Year 4

Small Steps Guidance and Examples

Block 3 – Measurement: Length & Perimeter

White Rose Maths

Overview
Small Steps

NC Objectives

Kilometres

Perimeter on a grid

Perimeter of a rectangle

Perimeter of rectilinear shapes

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

Here children use their new knowledge of four digit numbers in a real life context.

These contexts could include running, swimming, cycling etc.

Mathematical Talk

If you were to walk for 1km along the road from your school, where would you be?

How can you tell if your answer is sensible?

Explain to a friend how to convert km to m and vice versa?

How far do you travel to school? Do you travel more or less than 1km?

Visualise 1km – can we measure it out on the school field or the playground?
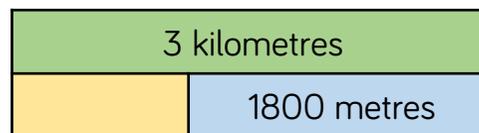
Varied Fluency

1. Complete the statements.

   3000m $=$ ☐ km

   5km $=$ ☐ m

   500m $=$ ☐ km

   9500m $=$ ☐ km

2. Complete the bar model.

3 kilometres	
	1800 metres

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

   500m ◯ $\frac{1}{2}$ km

   7km ◯ 800m

   5km ◯ 500m

Kilometres

Reasoning and Problem Solving

James and Sita do a sponsored walk for charity.

They walk 15km altogether.

James walks double the amount that Sita walks.

How far does Sita walk?

They each raise £1 for every 500m they walk.

How much money do they each make?
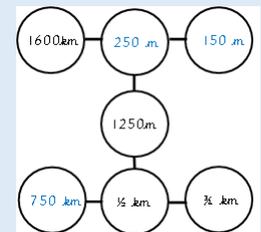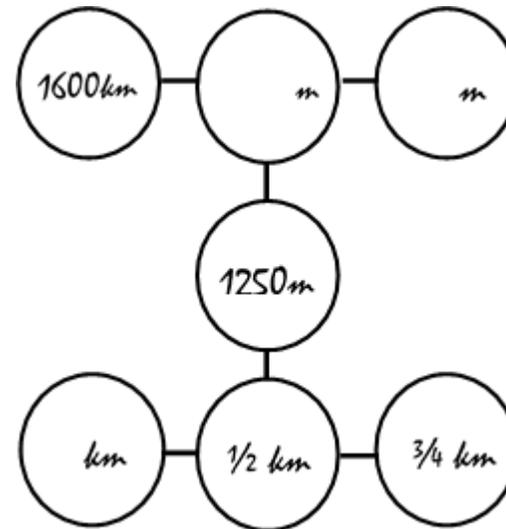
James _____ Sita _____

James walks 10km

Sita walks 5km

James raises £20

Sita raises £10

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

1600km — m — m

1250m

km — ½ km — 3/4 km

1600km — 250 m — 150 m

1250m

750 km — ½ km — 3/4 km

Perimeter on a Grid

Notes and Guidance

Children calculate the perimeter of rectilinear shapes by counting squares on a grid. They can use cm squares or work in pairs and groups on larger grids.

They should be encouraged to explore which arrangements lead to longer perimeters and begin to see patterns linked to the way the squares are arranged.

Mathematical Talk

Can you estimate which of two shapes would have the longer perimeter?
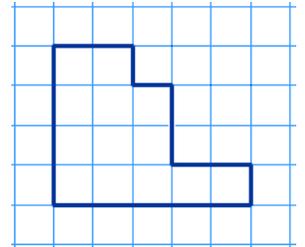
How do you decide where to start counting?

Can you make a shape with double the perimeter?

Can you make a shape with half the perimeter of shape x?

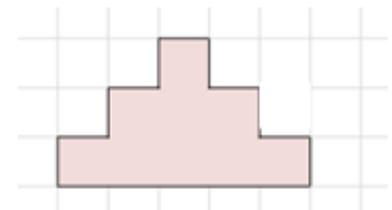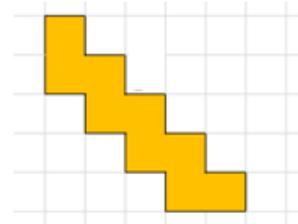When do you need to find the perimeter of a shape in real life?

Varied Fluency

1. Work out the perimeter of the shape.
   Can you draw a different shape with :
   a) the same perimeter
   b) a perimeter which is 5cm longer
   c) a perimeter which is double/half the length of this one.

2. Using squared paper draw two rectilinear shapes, each with a perimeter of 28cm
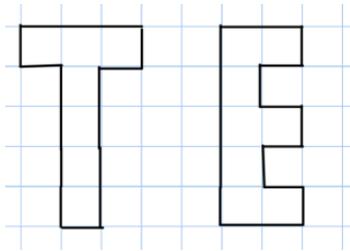   What's the same and what's different about these shapes?

3. Draw and find the perimeter of these shapes in cm.

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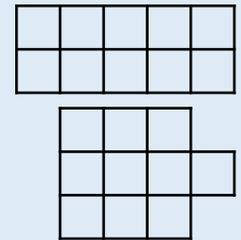
You have 10 paving stones to design a patio. The stones are one metre square.

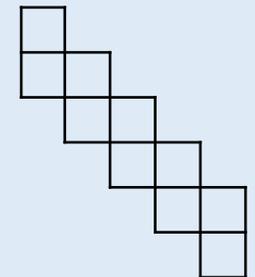The stones must be joined to each other so that at least one edge is joined corner to corner.

