Autumn - Block 3

Length & Perimeter

Overview

Small Steps

- Kilometres
- Perimeter on a grid
- Perimeter of a rectangle
- Perimeter of rectilinear shapes

NC Objectives

Measure and calculate the perimeter of a rectilinear figure (including squares) in centimetres and metres.

Convert between different units of measure [for example, kilometre to metre].

Kilometres

Notes and Guidance

Children multiply and divide by 1,000 to convert between kilometres and metres.
They apply their understanding of adding and subtracting with four-digit numbers to find two lengths that add up to a whole number of kilometres.
Children find fractions of kilometres, using their Year 3 knowledge of finding fractions of amounts. Encourage children to use bar models to support their understanding.

Mathematical Talk

Can you research different athletic running races? What different distances are the races? Can you convert the distances from metres into kilometres? Which other sports have races over distances measured in metres or kilometres?
If 10 children ran 100 metres each, how far would they run altogether? Can we go outside and do this? How long do you think it will take to run 1 kilometre?
How can we calculate half a kilometre? Can you find other fractions of a kilometre?

Varied Fluency

Complete the statements.

3,000 m = ___ km

8 km = _____ m

5 km = ___ m

3 km + 6 km = _____ m

500 m = ___ km

250 m = _____ km

9,500 m = ___ km

4,500 m − 2,000 m = _____ km

Complete the bar models.

3 kilometres	
	1,800 metres

___ km	
2,870 m	4,130 m

Use <, > or = to make the statements correct.

500 m ◯ $\frac{1}{2}$ km

7 km ◯ 800 m

5 km ◯ 500 m

Kilometres

Reasoning and Problem Solving

Dexter and Rosie walk 15 kilometres altogether for charity.
Rosie walks double the distance that Dexter walks.
How far does Dexter walk?

Rosie walks 10 km.

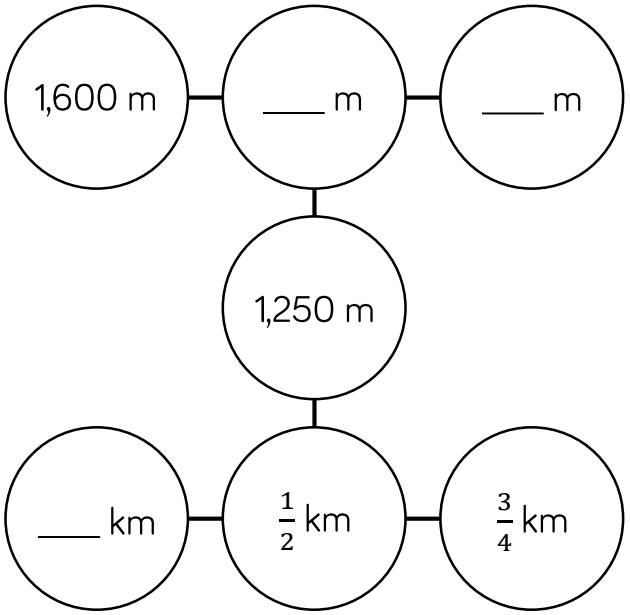
Dexter walks 5 km.

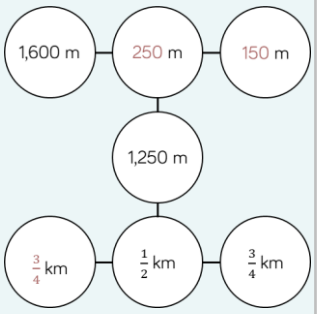
Dexter and Rosie each raise £1 for every 500 metres they walk.
How much money do they each make?

Rosie raises £20

Dexter raises £10

Complete the missing measurements so that each line of three gives a total distance of 2 km.





Perimeter on a Grid

Notes and Guidance

Children calculate the perimeter of rectilinear shapes by counting squares on a grid. Rectilinear shapes are shapes where all the sides meet at right angles.

Encourage children to label the length of each side and to mark off each side as they add the lengths together. Ensure that children are given centimetre squared paper to draw the shapes on to support their calculation of the perimeter.

