Year 5

Small Steps Guidance and Examples

Block 5: Perimeter and Area

White Rose Maths

Overview

Small Steps

NC Objectives

- Measure perimeter
- Calculate perimeter
- Find unknown lengths
- Area of rectangles
- Area of compound shapes
- Estimate and approximate area

Measure and calculate the perimeter of composite rectilinear shapes in cm and m.

Calculate and compare the area of rectangles (including squares), and including using standard units, cm^2, m^2 estimate the area of irregular shapes.

Measure Perimeter

Notes and Guidance

Children 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.

Mathematical Talk

Which measures are missing from the diagram?
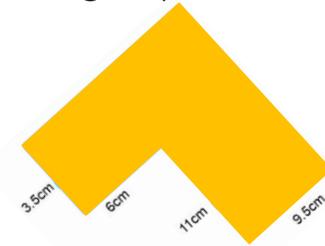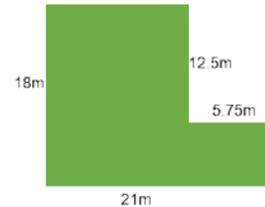Explain to your partner why you think the line is _____cm long. Can you prove it?
Can you make a rectilinear shape where your partner can work out the perimeter if you miss off the length of one of the sides? If you know the length of one side and part of the opposite side is known.
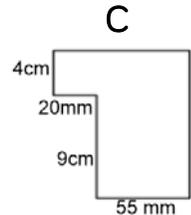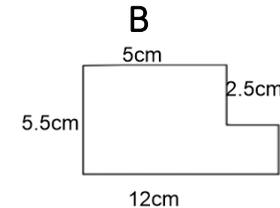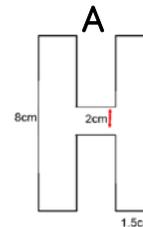
Varied Fluency
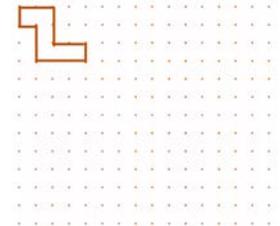
1 Find the perimeter of the following shapes.

2 Draw the following shapes to scale and find the perimeter of each shape.
Order them from smallest to greatest

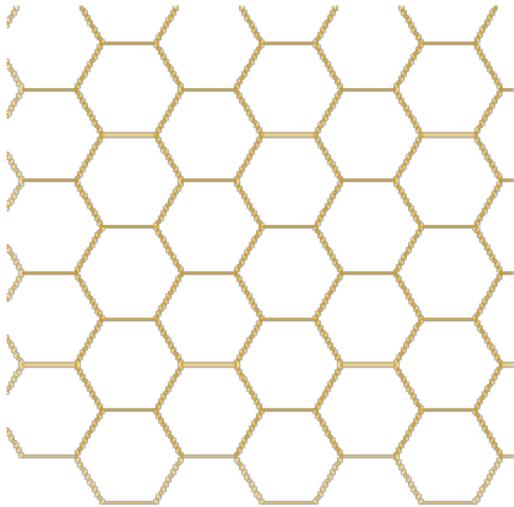3 Make this shape double the size using dot paper.

Measure Perimeter

Reasoning and Problem Solving

Each regular hexagon has sides measuring 2cm.

Can you construct a shape with a perimeter of 44cm?

Possible answer

Investigate the different ways you can make composite rectilinear shapes with a perimeter of 54cm.

Calculate Perimeter

Notes and Guidance

Children apply their knowledge of measuring and finding perimeter to find unknown lengths.

They find the perimeter of shapes with and without grids. When calculating perimeter of shapes, encourage children to mark off the sides as they add them up to prevent repetition of counting/omission of sides.
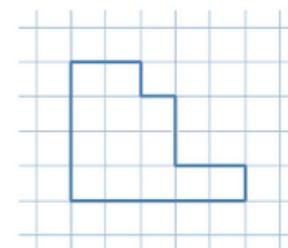
Mathematical Talk

What can you tell me about the sides of a square/rectangle?
How does this help you work out this question?

