

# Year 4

## Small Steps Guidance and Examples

Block 2 – Area

**White Rose Maths**

# Year 4 – Yearly Overview

	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Week 9	Week 10	Week 11	Week 12
Autumn	Number – Place Value				Number- Addition and Subtraction			Measurement - Length and Perimeter	Number- Multiplication and Division			Consolidation
Spring	Number- Multiplication and Division			Measurement - Area	Fractions				Decimals			Consolidation
Summer	Decimals		Measurement- Money		Time	Statistics		Geometry- Properties of Shape		Geometry- Position and Direction		Consolidation

# Overview

## Small Steps

- What is area?
- Counting squares
- Making shapes
- Comparing area

### NC Objectives

Find the area of rectilinear shapes by counting squares.

## What is Area?

### Notes and Guidance

Children are introduced to area for the first time. They will understand that area is how much space is taken up by a 2D shape or surface.

Children recognise why squares are used to measure area and understand why other things such as circles cannot be used (link to gaps between circles).

### Mathematical Talk

How many post it notes cover your piece of paper?  
Using the post it notes what would have a smaller area or larger area than your piece of paper?  
Which square is larger/smaller? Which squares will cover a larger/smaller area?  
If I wanted to find the surface area of...what size square would I use? Why can we not use other shapes to find the area?

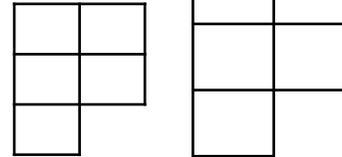
### Varied Fluency

- 1 Give children a pre-cut piece of paper that measures 15 cm by 15 cm  
How many post it notes cover your piece of paper?



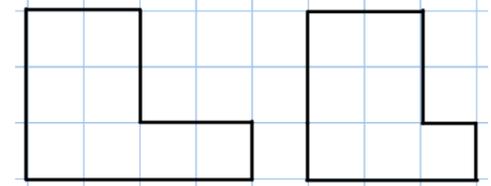
- 2 Give the children 10 squares, 5 measuring one measurement and 5 measuring another (e.g. 5 squares measuring 5 cm by 5 cm and 5 squares measuring 10 cm by 10 cm)  
Make the same shape using the smaller squares and the larger squares.

E.g.



Discuss which has the larger area and why.

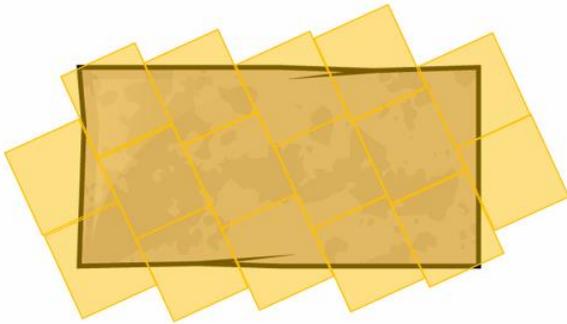
- 3 Look at the shapes and discuss what's the same and what's different?  
Which shape has the largest area?



# What is Area?

## Reasoning and Problem Solving

Leona is finding the area of a floor tile.



She says the area is 16 squares.

Do you agree?  
Explain why.

I disagree. Leona has gone over the edges of the tile. Each square should fit exactly over the tile.

Two children have measured the top of their desk. They used different sized squares.



Nima

The area of the table top is 7 squares.

The area of the table top is 12 squares.



Jen

Who used the biggest squares? How do you know?

Nima needed fewer squares to cover the space, so her squares must have been the bigger ones. If the squares are smaller, you need more of them.

## Counting Squares

### Notes and Guidance

Once children have recognised that area is measured in squares, they use the strategy of counting the number of squares in a shape to measure and compare the areas of rectilinear shapes.

Children are introduced to the notation  $\text{cm}^2$ . They explore the most efficient method of counting squares and link this to their understanding of squares and rectangles.

### Mathematical Talk

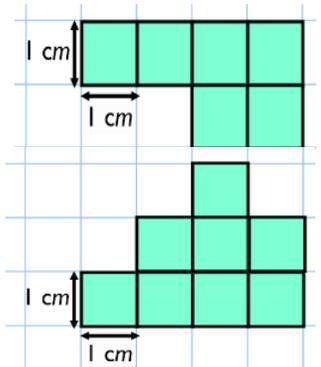
What strategy can you use to ensure you don't count a square twice?

What is the same and different about the two fields?

Are there any shapes that you wouldn't need to count every individual square to calculate the area? If so, which shapes? Can you write some rules for this?

