Year 2 Maths Activities - Week Beginning 15.6.20.

Dear Parents and Carers,

We are going to continue with our revision and we will learn about Shape both this week and next.

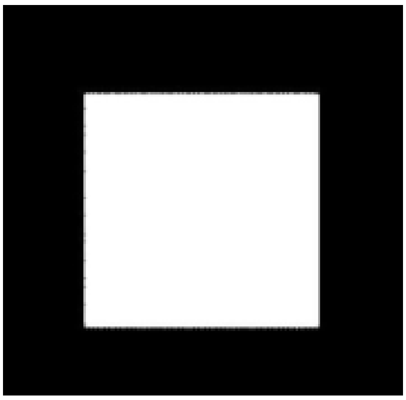
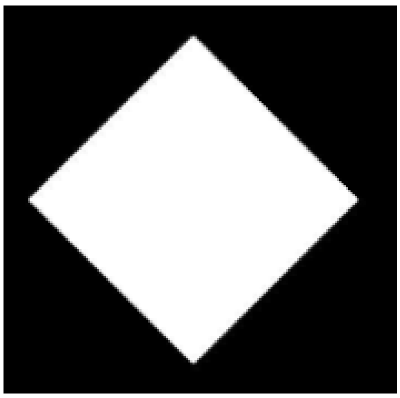
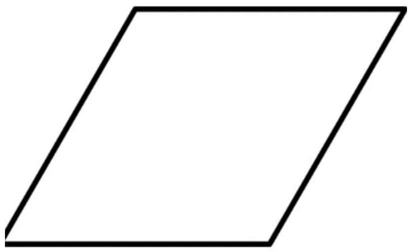
I have decided not to divide the sessions up into 3 levels of difficulty, as this topic is a bit more straight-forward than some of the others. However, I have tried to find some extra challenges for those children Working At Greater Depth.

Before we begin, let's look at what children in Year 2 need to know about Shape.

- A lot of this topic is about learning **new vocabulary**. There are a lot of 'special maths words' that we need to know. Children should not only know this vocabulary, but they should also **use it accurately to describe and reason about shapes.**
- We teach that 2D shapes only have 2 dimensions; length and height, but they have no depth or thickness. In reality, 2D shapes can only be drawn as flat images, we cannot pick them up and handle them.
- 3D shapes have 3 dimensions; length, height and depth. They are solid objects that can be picked up and handled.
- When learning about **2D shapes** we teach their properties as **'sides' and 'vertices'**. Sides can be **straight or curved** and we might also be interested in how long they are in comparison to other sides. This is particularly relevant when comparing squares and rectangles.
  *Children often say things like 'a rectangle is a squashed square or a square that has been stretched' – we want to **discourage** talk like this. They should be saying that a rectangle is a quadrilateral (4 sided shape), with 2 longer sides and 2 shorter sides, whereas the sides of a square are all equal in length.*
  'Vertices' are corners, or the points where two sides meet. For example, a square has 4 vertices.
- When learning about **3D shapes** we teach their properties as **'edges', 'vertices' and 'faces' or 'surfaces'.** Typically, we