Varied Fluency

1 Find the perimeter of the following shapes.

8cm
10cm
7cm
4cm

2.5m
9m
8m
1.5m

$8\frac{3}{4}$ cm
12cm
19cm
16cm
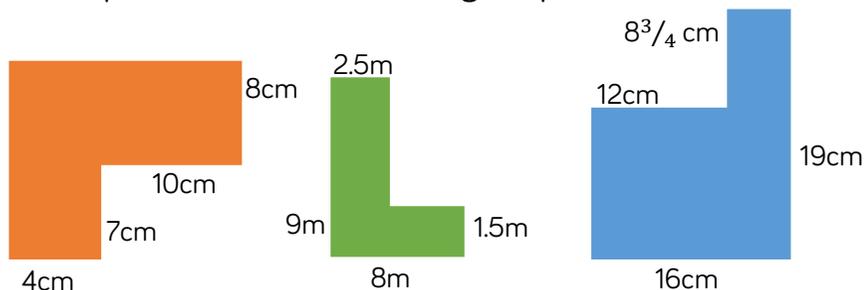
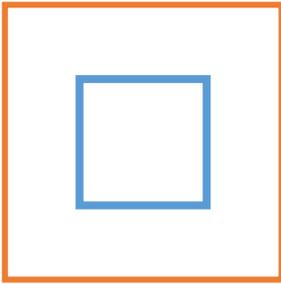**2** Each square has an area of 4 square cm. What is the perimeter of the whole shape?

3 How many ⬚ can you draw with a perimeter of x cm?
e.g. irregular shapes
e.g. rectangles
How many regular shapes can you make with a perimeter of ⬚ cm.

Calculate Perimeter

Reasoning and Problem Solving

Here is a square inside another square.

The perimeter of the inner square is 16cm
The outer square's perimeter is four times the size of the inner square.

What is the length of one side of the outer square?

How do you Know? What do you notice?

Small square = 16cm

Large square = 64cm

Length of one of the outer sides is 8cm, because 64 is a squared number.

The value of c is 14m. What is the total perimeter of the shape?

$4c + 4c + c + c = 10c$

$10 \times 14 = 140m$

The yellow rectangle has a perimeter of 38cm. What is the value of a?

Total perimeter = 38cm

$38 - (4.8 + 4.8) = 28.4$

So 28.4 divided by $2 = 14.2cm$

Area of Rectangles

Notes and Guidance

Children build on previous knowledge in Year 4 by counting squares to find the area. They then move on to using a formula to find the area.

Mathematical Talk

What properties of these shapes do you need to know to help you work this out?

What can you tell me about the sides of a square/rectangle?
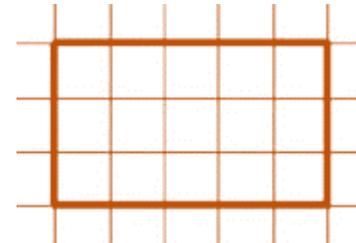
How does this help you work out this question?

Show formula for area alongside examples:

Area = length x width

Varied Fluency

1 How many rectangles can you draw with an area of ☐ cm²?

2 What is the area of this shape if:
If each square is 2cm in length, what is the area of the shape?
If each square is 3.5cm in length, what is the area of the shape?

3 Simon buys a house with a small back garden, which measures 12m². His house lies in a row of terraces, all identical. Simon's house lies in a row of 15 terraced houses. What is the total area of the garden space?

