cut it out, and fold it to form a solid. Identify the solid.
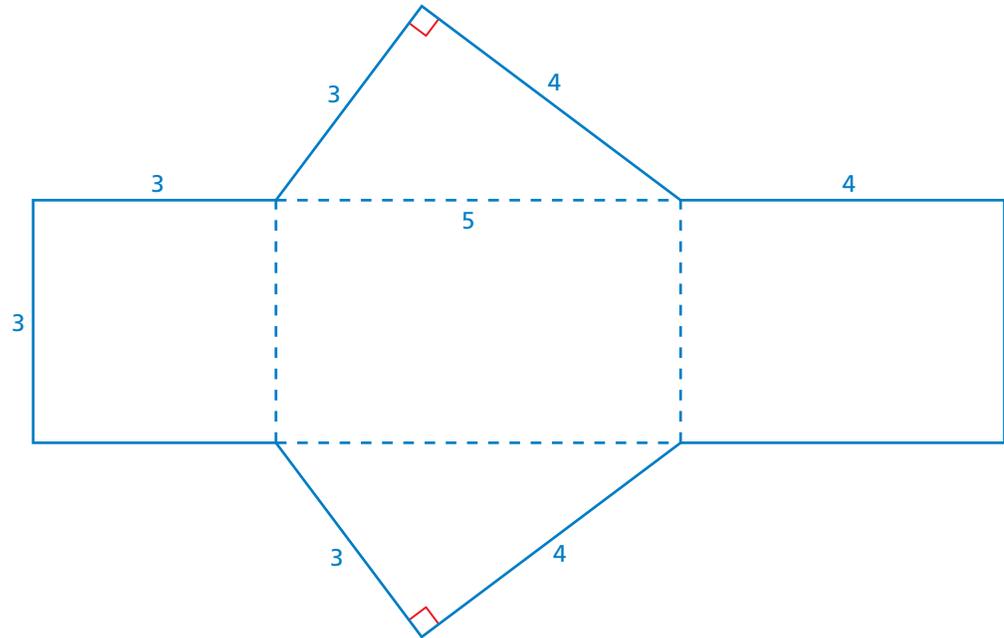
What Is Your Answer?

3. **IN YOUR OWN WORDS** How can you use a net to find the surface area of a prism? Draw a net, cut it out, and fold it to form a prism.

4. The greater the surface area of an ice block, the faster it will melt. Which will melt faster, the bigger block or the three smaller blocks? Explain your reasoning.
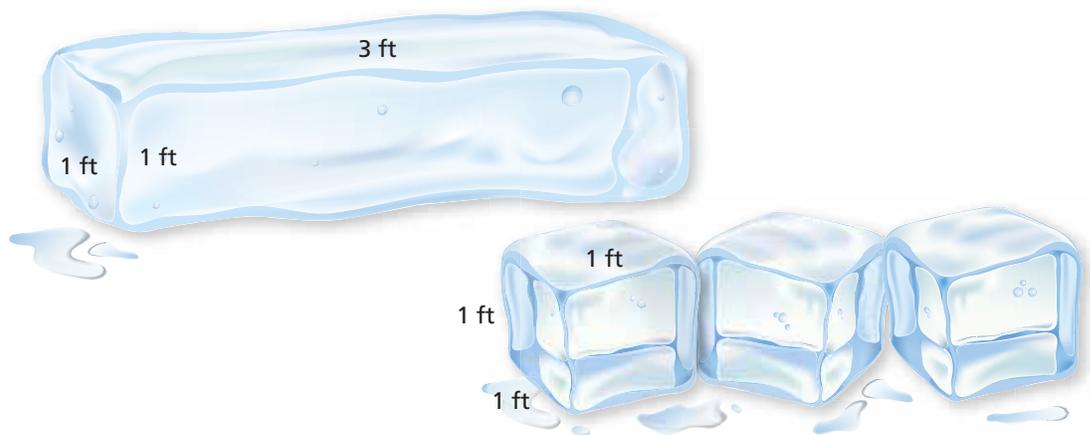
Practice