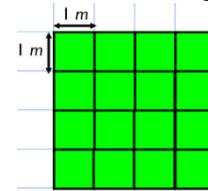
### Varied Fluency

- Work out the area of these shapes. The shape is made of \_\_\_ squares. The area of the shape is \_\_\_ square centimetres or \_\_\_  $\text{cm}^2$ . The shape is made of \_\_\_ squares. The area of the shape is \_\_\_ square centimetres or \_\_\_  $\text{cm}^2$ .

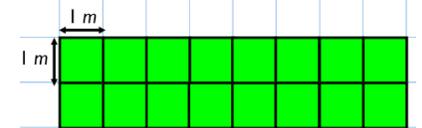


- Farmer Greg and Farmer Brian are measuring their fields in square metres.

Farmer Greg

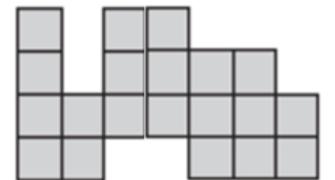


Farmer Brian



Whose field is larger?

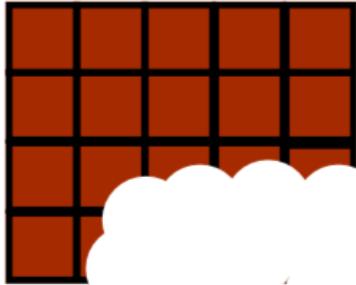
- What is the area of the playground in square metres? Each square is worth  $1 \text{ m}^2$



# Counting Squares

## Reasoning and Problem Solving

Mikey has taken a bite of the chocolate bar.



The chocolate bar was a rectangle. Can you work out how many squares of chocolate there were to start with?

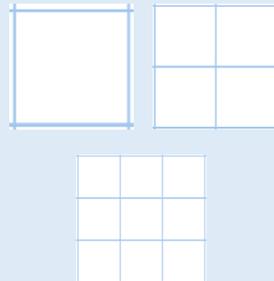
Yes  
There were 20 squares. You know this because two sides of the rectangle are shown.

### Always, sometimes, never

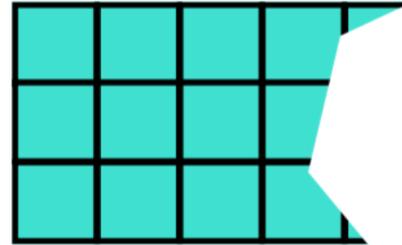
If you draw a square on squared paper it will have an even area.

Prove it

Sometimes



This rectangle has had part of it ripped off.



What is the smallest number of squares it could have had?

What is the largest number of squares it could have had if its width was no more than 5 times larger than its height?

Smallest – 15 squares

Largest – 45 squares

## Making Shapes

### Notes and Guidance

Children make rectilinear shapes using a given number of squares.

They build on practical experience of constructing rectilinear shapes using squares which they can handle before drawing them.

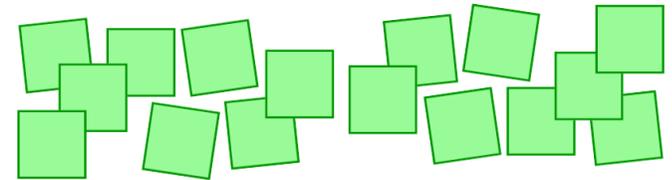
### Mathematical Talk

Could you overlap the squares when counting area? Explain your answer.

How many different rectilinear shapes can you make with 8 squares? Will the area always be the same? Why?

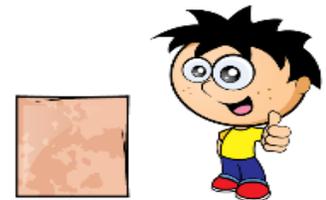
### Varied Fluency

- 1 You have 5 square cm tiles. How many different shapes can you make? Draw the shapes on 1 cm squared paper.
- 2 Use 16 identical squares. Take half of the squares to make a rectangle and the other half to make a different rectilinear shape.



What's the same, what's different?

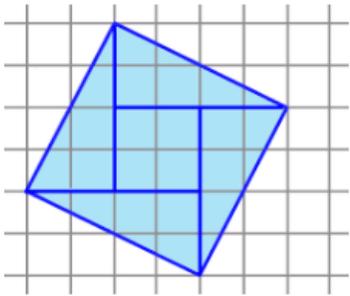
- 3 Max is building a patio made of 20 square slabs. What could the patio look like? Design it on squared paper. Max is using 6 coloured square slabs in his design. None of them are touching each other. Where could they be in the designs you have made?



## Making Shapes

## Reasoning and Problem Solving

Work out the area of this shape.



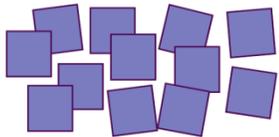
Cut out the triangles and squares to make a new shape.

Can you make a rectangle?

