Chapter 11

Third grade

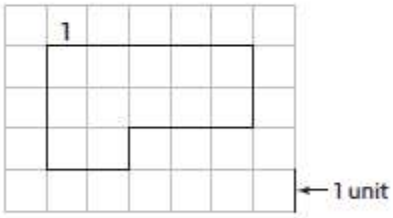
Lesson 11.1

Model Perimeter

Perimeter is the distance around a shape.

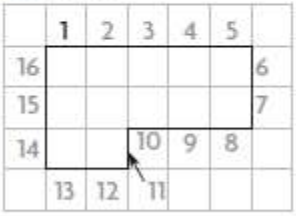
Find the perimeter of the shape.

Step 1 Choose a unit to begin counting and label it 1.



Step 2 Count each unit around the shape to find the perimeter.

16 units



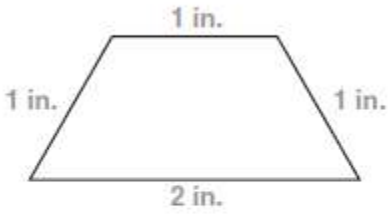
So, the perimeter of the shape is 16 units.

Lesson 11.2

Find Perimeter

Kelsey wants to know the perimeter of the shape below. She can use an inch ruler to find the perimeter.

Step 1 Choose one side of the shape to measure. Place the zero mark of the ruler on the end of the side. Measure to the nearest inch. Write the length.



Step 2 Use the ruler to measure the other three sides. Write the lengths.

Step 3 Add the lengths of all the sides.

$1 + 1 + 2 + 1 = 5$

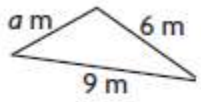
So, the perimeter of the shape is 5 inches.

Leeson 11.3

Algebra-Find unknown side lengths

An unknown side length is a side that does not have its length labeled with a number. Instead the side is labeled with a symbol or letter, such as *a*.

The perimeter of the shape is 20 meters. Find the value of *a*.



Think: There is only one unknown side length.

Step 1 Add the *known* side lengths.

$6 + 9 = 15$

Step 2 Subtract the sum of the known side lengths from the perimeter.

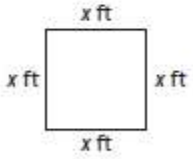
$20 - 15 = 5$

Step 3 Add to check your work.

$6 + 9 + 5 = 20$ ✓

So, the unknown side length, *a*, is 5 meters.

The perimeter of the square is 12 feet. What is the length of each side of the square?



Think: A square has four sides of equal length.

Step 1 Divide the perimeter by the number of sides.

$12 \div 4 = 3$

Step 2 Multiply to check your work.

$4 \times 3 = 12$ ✓

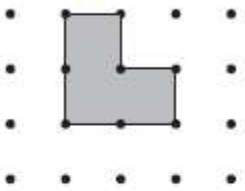
So, the length of each side, *x*, is 3 feet.

Lesson 11.4

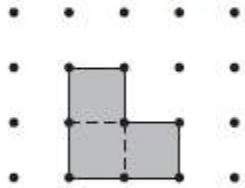
Understand Area

A unit square is a square with a side length of 1 unit. Area is the measure of the number of unit squares needed to cover a surface. A square unit is used to measure area.

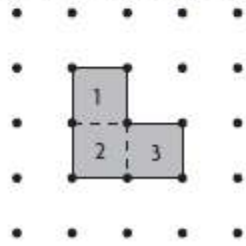
What is the area of the shape?



Step 1 Draw lines to show each unit square in the shape.



Step 2 Count the number of unit squares to find the area.

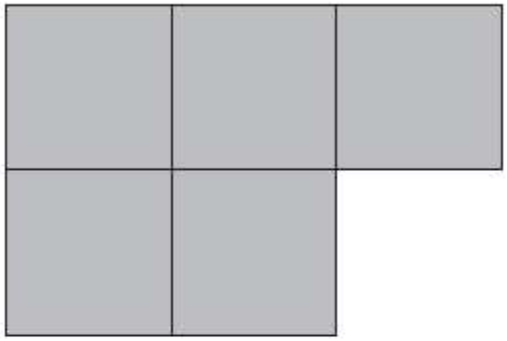


The area of the shape is 3 square units.

Lesson 11.5

Measure Area

Find the area of the shape. Each unit square is 1 square inch.



Think: How many unit squares are needed to cover this flat surface?

Step 1 Use 1-inch square tiles. Cover the surface of the shape with the tiles. Make sure there are no gaps (space between the tiles). Do not overlap the tiles.

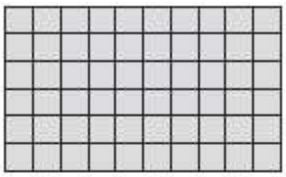
Step 2 Count the tiles you used.
5 tiles are needed to cover the shape.

