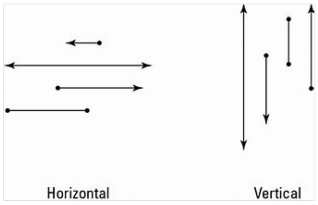
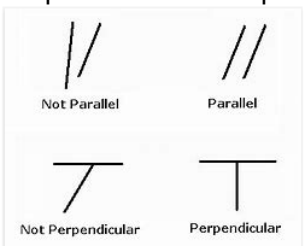
Planning Overview
Year 3 Geometry – Properties of Shape

Draw 2-D shapes and make 3-D shapes using modelling materials; recognise 3-D shapes in different orientations and describe them.
Recognise angles as a property of shape or a description of a turn.
Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle.
Identify horizontal and vertical lines and pairs of perpendicular and parallel lines.

3G–1 Recognise right angles as a property of shape or a description of a turn, and identify right angles in 2D shapes presented in different orientations.
3G–2 Draw polygons by joining marked points and identify parallel and perpendicular sides.

Objective	Teaching and learning
Introduction	**Recap shapes** Discuss 2D shapes and what defines a 2D shape (that it can only be measured along 2 of its dimensions – width and length). Recap names and properties of 2D shapes. Ensure children can recognise different types of triangles (not name them), and quadrilaterals (naming and describing squares and rectangles) and know that polygons are 2D shapes with only straight sides. What's the same, what's different? Children to choose two shapes and list what is the same and what is different.
Identify horizontal and vertical lines and pairs of perpendicular and parallel lines	Horizontal and vertical lines  Perpendicular and parallel lines  Two lines that lie on the same plane that never intersect are called parallel. Perpendicular lines are lines that cross or meet at a 90-degree angle. Relate vocabulary to shape 'which shapes have parallel lines?' Write the word MATHEMATICS digitally and identify parallel, perpendicular, horizontal and vertical lines. Can they write their name digitally and identify parallel, perpendicular, horizontal and vertical lines?

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<td>Investigate artwork by geometric artists such as Kandinsky. Ask children to identify what they can see in the paintings. ‘I can see perpendicular lines and parallel lines’
 
Can children create artwork with given geometric criteria?

Sort shapes according to their parallel and perpendicular lines.</td>
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<td>Recognise angles as a property of shape or a description of a turn

Identify right angles, recognise that two right angles make a half-turn, three make three quarters of a turn and four a complete turn; identify whether angles are greater than or less than a right angle</td>
<td>Children to investigate the concept of a right angle by making ‘angle eaters’

 

Children are to be given a circle. Children to fold circle in half and in half again. Once the circle is in quarters, open it up and cut out one of the quarters to make a ‘packman angle eater’

Children to investigate the concept of a right angle practically. Use their angle eater to find angles less than a right angle and greater than a right angle.

Children to sort angles into right angles, less than right angles and bigger than right angles.

Discuss the more abstract concept of a right angle being an amount of a whole turn. Draw a circle on the floor. Children to take turns in standing inside the circle and turning what they think is a right angle within the circle. Relate to their packman angle eater.

Build up to 2 right angles being a half turn, three being three quarters of a turn and 4 being a whole turn. Practice this skill in PE warm-ups building in clockwise and anti-clockwise language.

Relate the children’s knowledge of right angles to their shape work. Can you sort the shapes into those with right angles and those without? Using a piece of A5 paper draw 10 lines using a ruler from one edge to another. Make sure that your final piece of art includes, parallel, perpendicular, horizontal, vertical lines and a range of sized angles. Can you colour code and label your work?

Mastery
Can you draw a triangle with:
■ 1 right angle?
■ 2 right angles?

Can you draw a quadrilateral with:
■ 1 right angle?
■ 2 right angles?
■ 5 right angles?
■ No right angle?

If some of these are impossible, can you explain why?</td>
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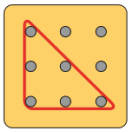
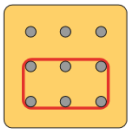
<td>Draw 2D shapes</td>
<td>Identify 2D shapes and describe their properties.

Discuss regular and irregular shapes – make sure that children can recognise that any 6-sided shape is a hexagon, not just the ones that are commonly used in shape sets.

Recap the language of polygon - 2D shapes with only straight sides.

Sort into Venn and Carrol diagrams.
Use the Venn and Carrol diagrams to help with what's the same and what's different reasoning activities – e.g. number of vertices, number of sides, regular shape, irregular shape, angle of vertices, which shapes have a line of symmetry.