Mathematical Talk

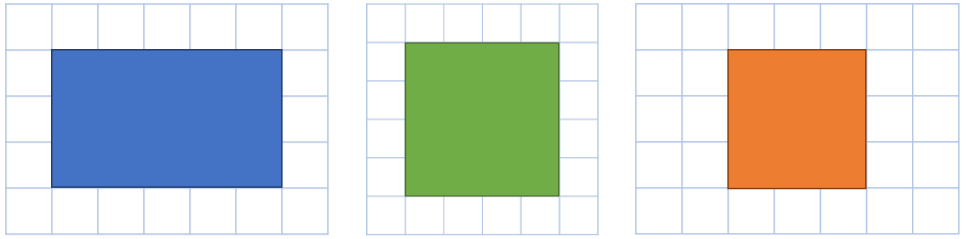
What is perimeter? How can we find the perimeter of a shape?

What do you think rectilinear means? Which part of the word sounds familiar?

If a rectangle has a perimeter of 16 cm, could one of the sides measure 14 cm? 8 cm? 7 cm?

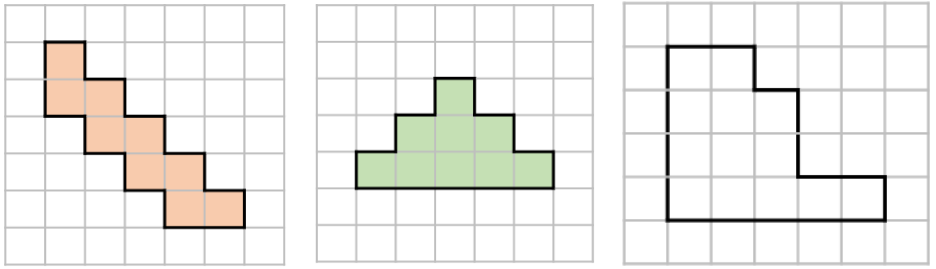
Varied Fluency

- Calculate the perimeter of the shapes.



- Using squared paper, draw two rectilinear shapes, each with a perimeter of 28 cm.
  What is the longest side in each shape? What is the shortest side in each shape?

- Draw each shape on centimetre square paper.

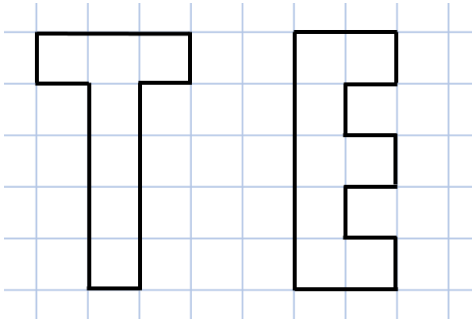


Order the shapes from smallest to largest perimeter.

Perimeter on a Grid

Reasoning and Problem Solving

Which of these shapes has the longest perimeter?



Explore other letters which could be drawn as rectilinear shapes.

Put them in order of shortest to longest perimeter.

Can you make a word?

E has a greater perimeter, it is 18 compared to 16 for T.

Open ended.

Letters which could be drawn include:

B C D F I J L O P

Letters with diagonal lines would be omitted.

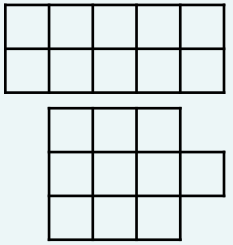
If heights of letters are kept the same, I or L could be the shortest.

You have 10 paving stones to design a patio. The stones are one metre square.

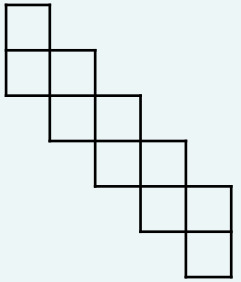
The stones must be joined to each other so that at least one edge is joined corner to corner.

Use squared paper to show which design would give the longest perimeter and which would give the shortest.

The shortest perimeter would be 14 m in a 2 × 5 arrangement or 3 × 3 square with one added on.



The longest would be 22 m.



Perimeter of a Rectangle

Notes and Guidance

Children calculate the perimeter of rectangles (including squares) that are not on a squared grid. When given the length and width, children explore different approaches of finding the perimeter: adding all the sides together, and adding the length and width together then multiplying by 2

Children use their understanding of perimeter to calculate missing lengths and to investigate the possible perimeters of squares and rectangles.