Area of Rectangles

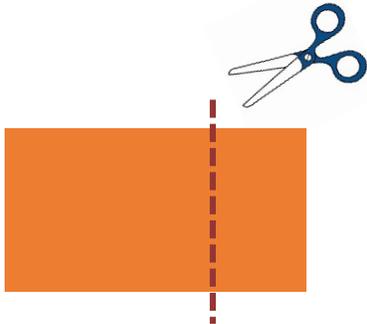## Reasoning and Problem Solving

Investigate how many ways you can make different squares and rectangles with the same area of 84cm^2
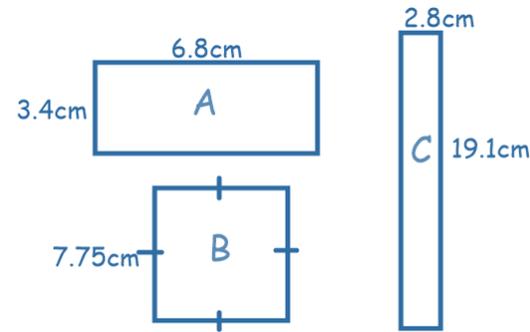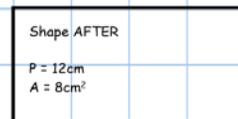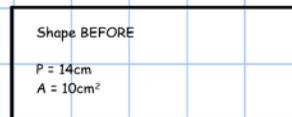
What strategy did you use?
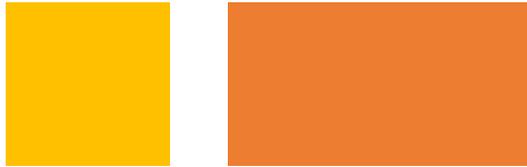
If you cut off a piece from a shape, you reduce its area and perimeter. True or False?
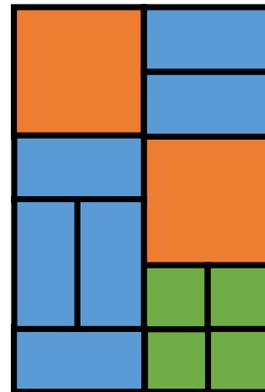
Draw 2 examples to prove your thinking.

Possible example:

Shape BEFORE

P = 14cm
A = 10cm^2

Shape AFTER

P = 12cm
A = 8cm^2

Approximate the area of each shape an then order from largest to smallest.

6.8cm
3.4cm
A

2.8cm
C   19.1cm

7.75cm   B

Answer: A = 3cm × 7cm = 21cm²

B = 8cm × 8cm = 64cm

C = 3cm × 19cm = 57cm²

Order: B, C, A

Each orange square has an area of 24cm². Calculate the total orange area. Calculate the blue area. Calculate the green area. What is the total area of the whole shape?

Answer: Orange = 48cm^2

Blue = 72cm^2

Green = 24cm^2

Total = 144cm^2

Area of Compound Shapes

Notes and Guidance

Children learn to calculate area of compound shapes. They need to apply their previous knowledge of area and the formula used. Children need to have experience of drawing their own shapes in this step.

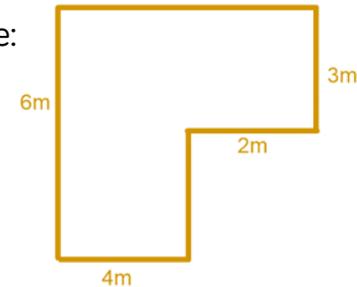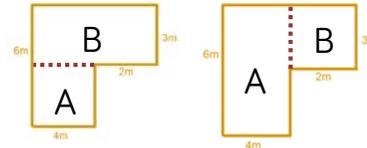## Mathematical Talk

What formula do we use to find the area?

How can we split the compound shape?

Is there more than one way?

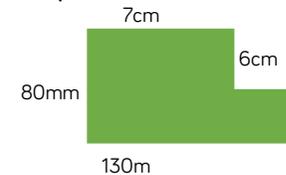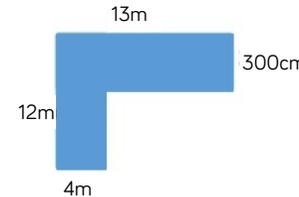Do we get a different answer if we split the shape differently?

Varied Fluency

1 Find the area of the compound shape:
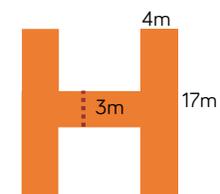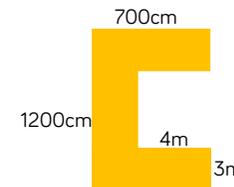How many ways can we split the compound shape?
Is there more than one way?

Could we multiply 6m × 6m and then subtract 2m × 3m?
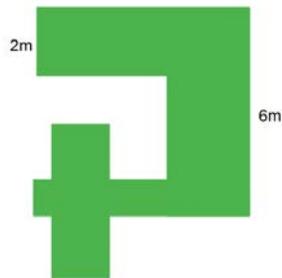
2 Find the area of the following shapes:

3 Find the area of the following shapes:

Area of Compound Shapes

Reasoning and Problem Solving

How many different ways can you split this shape to find the area?

2m

6m

Add more values and work out the area.

Possible solution:

A= 2m × 5m = 10m^2

B= 6m × 3m = 18m^2
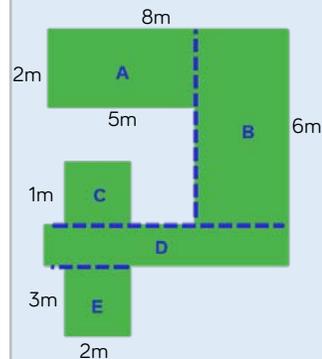
C= 1m × 2m = 2m^2

D=1m × 8m = 8m^2

E= 3m × 2m = 6m^2

Total area = 36m^2

8m

2m A

5m

B 6m

1m C

D

3m E

2m

Jack has a shape with an area of 36cm^2.