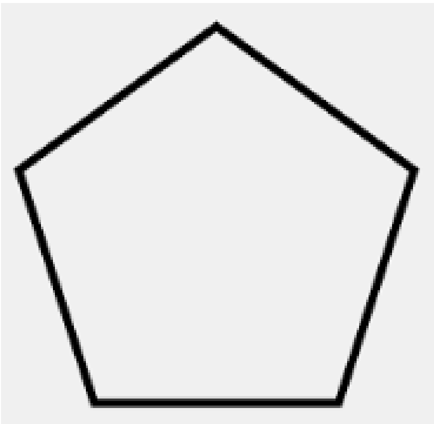
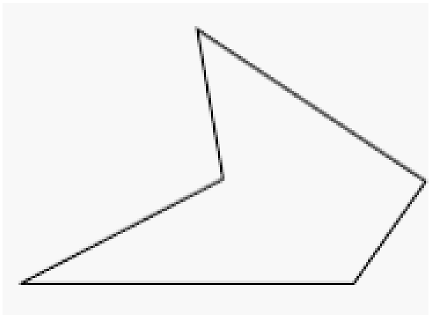
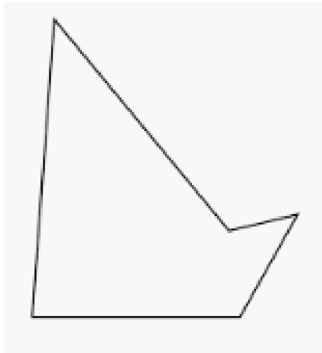
would want to know the number of edges, faces / surfaces and vertices a shape has, but we might also want to know the length of the edges in comparison to other edges and we would want to know the shape of the faces / surfaces.
Children often confuse 2D and 3D shapes when talking about them. They might call a 'cube' a 'square', when they should be saying 'it is a cube, and it has 6 square faces'. In other words, we use the names of 2D shapes when talking about the shape of the faces on a 3D shape, but we know that the overall shape has a different name.

- Children also need to know that shapes can be **rotated, but this does not change their name.** Below are two squares. The second one is not a diamond (in fact, the word 'diamond' is not a mathematical term at all). Just because it is being shown at an angle that we are not used to seeing, does not mean that its name changes, it still has 4 sides that are equal in length and 4 vertices. It also has 4 right angles. We don't strictly teach about angles in Year 2, but I find it is often necessary to have a very basic discussion about them because otherwise we wouldn't be able to differentiate between things like squares and rhombuses.

square…………………………..also a square…………..rhombus **(not a square)**

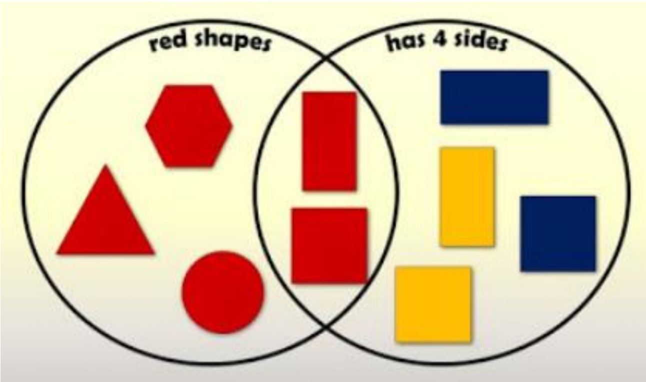
- Children also need to know about **regular** and **irregular** shapes. Regular shapes are the ones we are used to seeing, like the square above. All sides and internal angles are the same. Irregular shapes have sides and angles that are not all the same. Below are some pentagons. They are 5 sided shapes and that is what makes them pentagons, however only the first one is regular.

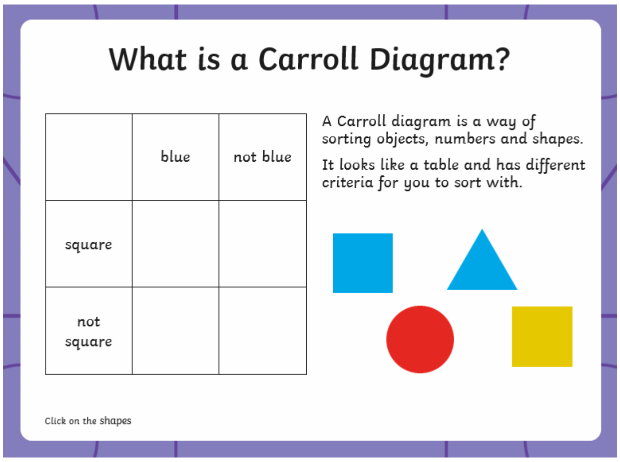
- Please see the attached sheets / posters which give the properties of 2D and 3D shapes. Just a couple of small notes;
    - **Unfortunately the rhombus on the 2D poster actually does look like a rotated square (you might want to stick a more accurate rhombus over the top of it!)**
    - **There are several 4 sided shapes on the 2D poster, although I don't think it shows all of the possible 4 sided shapes. Teach your child that the collective term for 4 sided shapes is 'quadrilateral'. Squares, rectangles, rhombus', kites, parallelograms, etc, are all different types of quadrilateral. We can give them different names when we know about their other properties, such as length of the sides and their angles.**
    - **The 2D poster only shows one type of triangle. Any 3 sided shape is a triangle (like we said about pentagons above, and in fact we could say it about other shapes, such as hexagons too!). Make sure that your child sees different types of triangles, e.g. equilateral, right angle, isosceles, etc.**

