Year 4

Small Steps Guidance and Examples

Block 5 – Properties of Shape

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

- Identify angles
- Compare and order angles
- Triangles
- Quadrilaterals
- Lines of symmetry
- Complete a symmetric figure

NC Objectives

Identify acute and obtuse angles and compare and order angles up to two right angles by size.

Compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes.

Identify lines of symmetry in 2-D shapes presented in different orientations.

Complete a simple symmetric figure with respect to a specific line of symmetry.

Identify Angles

Notes and Guidance

Children develop their understanding of obtuse and acute angles by comparing with a right angle. They use an angle tester to check whether angles are larger or smaller than a right angle.

Children learn that an acute angle is more than 0 degrees and less than 90 degrees, a right angle is exactly 90 degrees and an obtuse angle is more than 90 degrees but less than 180 degrees.

Mathematical Talk

How many degrees are there in a right angle?
_____ degrees is < _____ degrees.
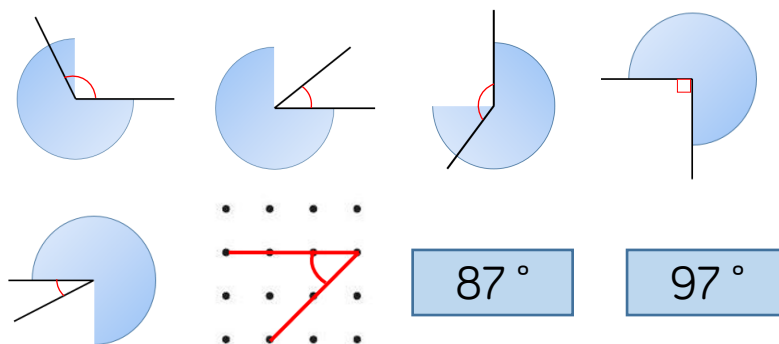Can you draw an acute/obtuse angle?
How many degrees do you think the angle is?
Can you find the difference between the smallest acute angle and the largest obtuse angle?

Varied Fluency
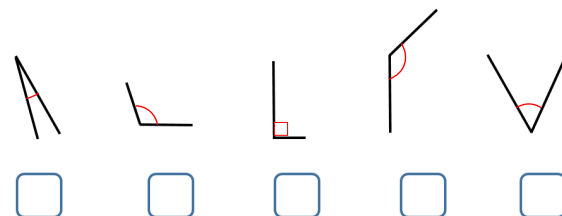
1 A right angle is _____ degrees.
   Acute angles are _____ than a right angle.
   Obtuse angles are _____ than a right angle.

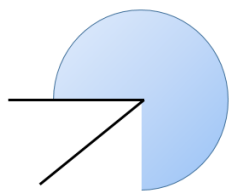2 Sort the angles into acute, obtuse and right angles.

87°   97°

3 Label the angles. O for obtuse, A for acute and R for right angle.

Identify Angles

Reasoning and Problem Solving

I know the angle is not obtuse.
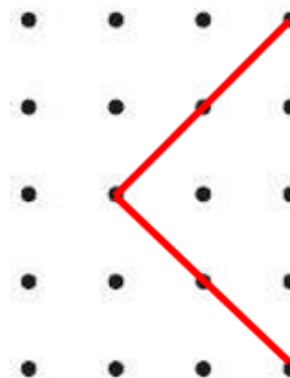
Max

I know the angle is acute.

Tina

I think the angle is roughly 45°.

Jess

Who do you agree with? Explain why.

All are correct. Children may reason about how Jess has come to her answer and discuss that the angle is about half a right angle. Half of 90 degrees is 45 degrees.

Is the angle acute, obtuse or a right angle?
Can you prove it?

Find the total number of degrees of the largest acute angle and the smallest obtuse angle:

| 12° | 98° | 87° | 179° | 90° | 5° |

The angle is a right angle.
Children may use an angle tester to prove it, or children may be able to draw an extra line to prove that it is a quarter turn which is the same as a right angle.