Use peg boards and elastic bands or dotty paper and ask children which different shapes they can make with 6 sides, 5 sides, etc. Do all of your 6-sided shapes have the same length sides?

NRICH – Board Block challenge
Mastery with Greater Depth
How many different triangles can you find on a 3×3 pin geoboard?
How do you decide that they are different?
 
How many different quadrilaterals can you find on a 3×3 pin geoboard?
How do you decide that they are different?
  </td>
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<td>Make 3D shapes using modelling materials; recognise 3D shapes in different orientations and describe them</td>
<td>Discuss a range of 3D shapes and what classifies them as 3D (the ability to measure them along 3 dimensions length, width and depth).

Discuss properties of shapes using the appropriate vocabulary.
-number of edges
-number of vertices
-number of faces

Mastery
Have a range of 3-D shapes in a 'feely bag'.
Can you feel for the cube, the cuboid, the pyramid, the cylinder and the cone?
Explain how you know.
Describe what you are feeling to your classmates and see if they guess what the shape is.</td>
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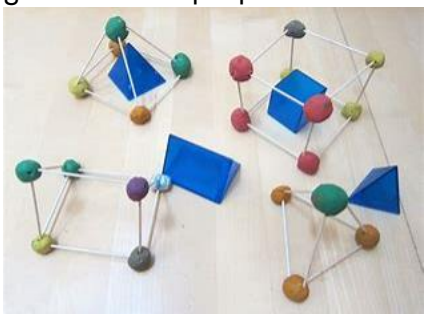
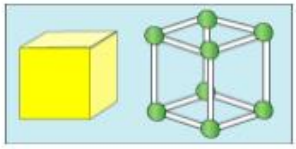
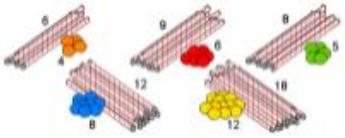
	Make shapes using a range of modelling materials. Children to make shapes and discuss properties. Children to also make shapes when given a list of properties to adhere to.  'Make a shape that has 4 faces and 8 vertices' NRICH – Skeleton Shapes **Skeleton Shapes** **Age 5 to 7** **Challenge Level** ★★ Skeleton shapes are made with balls of modelling clay and straws. This shows a cube and a skeleton cube:  How many balls of modelling clay and how many straws does it take to make the cube? Here are some piles of modelling clay balls and straws:   Investigating shapes using Polydron tiles I am thinking of a 3D shape which has faces that are triangles and rectangles. What could my shape be?

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<td>Recognise 3-D shapes in different orientations and describe them</td>
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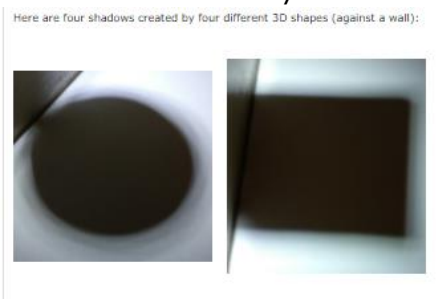
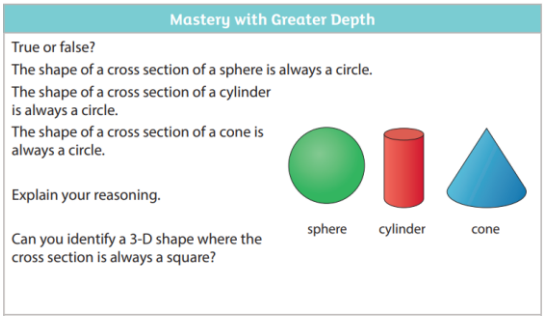
Children to investigate partly buried shapes in different orientations, what shape could it be? Why? What about now after some has been pulled further out?

How do you know that it is no longer going to be a cube?

NRICH – Shadow Play


One face of a 3D shape looks like this.
What could it be?
Is there more than one possibility?

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<td>Problem solving</td>
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NRICH – Flags

Here's a chance to investigate some of them.
Pick a flag and investigate some of the following:-
What shapes can you see in it? Can you describe them and their angles?
Does the flag have any lines of reflective symmetry, if so how many lines?
Can you find any pairs of parallel lines? If so mark them on your flag.
Are there any lines perpendicular to one another?
Can you find a way to classify the shapes in your flag?
Now try with another flag.
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