So, the area of the shape is 5 square inches.

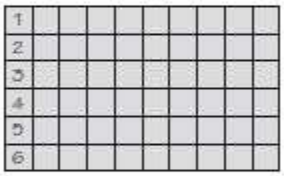
Lesson 11.6

Use area models

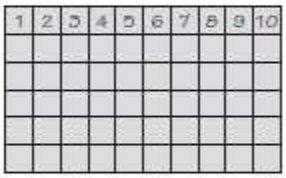
Use multiplication to find the area of the shape. Each unit square is 1 square meter.



Step 1 Count the number of rows. There are 6 rows.



Step 2 Count the number of unit squares in each row. There are 10 unit squares.



Step 3 Multiply the number of rows by the number in each row to find the area.

number of rows × number in each row = area

6 × 10 = 60

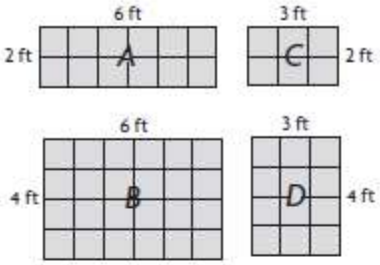
So, the area of the shape is 60 square meters.

Lesson 11.7

Problem solving- Areas of rectangles

Problem Solving • Area of Rectangles

Mrs. Wilson wants to plant a garden, so she drew plans for some sample gardens. She wants to know how the areas of the gardens are related. How will the areas of Gardens A and B change? How will the areas of Gardens C and D change?



Use the graphic organizer to help you solve the problem.

Read the Problem

What do I need to find?	What information do I need to use?	How will I use the information?
I need to know how the areas will change from *A* to *B* and from C to D.	I need to use the length and width of each garden to find its area.	I will record the areas in a table. Then I will look for a pattern to see how the areas will change.

Solve the Problem

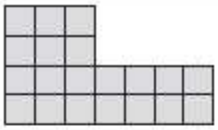
	Length	Width	Area		Length	Width	Area
Garden A	2 ft	6 ft	12 sq ft	Garden C	2 ft	3 ft	6 sq ft
Garden B	4 ft	6 ft	24 sq ft	Garden D	4 ft	3 ft	12 sq ft

From the table, I see that the lengths will be doubled and the widths will be the same.
The areas in square feet will change from 12 to 24 and from 6 to 12.
So, the area will be doubled.

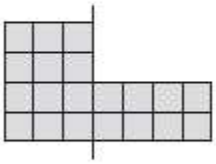
Lesson 11.8

Area of Combined Rectangles

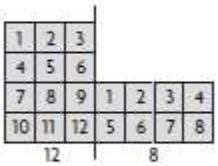
You can break apart a shape into rectangles to find the total area of the shape.



Step 1 Draw a line to break apart the shape into two rectangles.



Step 2 Count the number of unit squares in each rectangle.



Step 3 Add the number of unit squares in each rectangle to find the total area.

12 + 8 = 20 unit squares

So, the area of the shape is 20 square units.

Lesson 11.9

Same perimeter- different areas

You can use perimeter and area to compare rectangles.

Compare the perimeters of Rectangle *A* and Rectangle *B*.

A

B

Find the number of units around each rectangle.

Rectangle *A*: 3 + 2 + 3 + 2 = 10 units

Rectangle *B*: 4 + 1 + 4 + 1 = 10 units

Compare: 10 units = 10 units

So, Rectangle *A* has the same perimeter as Rectangle *B*.

Compare the areas of Rectangle *A* and Rectangle *B*.

A

B

Find the number of unit squares needed to cover each rectangle.

Rectangle *A*: 2 rows of 3 = 2 × 3, or 6 square units

Rectangle *B*: 1 row of 4 = 1 × 4, or 4 square units

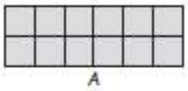
Compare: 6 square units > 4 square units

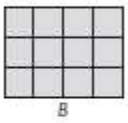
So, Rectangle *A* has a greater area than Rectangle *B*.

Lesson 11.10

Same area- different perimeters

Find the perimeter and area of Rectangles *A* and *B*. Tell which rectangle has a greater perimeter.





Step 1 Find the area of each rectangle. You can multiply the number of unit squares in each row by the number of rows.

Rectangle *A*: $2 \times 6 = 12$ square units

Rectangle *B*: $3 \times 4 = 12$ square units

Step 2 Find the perimeter of each rectangle. You can add the sides.

Rectangle *A*: $6 + 2 + 6 + 2 = 16$ units

Rectangle *B*: $4 + 3 + 4 + 3 = 14$ units

Step 3 Compare the perimeters. 16 units $>$ 14 units.

So, Rectangle *A* has a greater perimeter.