Home Connection

In 3rd grade, students learned the definitions of area and perimeter, and how to find the area and perimeter of composite shapes made up of rectangles. In this chapter, the concept of area and perimeter will extend to more complex figures.

Students will also learn to find an unknown side length of a rectangle, given total area or perimeter.

Students should recall the units of area and square units. They should also recall that the area of a rectangle can be found by multiplying the length of the two adjacent sides.

Students will also use their measurement conversion skills to convert one or both side lengths into different units to find the perimeter or area.

For example:
How many square feet is this rectangle?

2 yds

1yd

Students need to recognize that to put the answer in square feet, they must first convert yards to feet.

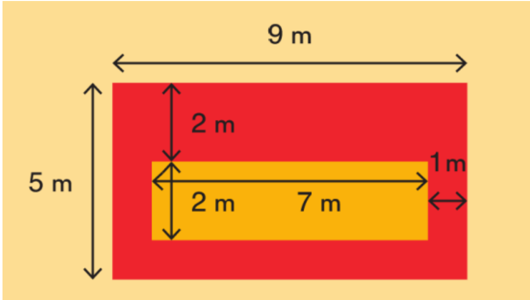
2 yd x 1 yd = 6 ft x 3 ft

= $18\ ft^2$

Composite Figures

Some problems will include finding the area of a path around a rectangle and finding the area of compound figures where some or all the side lengths first need to be converted to single units.

For example, students will be asked to find the area of the red border.



Here are two methods students may use:

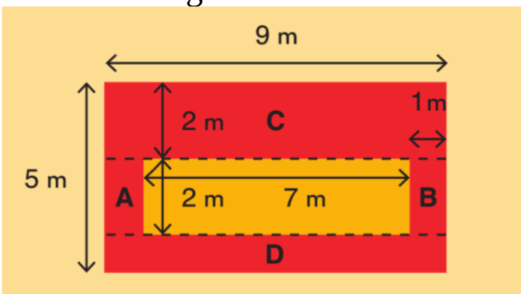
Method 1:
Find the total area of the large rectangle and subtract the area of the yellow rectangle.

Area of large rectangle: 9 x 5 = 45 m^2
Area of small rectangle: 2 x 7 = 14 m^2
Area of red border: 45 – 14 = 31 m^2

This method works well for figuring out borders.

Method 2:

Partition the rectangles into smaller rectangles.



Area of rectangle A: 2 x 1 = 2m^2
Area of rectangle B: 2 x 1 = 2m^2
Area of rectangle C: 2 x 9 = 18m^2
Area of rectangle D: 1 x 9 = 9m^2
Total area: 2 + 2 + 18 + 9 = 31m^2

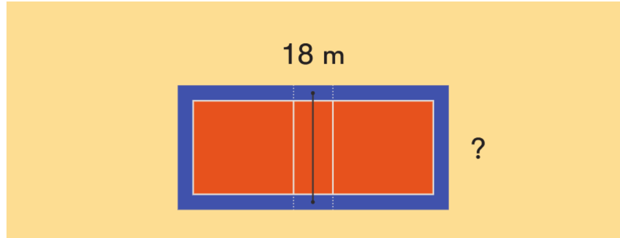
Students should understand that the underlying idea in both methods is to see rectangles in the figure and apply the area formula.

Perimeter

Students are not given a formula involving combined operations for finding perimeter- for example, 2 x L + 2 x W or 2 x (L + W)- because they have not been formally introduced to the order of operations (this comes in 5th grade).

However, they do understand the perimeter is L + W + L + W **OR** L + W and then they multiply that sum by 2. They will use this understanding to find unknown side lengths.

Example:
The perimeter of a volleyball court is 54m.
What is the length of the unknown side?



Method 1:
Students should recognize that the perimeter is the sum of all 4 sides. They can do a shortcut by multiplying the length times 2 and then subtracting that amount from the total perimeter of 54m which gives us 18m. IMPORTANT STEP: students must then divide that number by 2 because it's the distance between the 2 of the sides.

See example of solution:
2 x length → 2 x 18= 36m
Total perimeter minus known sides → 54 – 36 = 18m
Length of unknown side → 18 ÷ 2 = 9m

Method 2:
In this method, students will take the total perimeter and divide by 2. This results in the total of one length + one width. Then they will subtract the known side from that total which gives us our answer.

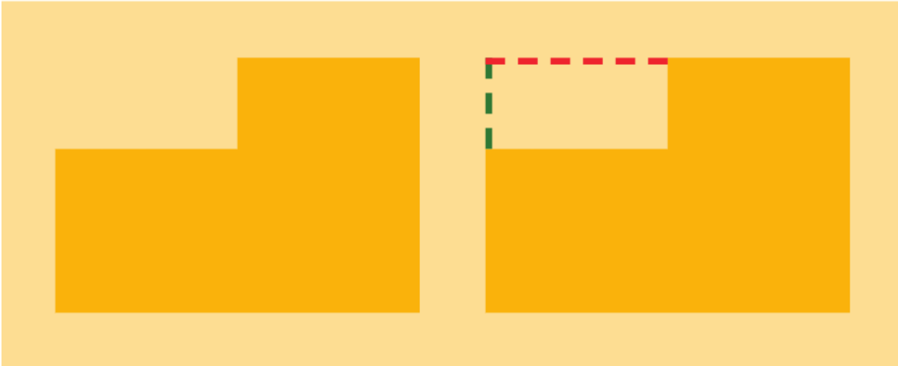
Length + Width → 54 ÷2 = 27m
Length of unknown side (width) → 27- 18 = 9m

Students will also find perimeters of composite figures and will discover that composite shapes with different areas can have the same perimeter.

There is a method for finding perimeter that involves "moving" or pushing out some of the sides. Removing square units from a corner does not change the perimeter. Removing square units from the middle changes the perimeter.

If we push out the lengths of the sides to form a rectangle, we can easily find the perimeter.

Look at the figures below. Imagine walking the perimeter. If we walk around the original figure or outer rectangle, we have walked the same distance up and down, and same distance left and right, as we would have along a rectangle.



What Can We Do At Home?

Materials: Toothpicks, 12 per student

If each toothpick is 1 unit, the perimeter of this rectangle is 12 units and the area is 8 square units (2 units x 4 units = 8 square units).

Make different polygons with the 12 toothpicks. What is the smallest area you can make with a perimeter of 12 units? What is the largest area?

5 square units

6 square units

7 square units

8 square units

9 square units