- **The 3D shape poster refers to 'surfaces'. We can use the term 'surface' to essentially mean the same thing as 'face'. It can be useful, particularly when talking about shapes that have curved surfaces. For example, a cone has one flat face or surface that is a circle, but it also has a 'curved surface' that sort of wraps all the way around. It has 2 faces / surfaces really, one that is flat and one that is curved.**

- Children learn to use all of this mathematical vocabulary to describe shapes and to explain their reasoning about them. They also use what they know about shapes and their properties to sort them in different ways (typically in Venn and Carroll diagrams). They also use shapes to identify, describe and create patterns.



Venn



Carroll

- In addition to the above features / properties, children also learn about lines of symmetry and to count the number of lines of symmetry 2D shapes have.

Activity 1

Objective: Recognise 2D and 3D shapes.

Notes and Guidance

Before learning about their properties, children need to recognise and name both 2D and 3D shapes and to be able to differentiate between them. They need to begin to understand that 2D shapes are actually flat and so cannot be handled or picked up.

Children also need to be able to recognise 2D shapes in different orientations..

Mathematical Talk

What shape is this? If I turn it around, now what shape is it?

Can you draw around any of the faces on your 3D shapes? Which 2D shapes can you make? Are there any you can't draw around?

Activities

1. Match the names of the shapes to the pictures.

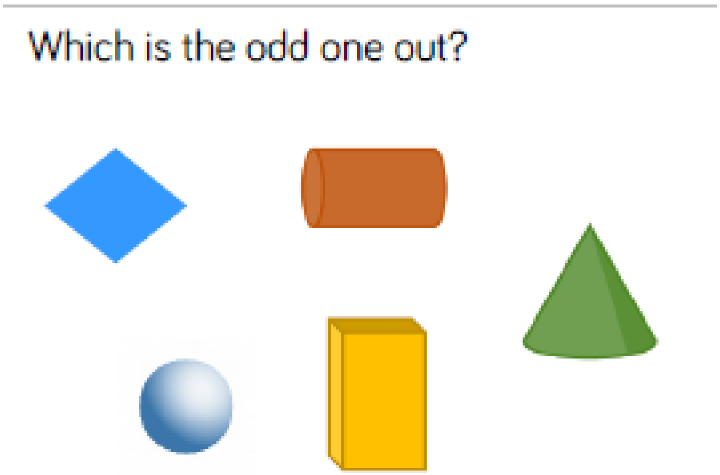
Square Triangle Rectangle Circle

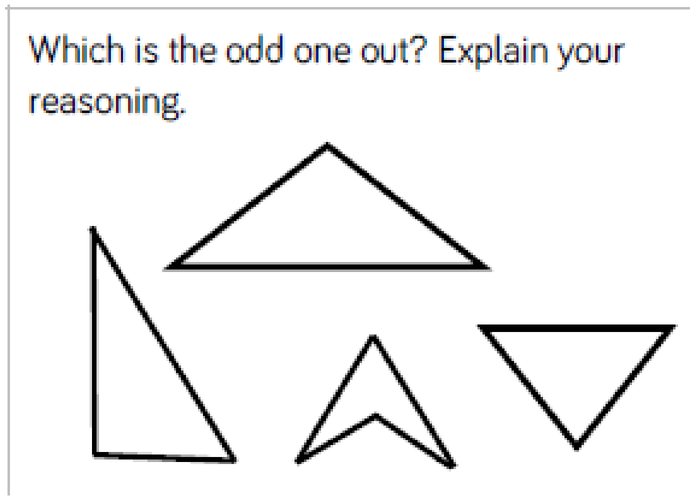
2. Put a combination of 3D shapes in a feely bag. Can you find the cube, the cone, the cylinder? etc.