Mathematical Talk

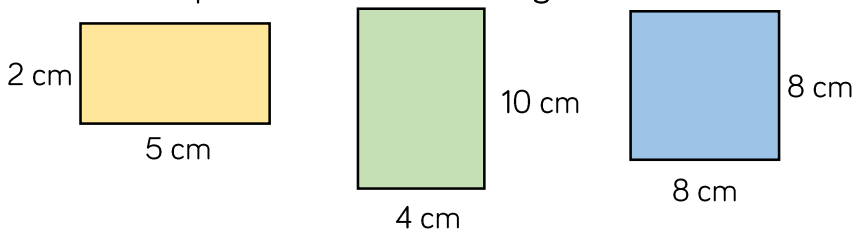
If I know the length and width of a rectangle, how can I calculate the perimeter? Can you tell me 2 different ways? Which way do you find the most efficient?

If I know the perimeter of a shape and the length of one of the sides, how can I calculate the length of the missing side?

Can a rectangle where the length and width are integers, ever have an odd perimeter? Why?

Varied Fluency

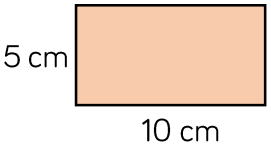
Calculate the perimeter of the rectangles.



___ cm + ___ cm + ___ cm + ___ cm = ___ cm

Eva is finding the perimeter of the rectangle.

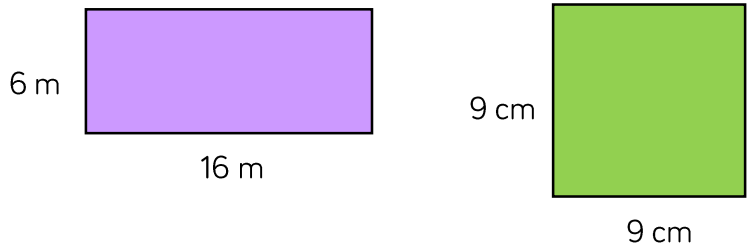
I added the length and width together and then multiplied by 2



5 cm + 10 cm = 15 cm

15 cm × 2 = 30 cm

Use Eva's method to find the perimeter of the rectangles.



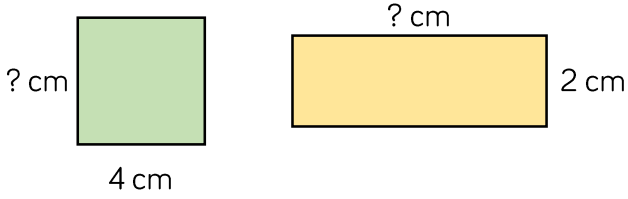
Perimeter of a Rectangle

Reasoning and Problem Solving

The width of a rectangle is 2 metres less than the length.
The perimeter of the rectangle is between 20 m and 30 m.
What could the dimensions of the rectangle be?
Draw all the rectangles that fit these rules.
Use 1 cm = 1 m.

If the perimeter is:
20 m
Length = 6 m
Width = 4 m
24 m
Length = 7 m
Width = 5 m
28 m
Length = 8 m
Width = 6 m

Each of the shapes have a perimeter of 16 cm.
Calculate the lengths of the missing sides.



4 cm

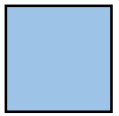
6 cm

Always, Sometimes, Never

When all the sides of a rectangle are odd numbers, the perimeter is even.
Prove it.

Always because when adding an odd and an odd they always equal an even number.

Here is a square. Each of the sides is a whole number of metres.



Which of these lengths could be the perimeter of the shape?
24 m, 34 m, 44 m, 54 m, 64 m, 74 m

Why could the other values not be the perimeter?

24 cm

Sides = 6 cm

44 cm

Sides = 11 cm

64 cm

Sides = 16 cm

They are not divisible by 4

Perimeter of Rectilinear Shapes

Notes and Guidance

Children will begin to calculate perimeter of rectilinear shapes without using squared paper. They use addition and subtraction to calculate the missing sides. Teachers may use part-whole models to support the understanding of how to calculate missing sides.
Encourage children to continue to label each side of the shape and to mark off each side as they calculate the whole perimeter.