Use what you learned about the surface area of a prism to complete Exercises 6–8 on page 260.
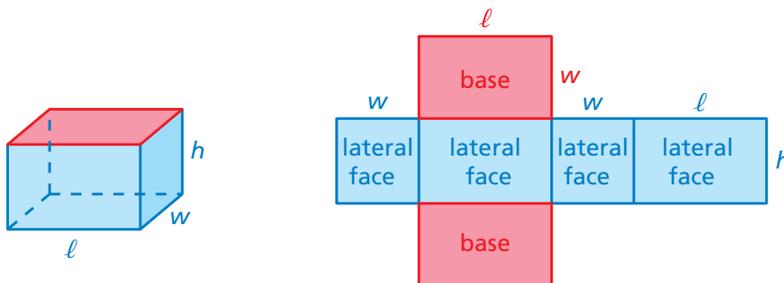
6.2 Lesson

Key Vocabulary
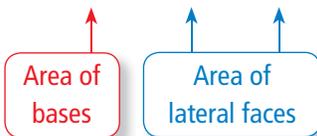surface area, *p. 256*
net, *p. 256*

Key Idea
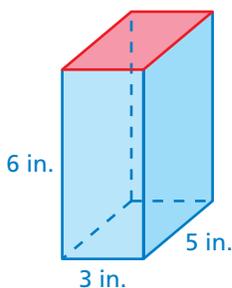
Surface Area of a Rectangular Prism

Words The surface area S of a rectangular prism is the sum of the areas of the bases and the lateral faces.

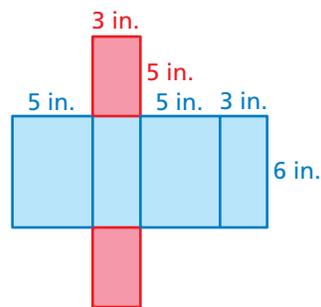**Algebra** $S = 2\ell w + 2\ell h + 2wh$

Area of bases

Area of lateral faces

EXAMPLE 1 Finding the Surface Area of a Rectangular Prism

Find the surface area of the prism.

Draw a net.

$S = 2\ell w + 2\ell h + 2wh$

$\quad = 2(3)(5) + 2(3)(6) + 2(5)(6)$

$\quad = 30 + 36 + 60$

$\quad = 126$

∴ The surface area is 126 square inches.

On Your Own

Now You're Ready
Exercises 9–11

Find the surface area of the prism.

1.
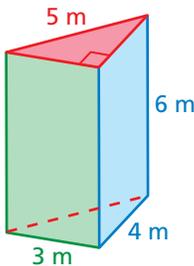
4 ft
3 ft
2 ft

2.

5 m
8 m
8 m
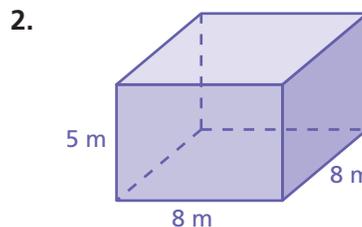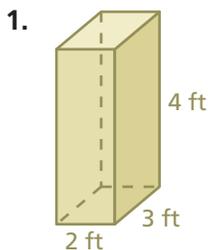
Key Idea

Surface Area of a Prism

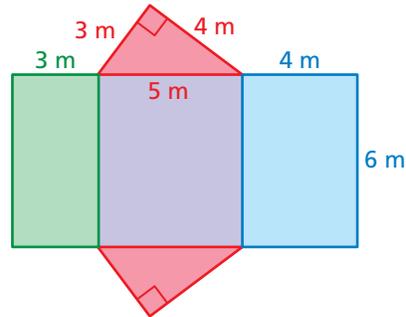The surface area S of a prism is the sum of the areas of the bases and the lateral faces.

$$S = \text{areas of bases} + \text{areas of lateral faces}$$

EXAMPLE **2** **Finding the Surface Area of a Triangular Prism**

Find the surface area of the prism.