$87° + 98° = 185°$

Compare & Order Angles

Notes and Guidance

Children compare and order angles in ascending and descending order. They use an angle tester to continue to help them to decide if angles are acute or obtuse.

Children identify and order angles in different representations including in shapes and on a grid.
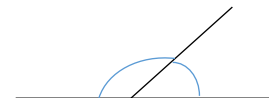
Mathematical Talk

How can you use an angle tester to help you order the angles?

Compare the angles to a right angle, does it help you to start to order them?

Rotate the angles so one of the lines is horizontal, does this help you to compare them more efficiently?
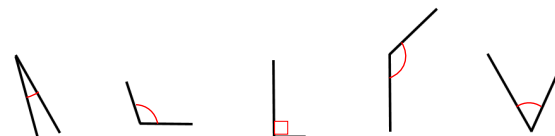
Varied Fluency

1 Circle the largest angle in each shape or diagram.

Can you label each angle as acute, obtuse or right angle?
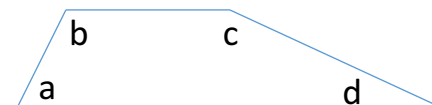
2 Order the angles from largest to smallest.

Can you draw a larger obtuse angle?
Can you draw a smaller acute angle?

3 Order the angles in the shape from smallest to largest. Complete the sentences.

Angle _____ is smaller than angle _____.
Angle _____ is larger than angle _____.

Compare & Order Angles

Reasoning and Problem Solving

Jannat looks at the analogue clock four times during the morning.

The times she sees are:

Eight o'clock	Five past 11
Twenty to eleven	08:15

Draw the times on the clock faces and find the angles less than 180 degrees.

Order the angles from greatest to smallest.

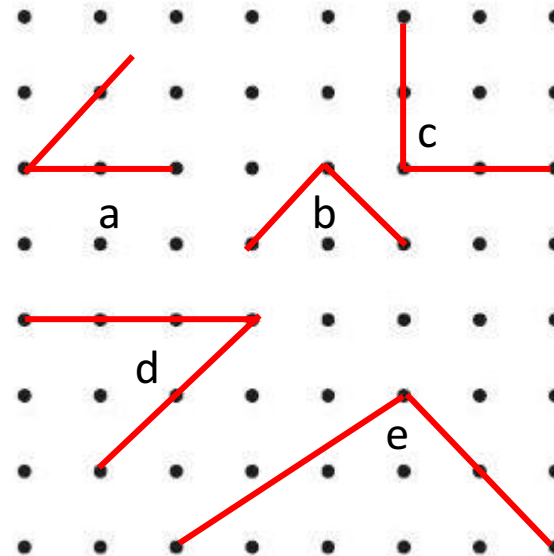
Greatest to smallest

08:15

Eight o'clock

Twenty to eleven

Five past 11

Here are five angles.
There are two sets of identical sized angles and one odd one out.
Which angle is the odd one out?
Prove it.

a   b   c

d   e

Angle e is the odd one out.

Angle b and c are both right angles.

Angle a and d are both half of a right angle 45 degrees.

Angle e is an obtuse angle.

Triangles

Notes and Guidance

Children will classify triangles for the first time using the names 'isosceles', 'scalene' and 'equilateral'. Children will use rulers to measure the sides in order to classify them correctly.

Children will compare the similarities and differences between triangles and use these to help them identify, sort and draw.

Mathematical Talk

Are all triangles the same?
What are the different types of triangles?
What are the properties of an isosceles triangles?
What are the properties of a scalene triangle?
What are the properties of an equilateral triangle?
How are the triangles different?
Do any of the sides need to be the same length?