Can you make a different rectangle?

There are 20 squares so rectangles could be  $20 \times 1$ ,  $10 \times 2$ ,  $5 \times 4$

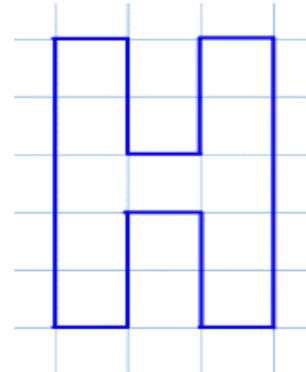
Use 12 plastic or card squares which are all exactly the same size.



How many different ways could you arrange them into a rectilinear shape with an area of 12 squares?

There are many possibilities, including rectangles of  $12 \times 1$ ,  $6 \times 2$ ,  $3 \times 4$

Can you make some capital letters on squared paper using less than 20 squares?



Make a word from some and count the total area of the letters.

Which ones have a line of symmetry?

What is the area of half of each letter?

Most letters can be made. They could be drawn on large squared paper or made with square tiles.

## Comparing Area

### Notes and Guidance

Children compare the area of rectilinear shapes where the same size square has been used.

Children will be able to use  $<$  and  $>$  with the value of the area to compare shapes.

They will also order shapes based on their area.

### Mathematical Talk

What is the area of the two rectilinear shapes? Which shape has a larger/smaller area?

How much larger/smaller is the area of the shape?

How can we order the shapes?

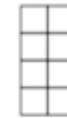
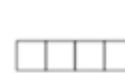
Can we draw a shape that would have the same area as \_\_\_?

Can we draw a shape that would have a larger/smaller area as \_\_\_?

### Varied Fluency

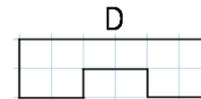
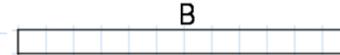
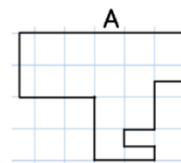
- 1 Use the words 'greater than' and 'less than' to compare the rectilinear shapes.

Complete the sentence stems using  $<$  and  $>$



\_\_\_  $\text{cm}^2$   $\bigcirc$  \_\_\_  $\text{cm}^2$     \_\_\_  $\text{cm}^2$   $\bigcirc$  \_\_\_  $\text{cm}^2$

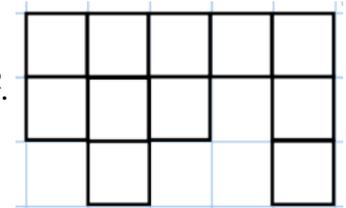
- 2 Put these shapes in order from largest to smallest area.



- 3 Here is a shape.

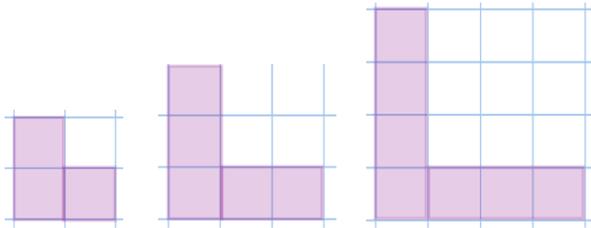
Draw a shape that has a smaller area but an area greater than  $7 \text{ cm}^2$ .

Draw a shape that has an equal area but looks different.



# Comparing Area

## Reasoning and Problem Solving



Look at the shapes. Can you spot the pattern and explain how the area is changing each time?

Draw the next shape. What is its area?

Can you predict what the area of the 6th shape would be?

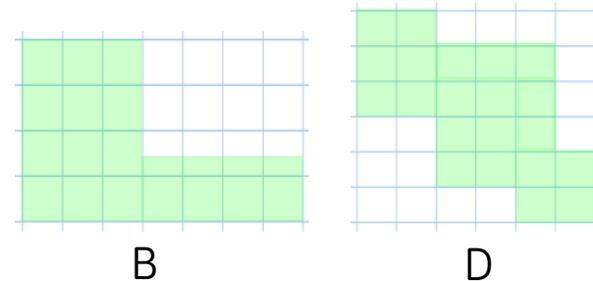
Can you spot any patterns in your answers?

The area increases by 2 each time. The next shape will have an area of 9. The 6th shape will have an area of 11. The answers are all odd numbers and increase by 2 each time.

Shape C has been deleted!

Its area is bigger than B's but smaller than D's.

Can you draw what shape C could look like?



Shape A went missing too.

- It had the smallest area.
- It was symmetrical.

Can you draw what it could have looked like?

Shape B has an area of 18

Shape D has an area of 23

So Shape C can be any shape that has an area of 19 to 22 squares.

Shape A must be less than 18 squares, but can be any symmetrical design.