

Unit 4

Five daily lessons

North West Consultants

Shape and Space
Reasoning about shapes

Year 3
Spring term

Unit Objectives Year Three

- **Make and describe shapes and patterns.**
- **Relate solid shapes to pictures of them.**
- **Read and begin to write the vocabulary of direction.**
- **Make and use right-angled turns, and use the four compass points.**
- **Solve shape problems or puzzles. Pages 80-89**
- **Explain reasoning or methods.**

This Unit Plan is designed to guide your teaching.
You will need to adapt it to meet the needs of your class.

Resources needed to teach this unit:

- Resource 4.1 with shapes cut out
- Resource 4.2 Carroll diagram enlarged to A3
- 4 PE mats or 4 sheets of A2 paper
- Set of Attribute/ Logic blocks
- Battenburg cake
- Toblerone box
- Play-dough
- Plasticine
- Sets of 3d shapes, including prisms
- compasses
- OHT resource 4.3 Haunted house plan
- Resource sheet 4.4 10x 10 blank grid
- OHT 4.5 Shape table
- OHT 4.6 Treasure map
- Match sticks or plastic milk straws

Year 2

Link Objectives

Year 4

- Use mathematical names for common 3-d and 2-d shapes.
- Sort shapes and describe their features.
- Make and describe shapes, pictures and patterns.
- Begin to recognise line symmetry.
- Use mathematical language to describe position, direction and movement.
- Recognise whole, half and quarter turns, to the left or right, clockwise or anti clockwise.
- Know a right angle is a measure of a quarter turn and recognise right angles in squares or rectangles.
- Give instructions for moving around a route in straight lines and round right-angled corners.

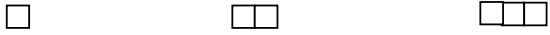


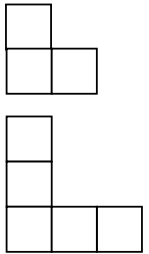
- Describe and visualise 3-d and 2-d shapes, including tetrahedron and heptagon, equilateral and isosceles triangles.
- Make shapes e.g. construct polygons and discuss properties.
- Visualise 3- shapes from 2-d drawings and identify simple nets of solid shapes.
- Sketch the reflection of a simple shape in a mirror line parallel to one side.
- Recognise positions and directions e.g. position of a point on a grid.
- Recognise simple examples of horizontal and vertical lines.
- Use compass directions N, S, E, W, NE, NW, SE, SW.
- Make and measure clockwise and anti-clockwise turns e.g. from SW to N.
- Begin to know that angles are measured in degrees.