As an alternative, you could find objects, such as a tin of beans (cylinder), tissue box (cuboid), and football (sphere). Hide behind something and describe the properties of each shape. Can somebody listening identify the shape you are describing?

3. Go on a shape hunt around school. Can you see any pentagons? Can you see any octagons? Can you see any hexagons?

You can hunt around your home if you are not in school!





Complete the worksheet about Recognising 2D and 3D shapes.

Extra Activities for Children Working at Greater Depth

TRUE OR FALSE

For each statement can you say whether it is true or false? Can you write sentences to explain your answers?

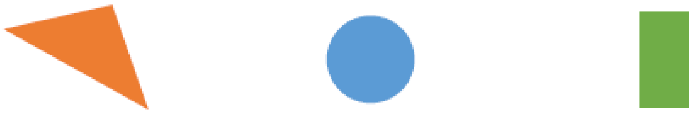
1. All of the sides on a pentagon need to be the same length.
2. A rectangle is a squashed square.
3. A rhombus and a square are the same shape.
4. There are different sorts of triangles.
5. A square, rectangle, cube and cuboid are all the same shape.

	6. A square, rectangle, rhombus, trapezium and kite are all different types of quadrilateral. 7. 3D shapes are solid shapes that you can pick up. 8. If you rotate a square around so that its vertices are at the top, bottom, left and right, it becomes a diamond. 9. Cuboids can have square faces as well as rectangular faces, but sometimes all of the faces are rectangular. 10. Rectangles are bigger than squares. 11. There is a 2D shape called 'a cone'. 12. Bricks for building houses are cuboid shaped, but they could be any 3D shape really.
Activity 2	**Objective:** Count sides on 2D shapes. **Notes and Guidance** In this step, children need to recognise that there are both straight sides and curved sides. Children should be encouraged to develop strategies for accurate counting of sides, such as by marking each side as it has been counted. Children also need to understand that not all same-sided shapes look the same, such as with irregular 2D shapes. **Mathematical Talk** What is a side? Are all sides straight? How can you check that you have counted all sides? Do all four-sided shapes look the same?

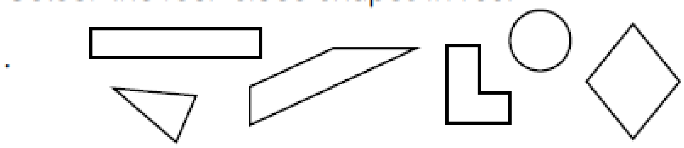
Activities

1 Match the shapes to the number of sides.

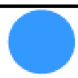
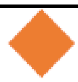
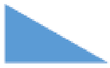
One Four Three



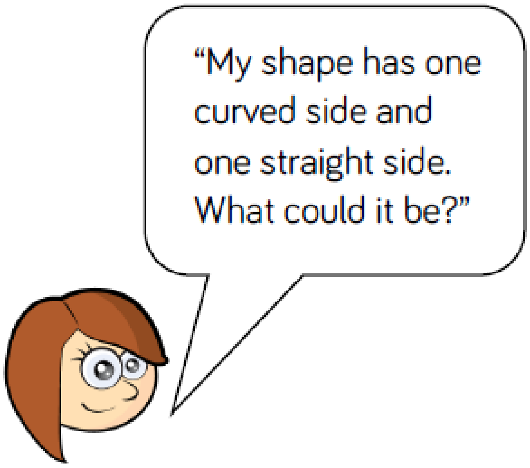
2 Colour the four-sided shapes in red.



