White Rose Maths

Spring - Block 2

Area

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 understand that area is the amount space is taken up by a 2D shape or surface.
Children investigate different shapes that an be made with sets of sticky notes. They should be encouraged to see that the same number of sticky notes can make different shapes but they cover the same amount of surface. We call this the area of a shape.

Mathematical Talk

Use square sticky notes to find areas of different items in the classroom, which items have the largest surface area?
Would we want to find the area of the playground using sticky notes? What else could we use?
Why are shapes with perpendicular sides more effective to find the area of rectilinear shapes?

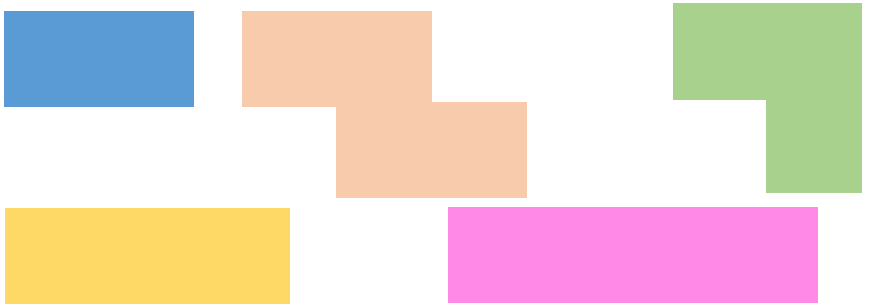
Varied Fluency

- Which of the two shapes covers most surface?

How do you know?

- This is a square sticky note.

Estimate how many sticky notes you need to make these shapes?



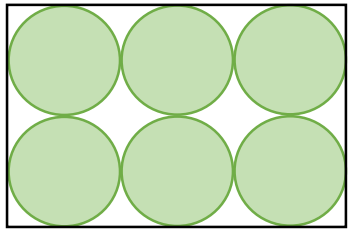
Now make the shapes using sticky notes.
Which ones cover the largest amount of surface? Which ones cover the least amount of surface?

What is Area?

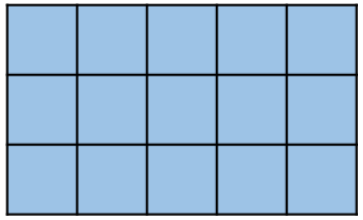
Reasoning and Problem Solving

Teddy and Eva are measuring the area of the same rectangle.

Teddy uses circles to find the area.



Eva uses squares to find the area.



Whose method do you think is more reliable?
Explain why.

Possible answer:

Eva's method is more reliable than Teddy's because her squares cover the whole surface of the rectangle whereas the circles leave some of the surface uncovered.

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

Dora

The area of the table top is 6 squares.

The area of the table top is 9 squares.

Alex

Who used the largest squares?
How do you know?

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

Counting Squares

Notes and Guidance

Once children understand 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.
They explore the most efficient method of counting squares and link this to their understanding of squares and rectangles.

Mathematical Talk

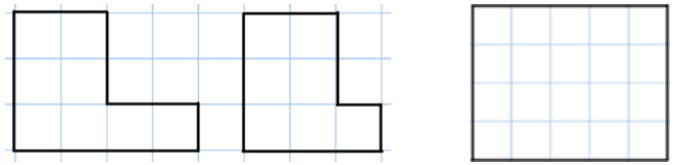
What strategy can you use to ensure you don't count a square twice?

Which colour covers the largest area of the quilt?
Which colour covers the smallest area of the quilt?

Will Jack's method work for every rectilinear shape?

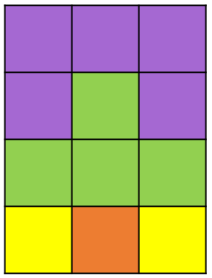
Varied Fluency

- Complete the sentences for each shape.



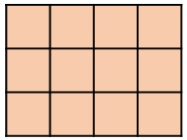
The area of the shape is ____ squares.

- Here is a patchwork quilt.
It is made from different coloured squares.
Find the area of each colour.



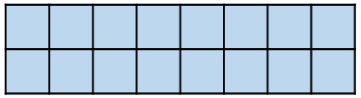
Purple = ___ squares Green = ___ squares
Yellow = ___ squares Orange = ___ squares

- Jack uses his times-tables to count the squares more efficiently.



There are 4 squares in 1 row.
There are 3 rows altogether.
3 rows of 4 squares = 12 squares

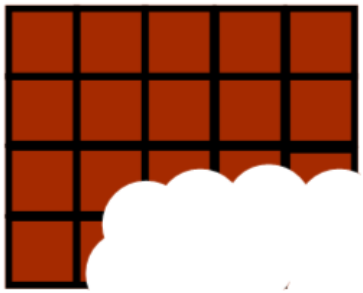
Use Jack's method to find the area of this rectangle.



Counting Squares

Reasoning and Problem Solving

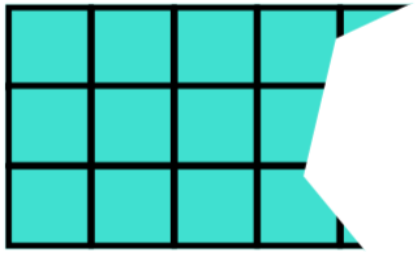
Dexter has taken a bite of the chocolate bar.



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

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

This rectangle has been ripped.



What is the smallest possible area of the original rectangle?

What is the largest possible area if the length of the rectangle is less than 10 squares?

Smallest area – 15 squares.