Draw a net.

Remember

The area A of a triangle with base b and height h is $A = \dfrac{1}{2}bh$.

Area of a base

Red base: $\dfrac{1}{2} \cdot 3 \cdot 4 = 6$

Areas of lateral faces

Green lateral face: $3 \cdot 6 = 18$

Purple lateral face: $5 \cdot 6 = 30$

Blue lateral face: $4 \cdot 6 = 24$

Add the areas of the bases and the lateral faces.

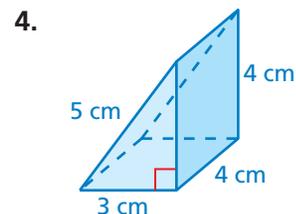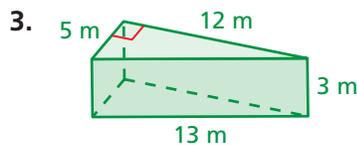$S = \text{areas of bases} + \text{areas of lateral faces}$

$= 6 + 6 + 18 + 30 + 24$

There are two identical bases. Count the area twice.

$= 84$

⋮ The surface area is 84 square meters.

On Your Own

Find the surface area of the prism.

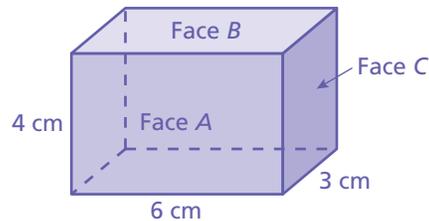**3.** 5 m   12 m   3 m   13 m

4. 4 cm   5 cm   4 cm   3 cm

✔ Vocabulary and Concept Check

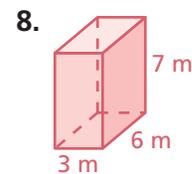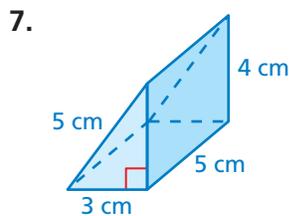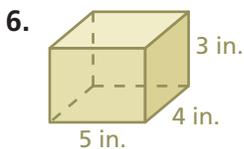1. **OPEN-ENDED** Describe a real-world situation in which you would want to find the surface area of a prism.

Find the indicated area for the rectangular prism.

2. Area of Face *A*

3. Area of Face *B*

4. Area of Face *C*

5. Surface area of the prism
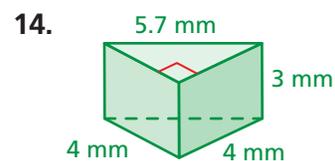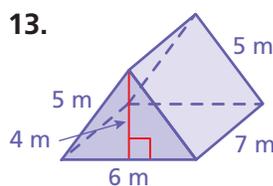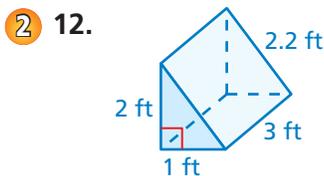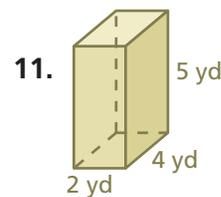
Face *B*
Face *C*
4 cm
Face *A*
3 cm
6 cm

✎ Practice and Problem Solving

Draw a net for the prism. Then find the surface area.

6.
3 in.
4 in.
5 in.

7.
4 cm
5 cm
5 cm
3 cm

8.
7 m
6 m
3 m

Find the surface area of the prism.

① 9.
1 ft
5 ft
10 ft

10.
3 cm
9 cm
6 cm

11.
5 yd
4 yd
2 yd

② 12.
2.2 ft
2 ft
3 ft
1 ft

13.
5 m
5 m
4 m
7 m
6 m

14.
5.7 mm
3 mm
4 mm
4 mm
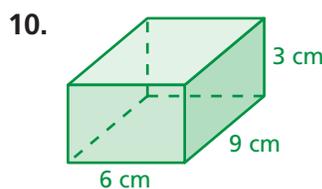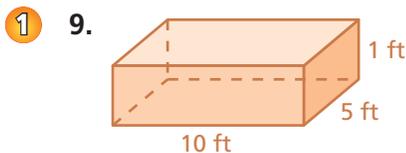
15. **GIFT BOX** What is the least amount of wrapping paper needed to wrap a gift box that measures 8 inches by 8 inches by 10 inches? Explain.