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
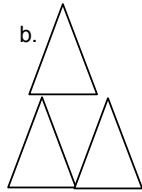
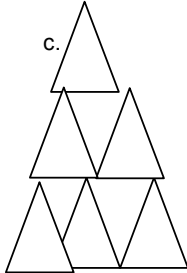
Planning Sheet	Day 1	Unit 4: Shape and space	Term: Spring	Year Group: 3
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
<p>To name, describe and classify common 2d shapes.</p> <p>To sort a set of shapes according to their properties and display them on a Carroll diagram.</p> <p>Vocabulary 2-shape 3-d shape Face Vertices Carroll diagram Quadrilateral Right angle Prism Pyramid Triangular Hemi-sphere</p>	<p>In a large space set out 4 PE mats or A2 paper. Label a Carroll diagram: Has a right angle Does not have a right angle. quadrilateral Not a quadrilateral</p> <p>Using resource sheet 4.1 cut out, give individual children a selection of regular and irregular shapes. Use a timer to time 30 seconds to sort the shapes. Ask the children to describe their choices.</p> <p>This activity can be repeated in other mental and oral starters by changing criteria e.g. shape with two lines of symmetry, shapes with two or more right angles.</p>	<p>To name describe and classify properties of common 2d and 3d shapes, including hemi-sphere, prism</p> <p>To relate solid shapes to pictures of them.</p> <p>Resources Sheet 4.1 copied on coloured paper and cut up 4 PE mats or 4 sheets of A2 paper Set of Attribute/ Logic blocks Battenburg cake Toblerone box Play-dough Plasticine Resource 4.2 Carroll diagram enlarged to A3</p>	<p>Recap on naming known 3-d shapes and properties from Autumn term. Show children a Battenburg cake.</p> <div style="border: 1px solid black; padding: 5px;"> <p>Q: What shapes are its faces? Q: How many corners? Q: How do you know it is not a cube?</p> </div> <p>Look at the pattern of the sponge on one face or slice of cake.</p> <div style="border: 1px solid black; padding: 5px;"> <p>Q: What would the pattern be on the next slices or faces?</p> </div> <p>Establish a prism has the same cross-section along its length Examine a Toblerone box</p> <div style="border: 1px solid black; padding: 5px;"> <p>Q: What shapes are the faces?</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>Q: Imagine standing inside a Toblerone, what shape would you see in front of you, behind you? What would the roof of the shape look like ?</p> </div> <p>Fill the empty Toblerone box with Play dough, when full, peel off the sides. Check children's predictions relating to the shapes of the faces with the flattened sides of box.</p> <div style="border: 1px solid black; padding: 5px;"> <p>Q: If the play dough was sliced into several slices, what would the shapes of the faces be?</p> </div> <p>Compare a triangular prism to a sphere</p> <div style="border: 1px solid black; padding: 5px;"> <p>Q: Predict: What would the shape of the faces be if I carefully sliced the sphere into slices? Would they all be the same? How would it be different to the prism? Why? Demonstrate what a hemi-sphere is.</p> </div> <p>Introduce children to pictures to represent 3d shapes. In groups of three, some groups with solid shapes, others with pictures of shapes, sort onto Carroll diagram.(Resource 4.2) Choose a shape, match it to a word card and describe it to a partner in terms of number and shape of faces, number of sides and vertices, then sort according to: Prism/not prism Curved / not curved</p>	<p>Give children 1 attribute block. Each child describes the attribute e.g. thick, red, small, triangle. Place one shape on floor, in turns children place a block, one at a time, only changing one attribute e.g. thin, red, small, triangle Thin, red, large triangle. Continue the sequence until all shapes have been used.</p> <p>When children are familiar, change to two criteria.</p> <div style="border: 1px solid black; padding: 10px; margin-top: 20px;"> <p>By the end of the lesson children should be able to name, describe, sort and classify 2d and 3d shapes</p> </div>

Planning Sheet	Day 2	Unit 4: Shape and space	Term: Spring	Year Group: 3
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
<p>To use the four compass points</p> <p><u>Vocabulary</u></p> <p>Left Right Up Down Forwards Backwards Across along through towards away from turn half turn quarter turn compass point north, south, east, west N,S,E,W Horizontal vertical</p>	<p>During PE or when a large space is available, in 4 corners of the room place 4 PE mats marked north, south, east, west. Place 3 to 4 mats in the centre to be the boat.</p> <p>Show children a compass and explain when using a map there are four points or directions marked on the compass, north, east, south, west.</p> <p>Children have to travel to various points on teacher's direction. e.g. hop slowly to compass point north, skip to the point opposite west, run to the next point clockwise from south, jog horizontally from west, travel vertically from south, travel anticlockwise to north.</p>	<p>To read and begin to write the vocabulary of direction.</p> <p>To use the four compass points</p> <p><u>Resources</u> Roamer whiteboards Grid track for Roamer made from large paper joined together to form a floor road (see small scale example resource sheet 4.2)</p>	<p>With a partner discuss if you were telling someone how to get from school to the local shop/park, what sort of words would you use? Take feedback, ask a child to scribe the words. e.g. forwards, backwards, towards, turn.</p> <p>Chose two children, one child gives the other instructions to navigate around the classroom e.g. from the carpet, around the desk to the sink and back. One child to follow the directions.</p> <div style="border: 1px solid black; padding: 5px;"> <p>Q: How will xxx know which way to turn? Q: What words will his/her partner have to use to make sure they turn correct way?</p> </div> <p>Establish children will need to use clockwise, anticlockwise, half turn, full turn.</p> <div style="border: 1px solid black; padding: 5px;"> <p>Q: Is there another way of saying a quarter turn? (Right angled turn)</p> </div> <p>Children follow routes around classroom.</p> <p>With a partner and using white boards children draw the route the children have taken, and then describe the route using appropriate language.</p> <p>Show the children the road track for Roamer, demonstrate the commands needed to make Roamer move around the track.</p> <div style="border: 1px solid black; padding: 5px;"> <p>Q: What command is needed for a quarter, half or full turn?</p> </div> <p>In pairs, using trial and error children write a sequence of directions to programme Roamer around the track or use Roamer ICT programme to programme a route.</p>	<p>Ask one child to read their instructions, whilst another programmes Roamer to test the route.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 20px;"> <p>By the end of the lesson children should be able to make and describe a route using appropriate vocabulary.</p> </div>