Largest area – 30 squares.

Making Shapes

Notes and Guidance

Children make rectilinear shapes using a given number of squares.

It is important that children understand that the rectilinear shapes they make need to touch at the sides not just at the corners. They can work systematically to find all the different rectilinear shapes by moving one square at a time.

Mathematical Talk

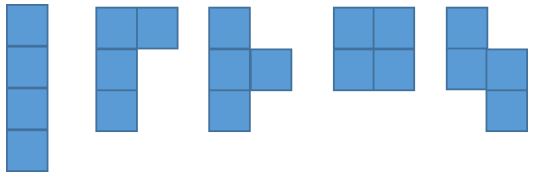
If you turn Ron's shapes upside down, do they stay the same or are they different?

Should 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

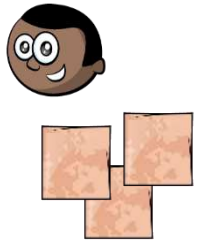
- Ron has 4 squares.
  He systematically makes rectilinear shapes.



  Use 5 squares to make rectilinear shapes.
  Can you work systematically?

- Use squared paper to draw 4 different rectilinear shapes with an area of 12 squares.
  Compare your shapes to a partner.
  Are they the same?
  Are they different?

- Mo is building a patio made of 20 square slabs.
  What could the patio look like?
  Mo is using 6 black square slabs in his design.
  None of them are touching each other.
  Where could they be in the designs you have made?



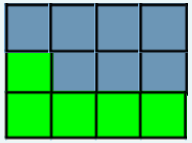
Making Shapes

Reasoning and Problem Solving

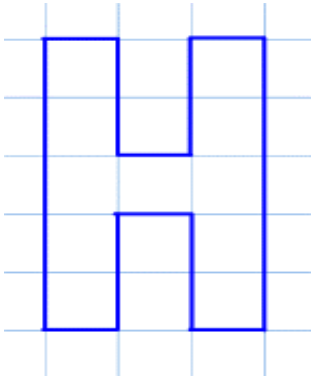
Here is a rectilinear shape.

Using 7 more squares, can you make a rectangle?
Can you find more than one way?

Possible answers include:



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 letters 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 put shapes in order of size by comparing their areas.

Mathematical Talk

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

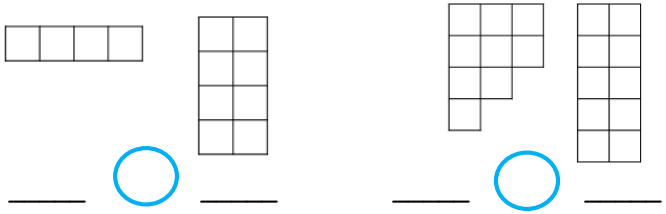
How can we order the shapes?

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

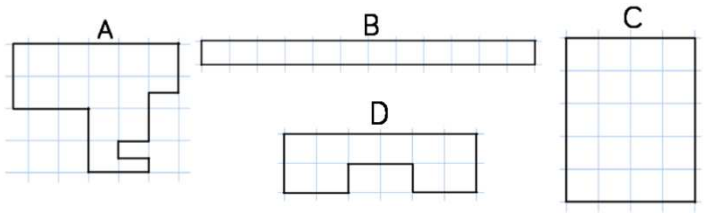
What is different about the number of squares covered by shape A?

Varied Fluency

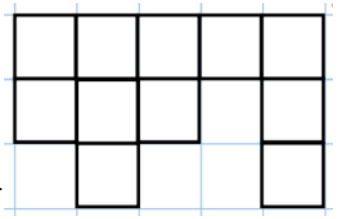
- Use the words 'greater than' and 'less than' to compare the rectilinear shapes.
  Complete the sentence stems using < and >



- Put the shapes in order from largest to smallest area.

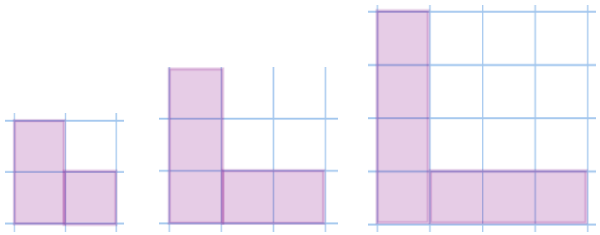


- Here is a shape.
  Draw a shape that has a smaller area than this shape but an area greater than 7 squares.
  Draw a shape that has an area equal to the first shape, but looks different.



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.

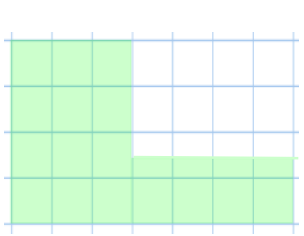
The 6th shape will have an area of 13.

The answers are all odd numbers and increase by 2 each time.

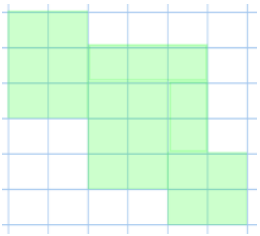
Shape C has been deleted.

Area C > Area B
Area C < Area D

Can you draw what shape C could look like?



B



D

Shape A is missing too.

- It has the smallest area.
- It is symmetrical.

Can you draw what it could look like?

Shape B has an area of 18 squares.

Shape D has an area of 21 squares.

So Shape C can be any shape that has an area between 18 and 21 squares.

Shape A must have area less than 18 squares, but can be any symmetrical design e.g. a 4 by 4 square.