Mathematical Talk

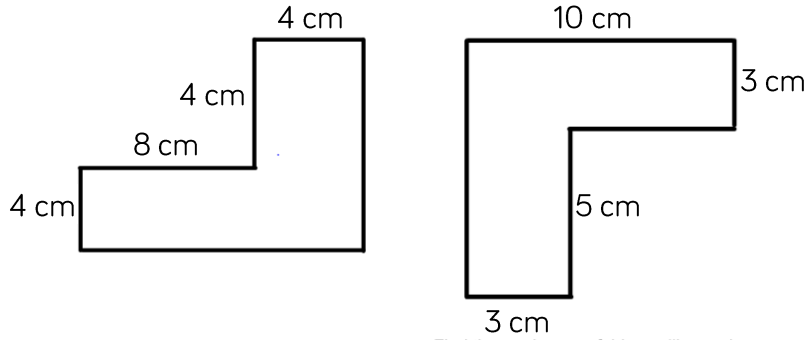
Why are opposite sides important when calculating the perimeter of rectilinear shapes?

If one side is 10 cm long, and the opposite side is made up of two lengths, one of which is 3 cm, how do you know what the missing length is? Can you show this on a part-whole model?

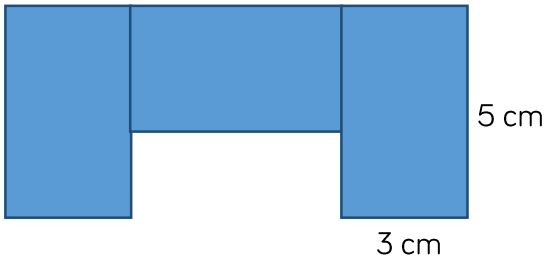
If a rectilinear shape has a perimeter of 24 cm, what is the greatest number of sides it could have? What is the least number of sides it could have?

Varied Fluency

- Find the perimeter of the shapes.



- The shape is made from 3 identical rectangles.
Calculate the perimeter of the shape.

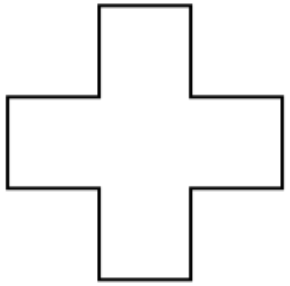


- How many different rectilinear shapes can you draw with a perimeter of 24 cm? How many sides do they each have? What is the longest side? What is the shortest side?

Perimeter of Rectilinear Shapes

Reasoning and Problem Solving

Here is a rectilinear shape. All the sides are the same length and are a whole number of centimetres.



Which of these lengths could be the perimeter of the shape?

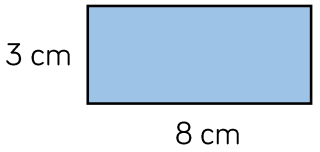
48 cm, 36 cm, 80 cm, 120 cm, 66 cm

Can you think of any other answers which could be correct?

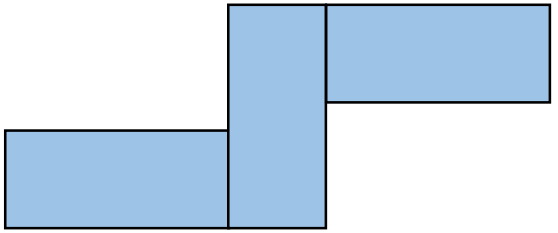
48 cm, 36 cm or 120 cm as there are 12 sides and these numbers are all multiples of 12

Any other answers suggested are correct if they are a multiple of 12

Amir has some rectangles all the same size.

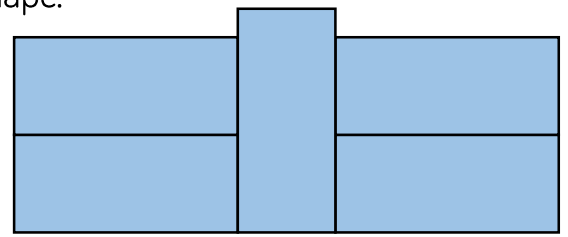


He makes this shape using his rectangles. What is the perimeter?



54 cm

He makes another shape using the same rectangles. Calculate the perimeter of this shape.



54 cm