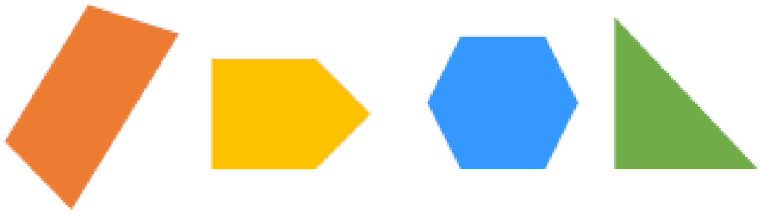
3 Complete the table.

Name	Shape	Number of sides
Pentagon		
Circle		
Square		
Triangle		
Hexagon		

Beth says:



Put these shapes into order based upon the number of sides that they have.



Complete the worksheet about Counting the Sides on 2D shapes.

Extra Activities for Children Working at Greater Depth

Here are 18 lollipop sticks. How many octagons can you make?

Will you have any lollipop sticks left over?
How did you work out the answer? Could you work it out by doing a calculation instead of drawing the sticks or making the shapes physically? What calculation could you do?

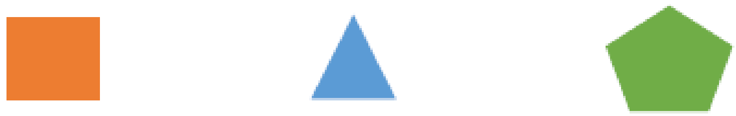
What if you had 20 lollipop sticks?
How many triangles could you make?
How many squares could you make?
How many pentagons could you make?
How many hexagons could you make?
How many heptagons could you make?
How many nonagons could you make?
How many decagons could you make?

	Could you make a shape with more sides than a decagon? Do your shapes always have to be regular? How would you make a rectangle? You would need to show that 2 sides are longer than the other 2. Does this have implications for the number of them that you could make when you compare it to other quadrilaterals? How many lollipop sticks would you need to make 23 squares? How did you work out your answer? Could you use lollipop sticks to make a circle, oval or semi-circle? Explain your answer.
Activity 3	**Objective:** Count vertices on 2D shapes. **Notes and Guidance** Children are introduced to the term vertices. They will understand that a vertex is where two lines meet at a point. By exploring the non-concept, e.g. a perpendicular line, they will recognise that corners are vertices and be able to count them in real-life 2D shapes. **Mathematical Talk** Show me a vertex. Can you identify the vertices in this shape? Would this be a vertex? Explain why. If I have ____ vertices, what could my shape be? What won't it be?

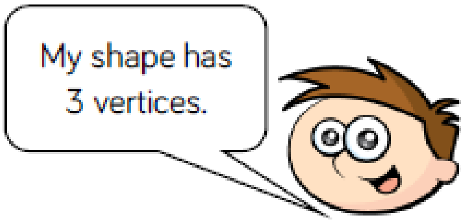
Activities

1. Match the shape to the correct number of vertices.

3 Vertices　　5 Vertices　　4 Vertices

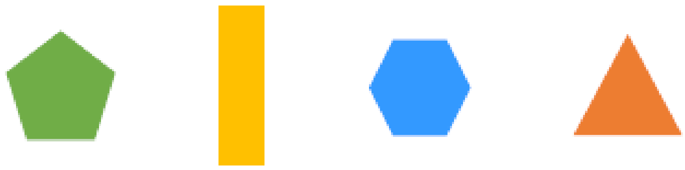


2. Chris says:



What shape could he have?

3. Put these shapes in order based upon the number of vertices they have.



Bob says:

Do you agree? Convince me.

Which 2d shape has half the amount of vertices as a hexagon?

What 2d shape has twice as many vertices as a square?

Complete the worksheet about Counting the Vertices on 2D shapes.

Extra Activities for Children Working at Greater Depth

Which shape has more vertices?