2cm

5cm

8cm

6cm   4cm

2cm
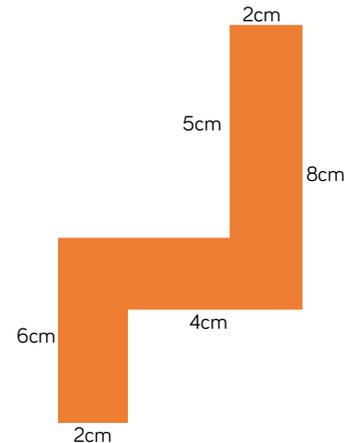
Find 3 possible compound shapes that have an area of 36cm^2.

Possible solution:

8cm

6cm

4cm

2cm   2cm
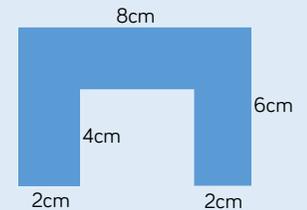
Area of Irregular Shapes

Notes and Guidance

Children use their knowledge of counting squares to estimate the areas of irregular shapes. They use their knowledge of fractions to estimate how much of a square is covered and combine different part covered squares to give an overall approximate area.

Children need to physically annotate to avoid repetition when counting the squares.

Mathematical Talk

How many whole squares can you see?

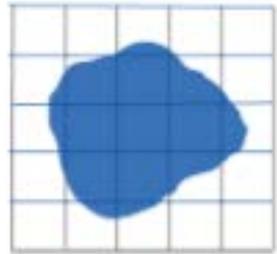How many part squares can you see?

What will we do with the parts?
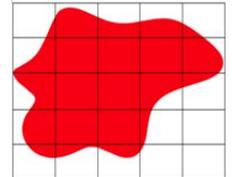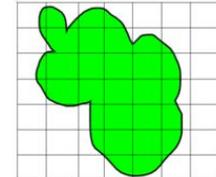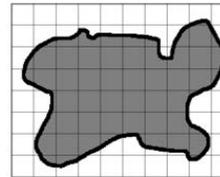
What does approximate mean?

Varied Fluency

1. Estimate the area of the pond.
Each square = 1m^2

The answer is 6 whole and 4 parts is this an acceptable answer? What can we do with the parts?

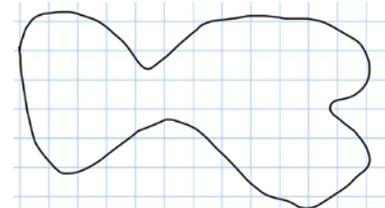2. If all of the squares are 1cm in length, which shape has the greatest area?

Is the red shape the greatest because it fills more squares? Why? Why not?
What is the same about each image? What is different about each image?
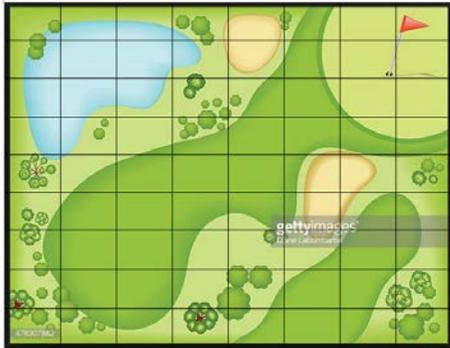
3. Each square is ☐ m²
what is the approximate area?

Area of Irregular Shapes

Reasoning and Problem Solving

Draw a circle on 1cm² paper. What is the estimated area?

Can you draw a circle that is approximately 20cm²?

If each square represents 3m², what is the approximate area of:

-     The lake
-     The bunkers
-     The fairway
-     The rough
-     Tree/forest area

Can you construct a 'Pirate Island' to be used as part of a treasure map for a new game? Each square represents 4m².

The island must include the following features and be of the given approximate measure:

Circular Island 180m²

Oval Lake 58m²

Forests with a total area of 63m² (can be split over more than one space)

Beaches with a total area of 92m² (can be split over more than one space)

Mountains with a total area of 57m²

Rocky coastline with total area of 25m²