**Goal:** Find the surface area of rectangular prisms.

**Vocabulary**
- **Surface Area:** The surface area of a solid is the sum of the areas of its outside surfaces.
- **Net:** The two-dimensional representation of a solid is a net.

**Example 1: Finding Surface Area Using a Net**

Find the surface area of the rectangular prism.

1. Find the area of each face.
   - Area of top or bottom: $8 \times 3 = 24$
   - Area of front or back: $8 \times 2 = 16$
   - Area of either side: $3 \times 2 = 6$

2. Add the areas of all six faces.

   $$24 + 24 + 16 + 16 + 6 + 6 = 92$$

**Answer:** The surface area of the prism is 92 square inches.

**Surface Area of a Rectangular Prism**

**Words**
- The surface area $S$ of a rectangular prism is the sum of the areas of its faces.

**Algebra**

$$S = 2lw + 2lh + 2wh$$
EXAMPLE 2 Finding Surface Area Using a Formula

Find the surface area of the rectangular prism.

\[ S = 2lw + 2lh + 2wh \]

Write formula for surface area.

\[ = 2(12)(4) + 2(12)(6) + 2(4)(6) \]

Substitute 12 for \( l \), 4 for \( w \), and 6 for \( h \).

\[ = 96 + 144 + 48 \]

Multiply.

\[ = 288 \]

Add.

**Answer:** The surface area of the prism is **288 square meters**.

Guided Practice Find the surface area of the rectangular prism. Check your answer by finding the area of the prism’s net.

1. \( 7 \text{ cm} \times 4 \text{ cm} \times 3 \text{ cm} \)
   
   122 cm\(^2\)

2. \( 6 \text{ mm} \times 2 \text{ mm} \times 1 \text{ mm} \)
   
   40 mm\(^2\)

3. \( 4 \text{ in.} \times 4 \text{ in.} \times 5 \text{ in.} \)
   
   112 in.\(^2\)
Gift Wrap  Leann is wrapping a present for her father. She has 15 square feet of wrapping paper. Does she have enough wrapping paper to cover the box?

Solution

1. Find the surface area of the box.

   \[ S = 2lw + 2lh + 2wh \]
   
   \[ = 2(2 \times 1.5) + 2(2 \times 1.5) + 2(1.5 \times 1.5) \]
   
   \[ = 16.5 \]

2. Compare the surface area to the amount of gift wrap Leann has.

   \[ 16.5 > 15 \]

Answer: Leann **does not** have enough wrapping paper.