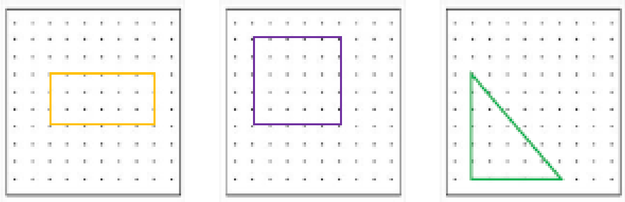
	Number of vertices
2 squares	
4 triangles	
2 pentagons	

Do you have to draw the shapes and physically count the vertices? Or are you able to visualize the shapes in your mind and count that way?

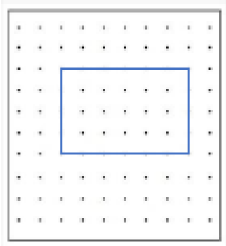
	Perhaps you could do a calculation to work out the answers, e.g. one square has 4 vertices, so 2 squares have 8. 4 + 4 = 8 OR 4 X 2 = 8. I have some shapes. Altogether my shapes have 20 vertices. What shape do I have and how many of them do I have? Is there more than one correct answer? How many different answers can you think of?
Activity 4	**Objective:** Draw 2D shapes. **Notes and Guidance** Children use their knowledge of properties of shape to accurately draw 2D shapes. Starting with geoboards, children make shapes with elastic bands to look carefully at the number of sides and vertices. They then use rulers and straight edges to draw the shapes on squared or dotty paper. **Mathematical Talk** Where are you going to start drawing the shape? In the middle of a side? At a vertex? Which is the most efficient way? Can you make the shape on a geoboard? How many sides has the shape got? Can you draw a rectangle? Can you now draw a larger rectangle?

Activities

1. Use a geoboard to make different 2D shapes. Can you make a rectangle? Can you make a square? Can you make a triangle?

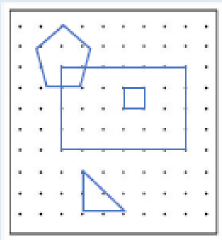


2. Can you draw a rectangle on dotty paper? Start at a vertex and use a ruler to draw your first straight side. How many straight sides will you need? Rotate the paper to help you draw the shape more accurately.



N.B. for number 1 above, you don't have to use a geoboard. You could just draw the shapes on squared paper.

When you draw a rectangle on squared paper, how many different rectangles can you draw? What is the same about your rectangles? What is different about them?

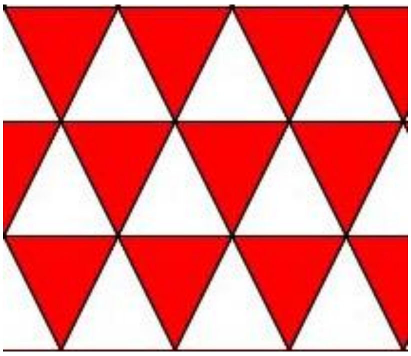
Draw a large rectangle on squared paper. Draw a square inside the rectangle. Draw a triangle underneath the rectangle. Draw a pentagon that is bigger than the square. Can you give instructions to your partner to help them draw different shapes?	 Children may end up with a different picture from above however they should have four shapes drawn. Children will make up their own instructions.

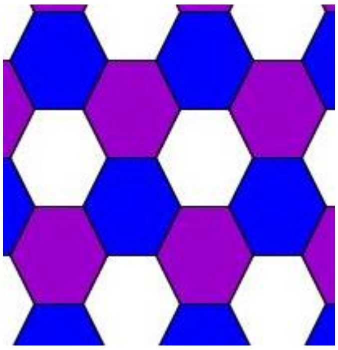
Complete the worksheet about Drawing Shapes.