Planning Sheet	Day 3	Unit 4. Shape and space	Term: Spring	Year Group: 3
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
<p>To solve shape puzzles.</p> <p><u>Vocabulary</u></p> <p>Left Right Up Down Forwards Backwards Across along through towards away from turn half turn quarter turn compass point north, south, east, west N,S,E,W Horizontal vertical</p>	<p>Give each child a selection of pictures of 3d shapes. Give the children a clue and children hold up appropriate shape.</p> <div style="border: 1px solid black; padding: 5px;"> <p>Q: I have two triangular faces. My faces will always be the same if I cut a cross section lengthwise What am I ?</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>Q: I have 8 corners... Some of my faces are rectangles.. What am I?</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>Q: I was a sphere, I have been cut in half, what am I?</p> </div>	<p>To read and begin to write the vocabulary of direction.</p> <p>To use the four compass points</p> <p><u>Resources</u> Compasses OHT resource 4.3 Haunted house map Resource sheet 4.4 10x 10 blank grid</p>	<p>Refer back to compass directions in hall, using a compass establish that the points North, south, east and west are always in this order, with north to the top .</p> <p>Refer back to the compass; demonstrate to children how to line the compass up to show north. Use the compass to find which way is north in the classroom; label each wall with the four compass points.</p> <div style="border: 1px solid black; padding: 5px;"> <p>Q: If I was facing this wall, in which direction would I be facing?</p> </div> <p>All children stand and face north, make a quarter clockwise turn, establish this is a right angled turn, establish this direction is east, repeat with south,</p> <div style="border: 1px solid black; padding: 5px;"> <p>Q: Is there another way of saying a quarter turn? (Right angled turn)</p> </div> <p>Using OHT resource 4.3 Haunted House, ask the children to write instructions on whiteboard to guide the ghost (counter) around the house, using directional language and compass points.</p> <p>In pairs with a blank grid 10 x 10 square grid, choose the context for a map, e.g. room plan, treasure map, town plan, label the compass points, plot obstacles, then write down directions to reach certain points e.g. the post office to the swimming pool.</p>	<p>Tell the children you are going to give them some directions which they have to listen to carefully, but some of the information is missing so they will have to ask the teacher for clarification of the direction and the missing vocabulary.</p> <p>All face north Make a quarter turn (<i>clockwise or anti clockwise?</i>) <i>Clockwise</i></p> <div style="border: 1px solid black; padding: 5px;"> <p>Q: Which compass point are you facing? (E)</p> </div> <p>Make another quarter turn. (Clockwise)</p> <div style="border: 1px solid black; padding: 5px;"> <p>Q: Which direction are you facing? (S)</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>Q: Predict, if you now take a half turn, clockwise which way will you be facing? (N)</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>Q: If you had turned anticlockwise where would you be facing?</p> </div> <p>Turn anticlockwise (quarter, half or full turn?) Make a right-angled turn. In partners give directions to each other.</p>