Varied Fluency

1   Label each of these triangles **isosceles**, **scalene** or **equilateral**.
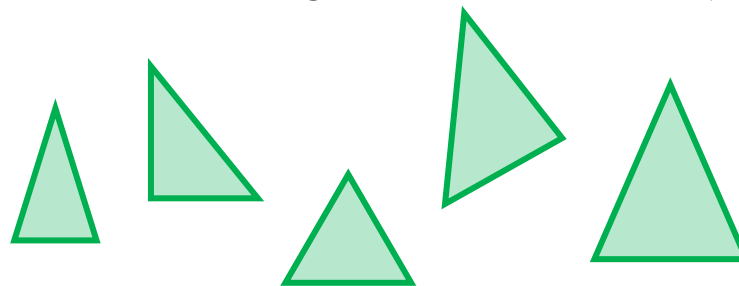
2   Look at these Triangles.
What is the same and what is different?
Can you explain why?
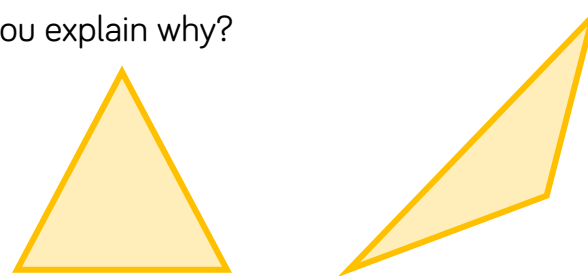
3   Using a ruler draw:
- An isosceles triangle
- A scalene triangle
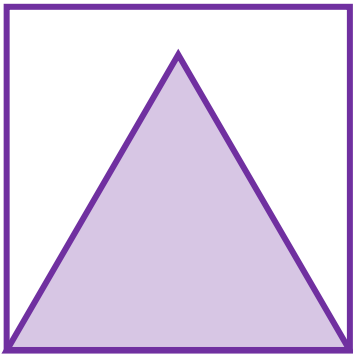- An equilateral triangle

Triangles

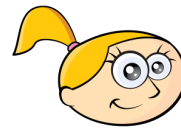## Reasoning and Problem Solving

Here is a square.
Inside the square is an equilateral triangle.
The perimeter of the square is 60 cm.
Find the perimeter of the triangle.
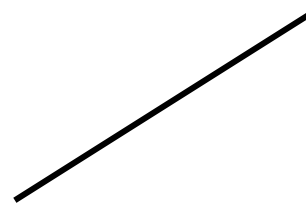
The perimeter of the triangle is 45 cm

Maisy

If I use a piece of string to make a triangle, all of the sides have to be the same length.

Investigate whether Maisy is correct.

Maisy is not correct. The length of the string will depend what sort of triangle can be made.

Draw two more sides to create:
- An equilateral triangle
- A scalene triangle
- An isosceles triangle

Children will draw a range of triangles. Get them to use a ruler to check their answers. Ask the children to compare their triangles – are all isosceles triangles and scalene triangles the same?

Quadrilaterals

Notes and Guidance

Children name quadrilaterals including a square, rectangle, rhombus, parallelogram and trapezium. They describe their properties and highlight the similarities and differences between different quadrilaterals.

Children draw quadrilaterals accurately using their knowledge of the properties.

Mathematical Talk

What's the same about the quadrilaterals?
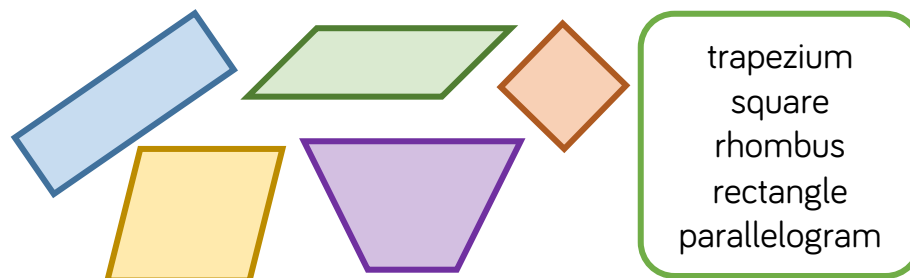What's different about the quadrilaterals?
What is a polygon?
Why is a square a special type of rectangle?
Why is a rhombus a special type of parallelogram?