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

The shortest perimeter would be 14m in a 2x5 arrangement or 3x3 square with one added on.

The longest would be 22m.

Perimeter of a Rectangle

Notes and Guidance

In this step, children look at rectangles no longer on a square grid where some values may be missing.

They should explore different ways of expressing the calculation using known number facts including multiplication and division.

Mathematical Talk

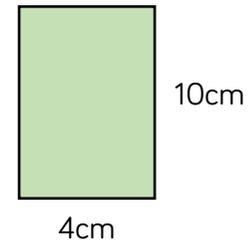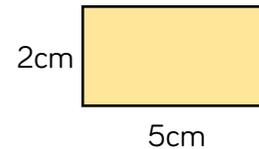What do you need to know to work out the perimeter?

How do you know the value of each side?

What shape is this? (square) If you only have the length of one side, how can you calculate the perimeter?

What is a more efficient way of calculating the perimeter?

Varied Fluency

1 Work out the perimeter of the rectangles.

2cm · 5cm

10cm · 4cm

2 Work out the perimeter of the square.

8cm

3 The perimeter of the rectangle is 36m. What is the length of the longest side?

6cm

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 20m and 30m.
What could the dimensions of the rectangle be?

Draw all the rectangles that fit these rules.
Use 1cm=1m.

The perimeter of a square is 16cm. How long is each side?

If the perimeter ...
20m
Length = 6m
Width = 4m
24m
Length = 7m
Width = 5m
28m
Length = 8m
Width = 6cm

4cm

Always, sometimes, never.
When all the sides of a rectangle are odd numbers, the perimeter is even.
Prove it.

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

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

Why could the other values not be the perimeter?

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

24cm

Sides = 6cm

44cm

Sides = 11cm

64cm

Sides 16cm

Perimeter of Rectilinear Shapes

Notes and Guidance

In this step, children will begin to calculate perimeter of rectilinear shapes from diagrams without grids.

They need to apply their knowledge of missing numbers to work out dimensions by finding the difference.

Children need to have experience of drawing their own shapes in this step.

Mathematical Talk

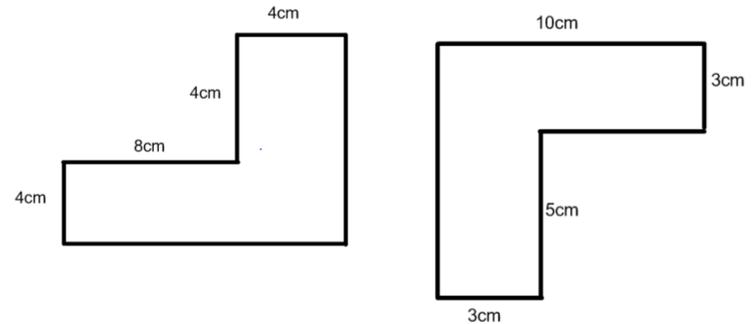Which measures are missing from the diagram?

Explain to your partner why you think the line is _____cm long. Can you prove it?

Can you make a rectilinear shape where your partner can work out the perimeter if you miss off the length of one of the sides?
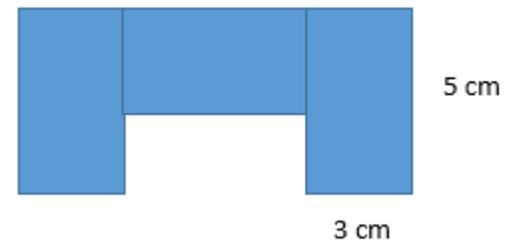
If you know the length of one side and part of the opposite side is known. Could you use a bar model to help?

Varied Fluency

1. Find the perimeter of the shapes.

2. The shape is made from 3 identical rectangles. Find the perimeter of the shape.
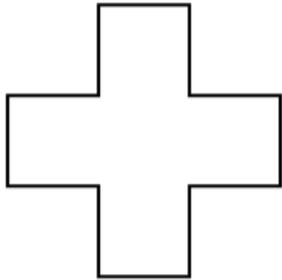

3. How many different shapes can you make with a perimeter of 24cm? How many sides do they have?

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.

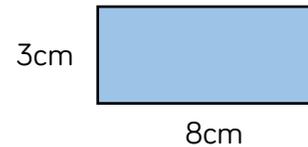Which of these lengths could be the perimeter of the shape?

48cm   36cm   80cm   120cm   66cm

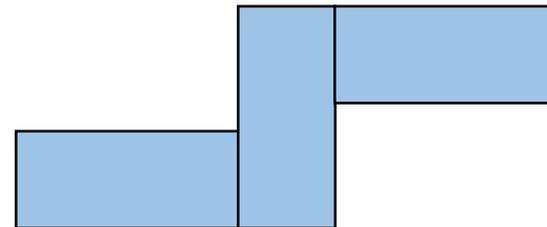Can you think of any other answers which could be correct?

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

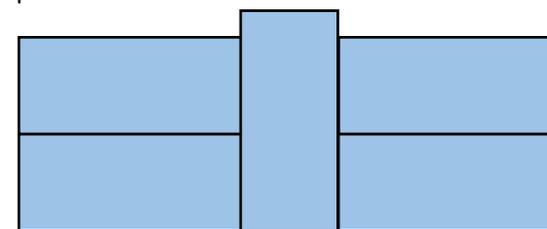Any other answers suggested are correct if they are a multiple of 12

Bob has some rectangles all the same size.

3cm
8cm

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

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

54cm

54cm