Planning Sheet	Day 4	Unit 4: Shape and space	Term:	Year Group: 3
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
<p>To read and begin to write the vocabulary of direction.</p> <p>To make and use right-angled turns, and use the four compass points</p> <p><u>Vocabulary</u></p> <p>Travel Continue Ahead Forwards Sideways Up down Left Right Clockwise Anticlockwise Turn Right angled turn Quarter turn Half turn Full turn north South East West squares</p>	<p>With treasure map OHT 4.6 Treasure island.</p> <p>Begin at the galleon; direct the pirates to the treasure using appropriate vocabulary.</p> <p><u>Resources</u></p> <p>OHT Resource 4.6 Treasure island</p>	<p>To solve shape problems.</p> <p>To explain reasoning and methods.</p> <p>To make and describe shapes and patterns.</p> <p><u>Resources</u></p> <p>Large number of matchsticks, straws or small sticks OHT Resource 4.5</p> <p><u>Vocabulary</u> Corners Right angles Squares Rectangles Describe Predict Sequence</p>	<p>Making squares investigation: With an OHT 4.5 make the following shapes with matchsticks. In pairs give children 16 sticks</p> <p></p> <p>8 sticks 2 squares. 7 sticks 2 squares. 11 sticks 3 squares.</p> <p>Use matchsticks to help complete the table. OHT 4.4</p> <p>Q: can you make these shapes and describe them?</p> <p>Q: What will the next shape be? Q: Can you predict how many matches will be in the next shape?</p> <p>Q: Can you describe how the numbers are obtained in each sequence?</p> <p>Explain in the first sequence it is three times the shape number plus one.</p> <p>Q: can you predict how many sticks will be in the 10th shape the 20th shape?</p> <p>Ask the children in threes to investigate the following patterns.</p> <p></p> <p>Ask children to explain their findings</p> <p></p>	<p>With a set of cubes or interlocking cubes. Demonstrate building sequences with interlocking cubes e.g.</p> <p></p> <p>Q: Can you describe what is happening?</p> <p>Q: How many cubes in the 4th shape?</p> <p>By the end of the session children should be able to make and describe sequences of shapes, explain their reasoning.</p>

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Planning Sheet	Day 5	Unit 4: Shape and space	Term: Autumn	Year Group: 3
Oral and Mental		Main Teaching		Plenary
Objectives and Vocabulary	Teaching Activities	Objectives and Vocabulary	Teaching Activities	Teaching Activities/Focus Questions
<p>To name, describe and classify common 2d shapes.</p> <p>To read and begin to write the vocabulary of direction.</p> <p>To make and use right-angled turns, and use the four compass points.</p> <p><u>Vocabulary</u> Travel Continue Ahead Forwards Sideways Up down Left Right Clockwise Anticlockwise Turn Right angled turn Quarter turn Half turn Full turn north South East West Squares</p> <p><u>Resources</u> Geo boards Peg boards Elastic bands</p>	<p>Place a shape on a squared 10x 10 grid on the OHT, with squares labelled, horizontally A-J and 1-10 vertically. Resource 4.7 Place an isosceles triangle on the grid; identify which square the vertex is within.</p> <div style="border: 1px solid black; padding: 5px;"> <p>Q: Tell me something about this shape. Q: Which Square is this vertex within?</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>Q: If I turned the shape clockwise through a right angle, where would the vertex now be?</p> </div> <p>Establish where the vertex is now positioned.</p> <div style="border: 1px solid black; padding: 5px;"> <p>Q: I am now going to turn the shape (Turn a half turn clockwise) Can you describe what I have done to your partner.</p> </div>	<p>To solve shape problems.</p> <p>To explain reasoning and methods.</p> <p>To make and describe shapes and patterns.</p> <p><u>Resources</u></p> <p>OHT Resource 4.4 labelled A-J Horizontally and 1-10 vertically</p> <p>Matchsticks or straws</p>	<p>Lay out sticks or straws in the following arrangement on the OHP. (With all sides touching)</p> <div style="display: flex; justify-content: space-around;"> <div> <p>a.</p>  </div> <div> <p>b.</p>  </div> </div> <div style="text-align: center; margin-top: 20px;"> <p>c.</p>  </div> <div style="border: 1px solid black; padding: 5px; margin-top: 20px;"> <p>Q: How many sticks in each of the shapes? Q: How many do they increase by each time?</p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Q: How many sticks will you need to make a triangle with sides 5 sticks long?</p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Q: What would happen if we made hexagons?</p> </div> <p>In pairs children investigate number of sticks needed to make increasing hexagon pattern. Discuss findings</p>	<p>With children at tables in pairs with geo boards/ peg boards and elastic bands children respond to teachers instruction.</p> <div style="border: 1px solid black; padding: 5px; margin-top: 20px;"> <p>Q: Can you make an irregular shape with three vertices?</p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 20px;"> <p>Q: Can you make a regular shape with three vertices how are they different? How many lines of symmetry in each shape?</p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 20px;"> <p>Q: Can you make a shape with 8 vertices with no lines of symmetry? Can you describe it?</p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 20px;"> <p>By the end of the session children should be able to make and describe sequences of shapes, explain their reasoning.</p> </div>

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