Varied Fluency

1 Label the quadrilaterals using the word bank.

trapezium
square
rhombus
rectangle
parallelogram

2 Use the criteria to describe the shapes.

four sides	2 pairs of parallel sides	four equal sides
polygon	1 pair of parallel sides	4 right angles

Which criteria can be used more than once?
Which shapes share the same criteria?
Can you add any more properties to the shapes?

3 Draw and label;
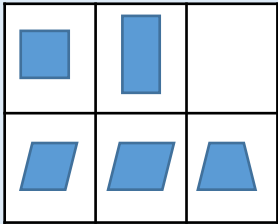• a rhombus.   • a parallelogram.   • 3 different trapeziums

Quadrilaterals

Reasoning and Problem Solving

Complete each of the boxes in a table with a different quadrilateral.

	4 equal sides	2 pairs of equal sides	1 pair of parallel sides
4 right angles			
No right angles			

Which box cannot be completed? Explain why.

Children can discuss if there are any shapes that can go in the top right corner. Some children may justify it could be a square or a rectangle however these have 2 pairs of parallel sides.

You will need:
4 centimetre straws
6 centimetre straws

How many different quadrilaterals can you make using the straws?

Calculate the perimeter of each shape.

Square: Four 4 cm - perimeter is 16 cm or four 6 cm- perimeter is 24 cm
Rectangle: Two 4 cm and two 6 cm- perimeter is 20 cm
Rhombus: Four 4 cm - perimeter is 16 cm
Four 6 cm straws- perimeter is 24 cm
Parallelogram: Two 4 cm and two 6 cm - perimeter is 20 cm
Trapezium: Three 4 cm and one 6 cm- perimeter is 18 cm

Lines of Symmetry

Notes and Guidance

Children find and identify lines of symmetry within 2D shapes.

Children explore symmetry in shapes of different sizes and orientations. To help find lines of symmetry children may use mirrors, tracing paper and folded paper.

Mathematical Talk

What does symmetrical mean?

How can you tell if something is symmetrical?

Are lines of symmetry only ever vertical?

Does the orientation of the shape affect the lines of symmetry?

What equipment could you use to help you find and identify lines of symmetry?
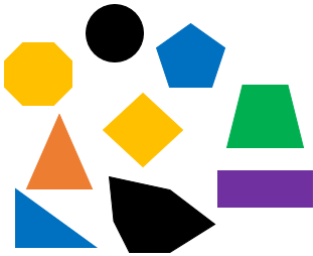
What would the rest of the shape look like?

Varied Fluency
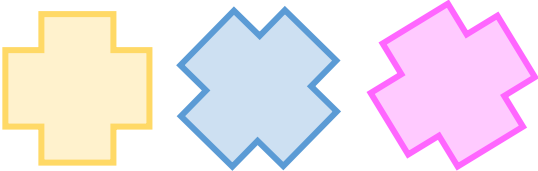
1 Find and draw the lines of symmetry in these shapes.
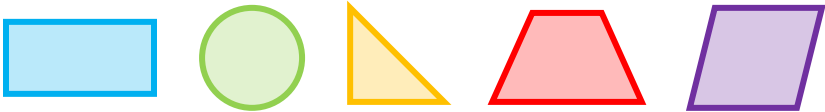
2 Sort the shapes into the table.

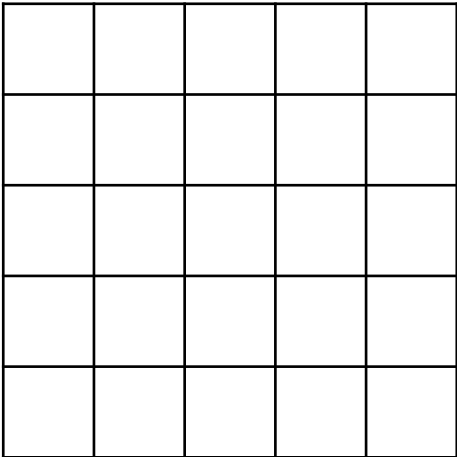|	1 line of symmetry	More than 1 line of symmetry
Up to 4 sides		
More than 4 sides		

3 Draw the lines of symmetry in these shapes.
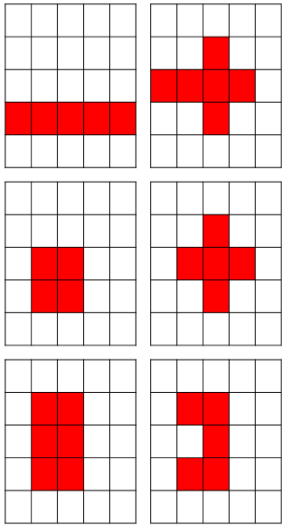

What do you notice?