Extra Activities for Children Working at Greater Depth

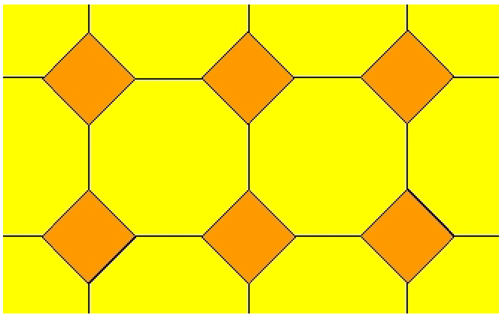
How many different pentagons can you draw?
How many different hexagons can you draw?
Try this with other shapes.

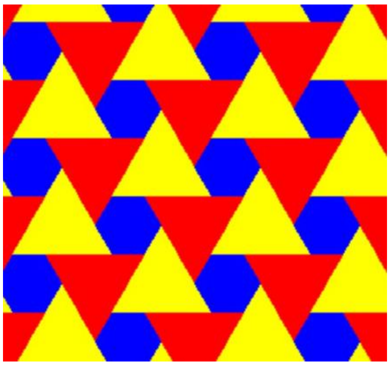
Why not have a go at tessellation? That means drawing a flat shape over and over again, so that the shapes are touching and there are no gaps. Here are some examples;





You can also use combinations of different shapes, like these;



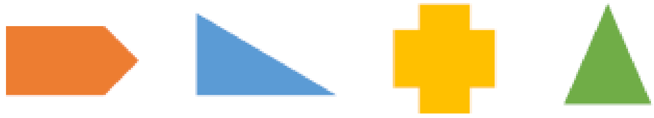


When you were drawing your tessellations, what did you find easy? What did you find difficult? If you drew another one, would you do anything differently? Why?

Activity 5	**Objective:** Lines of symmetry.
	## Notes and Guidance In the previous small steps, children have identified and described 2D shapes according to the number of sides and vertices. They now need to be introduced to the concept of symmetry. There are a range of practical resources that would introduce them to the concept of shapes being halved on their vertical line of symmetry, such as mirrors, GeoBoards and paper folding. ## Mathematical Talk What is a vertical line of symmetry? What does vertical mean? Which is the odd shape out? How do you know? What resources could you use to check if a shape has a vertical line of symmetry?

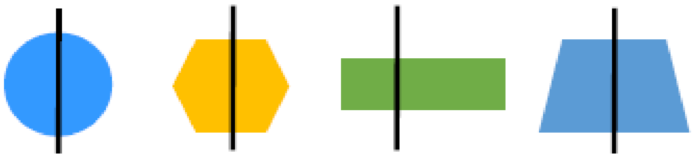
Activities

1 Can you fold these shapes to find a vertical line of symmetry? Rotate the shape, can you find a Horizontal line of symmetry?



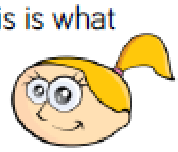
2 Draw the vertical lines of symmetry on these shapes.

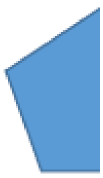
3 Circle the shape with an incorrect line of symmetry. Explain why.



Can you draw more than one four-sided shape that has a vertical line of symmetry?

Caroline has placed a mirror on the vertical line of symmetry. This is what she sees:





Can you complete the other half of the shape?

	Complete the worksheet about Lines of Symmetry. **Extra Activities for Children Working at Greater Depth** Lines of Symmetry don't always have to be vertical. They can be horizontal or diagonal or any which way really, as long as the shapes on both sides of the line are the same (or a mirror image of each other). Have a go at the 'Greater Depth Lines of Symmetry' Activities.

N.B.

I have not included the White Rose End of Block Assessment with the materials this week because we will be learning more about Shape next week.

There is a little extra though!

If you Google 'I See Maths Videos', the top result that comes up is 'All Home Lessons – I See Maths'.

This website has videos for learning maths at home. They teach you how to play little maths games with different levels of challenge. They cover different topics like Money, Addition and Subtraction and Multiples. They have a few printable resources to support the games too. I have watched a couple of the videos and can recommend them. ☺