16. **TENT** What is the least amount of fabric needed to make the tent?

5 ft
5 ft
7 ft
6 ft
4 ft

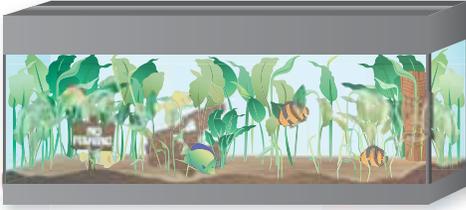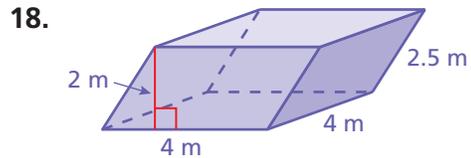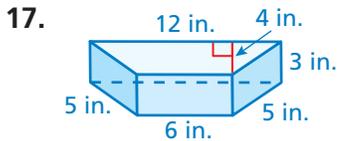**Find the surface area of the prism.**

17.

12 in. 4 in.
3 in.
5 in. 5 in.
6 in.

18.

2.5 m
2 m
4 m
4 m

19. AQUARIUM A public library has an aquarium in the shape of a rectangular prism. The base is 6 feet by 2.5 feet. The height is 4 feet. How many square feet of glass were used to build the aquarium? (The top of the aquarium is open.)

20. STORAGE BOX The material used to make a storage box costs $1.25 per square foot. The boxes have the same volume. How much does a company save by choosing to make 50 of Box 2 instead of 50 of Box 1?

	Length	Width	Height
Box 1	20 in.	6 in.	4 in.
Box 2	15 in.	4 in.	8 in.

$25\frac{1}{12}$ ft
5 ft
25 in.
25 ft
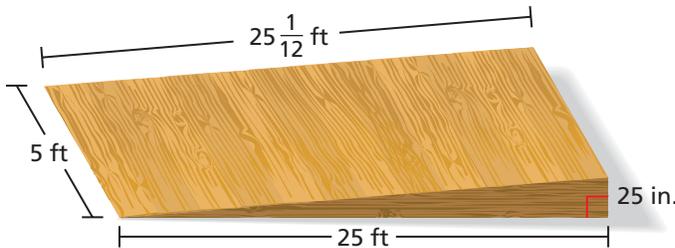
21. RAMP A quart of stain covers 100 square feet. How many quarts should you buy to stain the wheelchair ramp? (Assume you do not have to stain the bottom of the ramp.)
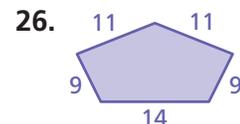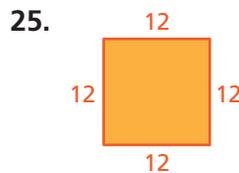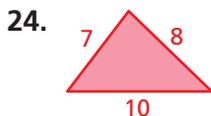
22. LABEL A label that wraps around a box of golf balls covers 75% of its lateral surface area. What is the value of x?

23. **Critical Thinking** Write a formula for the surface area of a rectangular prism using the height h, the perimeter P of a base, and the area B of a base.

3 in.
SUPER
Golf Balls
SUPER
Golf Balls
because
YOU are a
super golfer
2 in.
2 in.
x

 Fair Game Review *What you learned in previous grades & lessons*

Find the perimeter.

24.

7 8
10

25.

12
12 12
12

26.

11 11
9 9
14

27. MULTIPLE CHOICE The class size increased 25% to 40 students. What was the original class size?

  A 10   **B** 30   **C** 32   **D** 50