Lines of Symmetry

Reasoning and Problem Solving

How many symmetrical shapes can you make by colouring in a maximum of 6 squares?

There are a variety of options. Some examples include:

Josef

A triangle has 1 line of symmetry unless you change the orientation.

Is Josef correct? Prove it.

Josef is incorrect. Changing the orientation does not change the lines of symmetry. Children should prove this by drawing shapes in different orientations and identify the same number of lines of symmetry.

Always, Sometimes, Never.

A four-sided shape has four lines of symmetry.

Sometimes.

Symmetric Figures

Notes and Guidance

Children use their knowledge of symmetry to complete 2D shapes and patterns. Children could use squared paper, mirrors or tracing paper to help them accurately complete figures.

Mathematical Talk

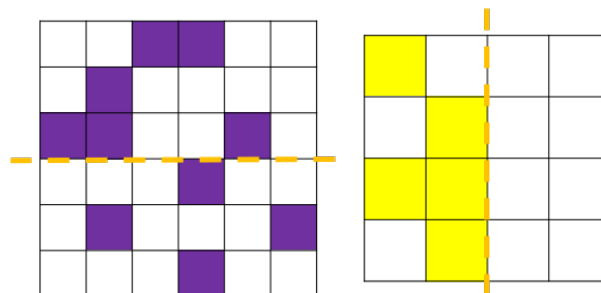What will the rest of the shape look like?
How can you check?

How can you use the squares to help you?

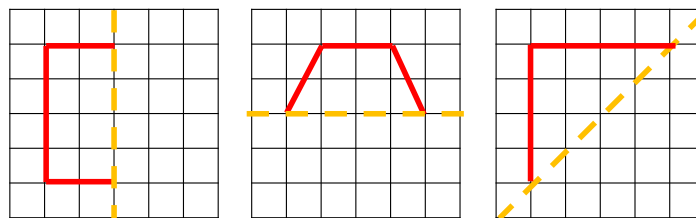Does each side need to be the same or different?

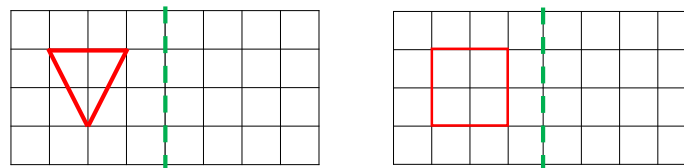Which lines need to be extended?

Varied Fluency

1 Colour the squares to make the pattern symmetrical.

2 Complete the shapes according to the line of symmetry.

3 Reflect the shapes in the mirror line.

Symmetric Figures

Reasoning and Problem Solving

Anusha

When given half of a symmetrical shape I know the original shape will have double the amount of sides.

Do you agree with Anusha? Convince me.

Anusha is partially correct. Depending on where the line of symmetry is will depend on whether sides are doubles or extended. If sides are extended this does not necessarily double the given number of sides.

How many different symmetrical shapes can you create using the given sides?
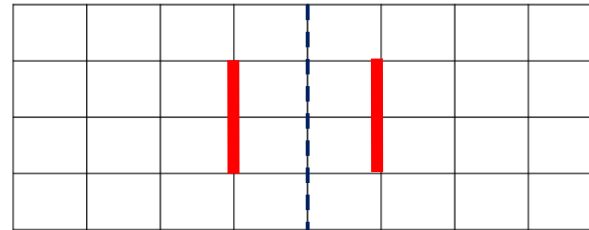
Children will find a variety of shapes. For example: