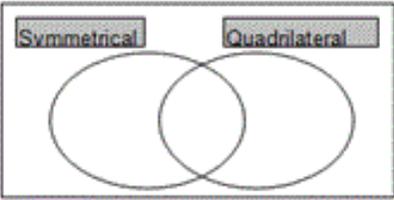


Unit Overview and Guidance

- The exemplification has been taken from the NCETM online 'Resource Toolkit', with additions in order to ensure full coverage.
- Links to the White Rose Maths hubs schemes of work (with questions categorised into the three aims of the national curriculum i.e. fluency, problem solving and reasoning) are hyperlinked to each of the objectives. Many thanks go to the White Rose Maths hub for permission to include their resources.
- The NCETM reasoning questions have also been incorporated into each unit and are identified in pale purple boxes underneath the group of the most relevant objectives.
- The 'big Ideas' sections from the NCETM 'Teaching for Mastery' documents have been included at the start of each unit. Hyperlinks to the full NCETM 'Teaching for Mastery' documents have also been included for easy reference.
- Hyperlinks to NRich activities have also been added to this version. These are found by clicking on the blue buttons like this one 1 at the bottom of relevant objective.
- Some additional content has been added in order to support mixed-aged planning. Any additional content is in *italics*. Occasionally ~~strike through~~ has been used to identify when an objective has been altered and this is primarily where an objective has been split between two units.
- Each unit is sub-divided into sections for ease of planning. Sub-categories in this unit are;
 1. Properties of shapes
 2. Angles
 3. Position, direction and movement

	Yr 2	Yr 3	Yr 4
NCETM Teaching for Mastery Questions, tasks and activities to support assessment	<p>The Big Ideas</p> <p>It is not uncommon for pupils to say that this is a square  and this is not , or that something like this is a triangle .</p> <p>It is important for pupils to know what the properties are that make up certain shapes, and for them not to just learn the names of typical proto looking shapes.</p> <p>It is helpful to think about non examples of shapes. For  example, why this is not a triangle:</p> <p>Recognising pattern and generalising structures and relationships are key elements for laying the foundations for later work in algebra.</p>	<p>The Big Ideas</p> <p>During this year there is an increasing range of shapes that pupils are familiar with. The introduction of symmetrical and non-symmetrical polygons and the requirement that pupils should be able to draw them will give rise to discussions about lengths of sides and sizes of angles. Pupils need to appreciate these features as properties of shapes as well as the number of sides and vertices.</p> <p>Pupils recognise that angles are about the amount of turn – the lengths of the lines used to represent angles do not affect the size of the angle.</p> <p>Pupils recognise that relationships are at the heart of properties of shapes, not particular measurements. For example, the opposite sides of any rectangle will always be equal, not that rectangles have a pair of long sides and a pair of short sides.</p>	<p>The Big Ideas</p> <p>During this year, pupils increase the range of 2-D and 3-D shapes that they are familiar with. They know the correct names for these shapes, but, more importantly, they are able to say why certain shapes are what they are by referring to their properties, including lengths of sides, size of angles and number of lines of symmetry.</p> <p>The naming of shapes sometimes focuses on angle properties (e.g. a rectangle is right-angled), and sometimes on properties of sides (e.g. an equilateral triangle is an equal sided triangle).</p> <p>Shapes can belong to more than one classification. For example, a square is a rectangle, a parallelogram, a rhombus and a quadrilateral.</p>
	Teaching for Mastery Year 2	Teaching for Mastery Year 3	Teaching for Mastery Year 4

GEOMETRY (GEO - 6 weeks)

Strand	Yr2	Yr3	Yr4
<p style="writing-mode: vertical-rl; transform: rotate(180deg);">Properties of Shapes</p>	<p>identify and describe the properties of 2D shapes, including the number of sides and symmetry in a vertical line</p> <p>Recognise 2D and 3D shapes</p> <p>Count sides on 2D shapes</p> <p>Count vertices on 2D shapes</p> <p>Draw 2D shapes</p> <p>Lines of symmetry</p> <div data-bbox="248 448 674 647" style="border: 1px solid black; padding: 5px;"> <p>Place the shapes below in the correct place in the Venn diagram.</p>  <p>Make one shape of your own to add to each section of the diagram.</p> </div> <div data-bbox="331 671 725 871" style="border: 1px solid black; padding: 5px;">  </div> <div data-bbox="421 906 824 954" style="border: 1px solid black; padding: 2px; display: flex; justify-content: space-around;"> 123456789 </div> <p>compare and sort common 2D shapes and everyday objects</p> <p>Sort 2D shapes</p> <p>Make patterns with 2D shapes</p> <p>Children can sort two sets of 2D shapes in 2 or more different ways using different criteria each time. For example, they might choose 'dimensions' or 'right angled'</p> <div data-bbox="734 1225 824 1273" style="border: 1px solid black; padding: 2px; display: flex; justify-content: space-around;"> 12 </div>	<p>draw 2D shapes;</p> <p>Recognise and describe 2D shapes</p> <p>use appropriate mathematical vocabulary to describe the features of 2D and 3D shapes including semicircles, hemispheres and prisms</p> <p>sort and classify collections of 2D shapes in different ways using a range of properties including: 'all sides are of equal length,' 'has at least one right angle' or 'has at least one line of symmetry' and record their classifications on Venn and Carroll diagrams, including diagrams involving more than one criterion</p> <p>How many triangles can you draw on a 3x3 pin board? How many quadrilaterals can you draw on a 3x3 pin board? In each case, how do you decide if the shapes are the same or different?</p> <p>Could you find different right angled triangles, or is there only one? Can you name the different quadrilaterals?</p> <p>Identify horizontal and vertical lines and pairs of perpendicular and parallel lines</p> <p>Horizontal and vertical</p> <p>Parallel and Perpendicular</p> <div data-bbox="1010 1225 1509 1273" style="border: 1px solid black; padding: 2px; display: flex; justify-content: space-around;"> 123456789XY </div>	<p>compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes</p> <p>Triangles</p> <p>Quadrilaterals</p> <p>Pupils should be able to complete this sentence: All equilateral triangles have ...</p> <div data-bbox="1899 1225 2148 1273" style="border: 1px solid black; padding: 2px; display: flex; justify-content: space-around;"> 12345 </div>

GEOMETRY (GEO - 6 weeks)

Properties of Shapes

Properties of 3D Shapes

identify and describe the properties of 3D shapes, including the number of edges, vertices and faces

[Count edges on 3D shapes](#)

[Count vertices on 3D shapes](#)

Write the missing numbers in the 2 empty boxes.

	number of square faces	number of triangular faces	number of circular faces
cylinder 	0	0	
cube 		0	0
pyramid 	1	4	0

1 2 3

identify 2-D shapes on the surface of 3D shapes, for example a circle on a cylinder and a triangle on a pyramid

[Count faces on 3D shapes](#)

What is a 3-D shape?

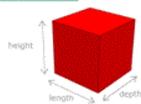
3-D means the shape has 3 dimensions, length, width and depth.

1-Dimension

2-Dimensions

3-Dimensions

3. This is a cube



It has 3 dimensions - length, height and depth.
All 3-D shapes are solids.

1 2

compare and sort common 3D shapes and everyday objects

[Sort 3D shapes](#)

[Make patterns with 3D shapes](#)

Children can sort two sets of 3D shapes in 2 or more different ways using different criteria each time. For example, they might choose 'dimensions' or 'right angled'

1

make 3D shapes using modelling materials;

[Construct 3D shapes](#)

recognise 3D shapes in different orientations and describe them

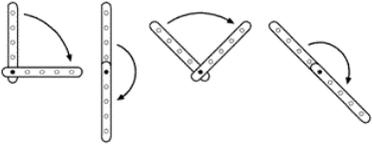
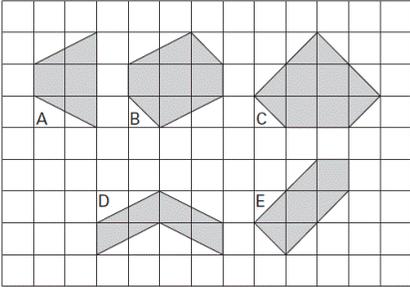
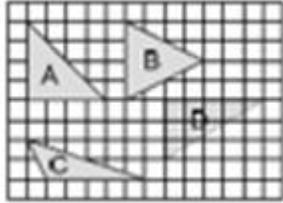
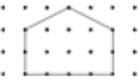
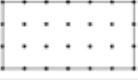
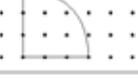
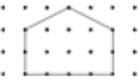
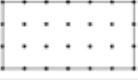
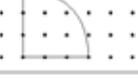
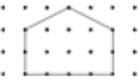
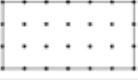
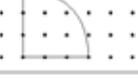
[Recognise and describe 3D shapes](#)

use appropriate mathematical vocabulary to describe the features of 2D and 3D shapes including semicircles, hemispheres and prisms

GEOMETRY (GEO - 6 weeks)

Properties of Shapes	NCETM Reasoning	<p>What's the same, what's different? Pick up and look at these 3-D shapes.</p>  <p>Do they all have straight edges and flat faces? What is the same and what is different about these shapes?</p> <p>Visualising</p> <p>In your head picture a rectangle that is twice as long as it is wide. What could its measurements be?</p> <p>Always, sometimes, never</p> <p>Is it always, sometimes or never true that when you fold a square in half you get a rectangle.</p> <p>Other possibilities</p> <p>Can you find shapes that can go with the set with this label? "Have straight sides and all sides are the same length"</p>	<p>What's the same, what's different?</p>  <p>Visualising</p> <p>I am thinking of a 3-dimensional shape which has faces that are triangles and squares. What could my shape be?</p> <p>Other possibilities One face of a 3D shape is a square. What shape could it be? Are there any other possibilities? Other possibilities One face of a 3-D shape looks like this.</p> <p>What could it be? Are there any other possibilities?</p> <p>Always, sometimes, never Is it always, sometimes or never that all sides of a hexagon are the same length?</p> <p>Other possibilities Can you find shapes that can go with the set with this label? "Have straight sides that are different lengths."</p> <p>Convince me Which capital letters have perpendicular and / or parallel lines? Convince me.</p>	<p>What's the same, what's different about the <u>diagonals</u> of these 2-D shapes?</p>  <p>Visualising</p> <p>Imagine a square cut along the diagonal to make two triangles. Describe the triangles.</p> <p>Join the triangles on different sides to make new shapes. Describe them. (you could sketch them). Are any of the shapes symmetrical? Convince me.</p>

GEOMETRY (GEO - 6 weeks)

Angles	Drawing and Recognising Angles	<p>use mathematical vocabulary to describe position, direction and movement including distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anti-clockwise), and movement in a straight line</p> <p>Describe turns</p> <p>Recognise whole, half and quarter turns. They describe turns and give and follow instructions to turn. For example, they give instructions to a friend to follow a route around the playground. They make and draw half and quarter turns from the same starting point using, for example, two geo-strips.</p> 	<p>Recognise angles as a property of a shape or description of a turn</p> <p>Turns and angles</p> <p>Identify right angles, recognise that two right angles make a half turn, three make three quarters of a turn and a complete turn; identify whether angles are greater or less than a right angle</p> <p>Right angles in shapes</p> <p>Compare angles</p>  <p>Which of these shapes have right angles?</p>  <p>If I face West and make a quarter turn anticlockwise, in which direction will I now face?</p> <p>What about half turn?</p>	<p>identify acute and obtuse angles; compare and order angles up to two right angles by size</p> <p>Identify angles</p> <p>Compare and order angles</p> <p>Here are four triangles drawn on a square grid</p>  <p>Write the letter for each triangle in the correct region of the sorting diagram. One has been done for you.</p> <table border="1" data-bbox="1738 507 2123 719"> <thead> <tr> <th></th> <th>has a right angle</th> <th>has an obtuse angle</th> <th>has an acute angle</th> </tr> </thead> <tbody> <tr> <th>is isosceles</th> <td>A</td> <td></td> <td></td> </tr> <tr> <th>is not isosceles</th> <td></td> <td></td> <td></td> </tr> </tbody> </table> <p>Put a tick or a cross in each box. The first one has been done for you.</p> <table border="1" data-bbox="1778 740 2114 1171"> <thead> <tr> <th>Shape</th> <th>It is a quadrilateral</th> <th>It has one or more right angles</th> </tr> </thead> <tbody> <tr> <td></td> <td>x</td> <td>✓</td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> </tr> </tbody> </table>		has a right angle	has an obtuse angle	has an acute angle	is isosceles	A			is not isosceles				Shape	It is a quadrilateral	It has one or more right angles		x	✓									
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NCE TM Reasoning		<p>Always, sometimes, never - all sides of a hexagon are the same length?</p> <p>Other possibilities</p> <p>Can you find shapes that can go with the set with this label? "Have straight sides that are different lengths."</p> <p>Convince me</p> <p>Which capital letters have perpendicular and / or parallel lines? Convince me.</p>	<p>Always, sometimes, never - the two diagonals of a rectangle meet at right angles?</p> <p>Other possibilities</p> <p>Can you show or draw a polygon that fits both of these criteria?</p> <p>"Has exactly two equal sides."</p> <p>"Has exactly two parallel sides."</p>																												

GEOMETRY (GEO - 6 weeks)

Position, direction, movement

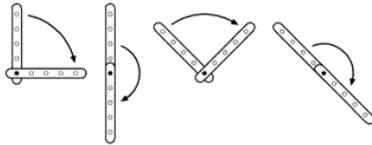
Coordinates and translation

use mathematical vocabulary to describe position, direction and movement including distinguishing between rotation as a turn and in terms of right angles for quarter, half and three- quarter turns (clockwise and anti-clockwise), and movement in a straight line

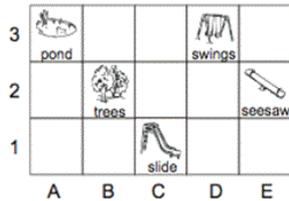
Describe movement

Describe movement and turns

Recognise whole, half and quarter turns. They describe turns and give and follow instructions to turn. For example, they give instructions to a friend to follow a route around the playground. They make and draw half and quarter turns from the same starting point using, for example, two geo-strips.



Use this grid to help you complete the table –



Trees	B2
Slide	
Seesaw	
	A3

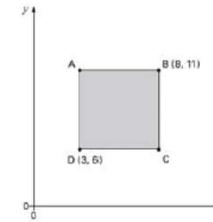
1 2 3 4 5 6 7 8 9 X

describe positions on a 2-D grid as coordinates in the first quadrant

Describe position

Draw on a grid

Here is a shaded square. Write the coordinates for point A



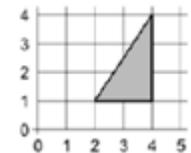
1 2

describe movements between positions as translations of a given unit to the left/right and up/down

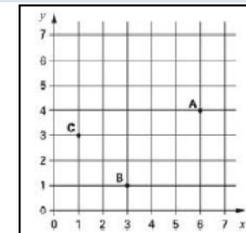
Move on a grid

Describe movement

This triangle is translated two squares to the left and one square down. Give the coordinates of its vertices in the new position.



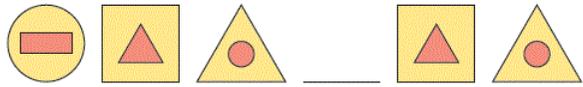
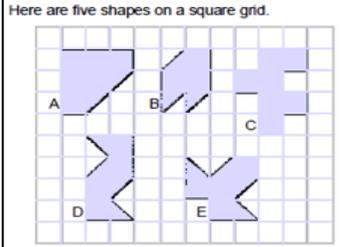
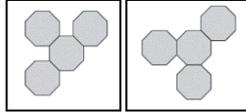
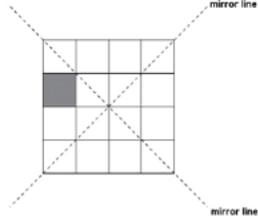
plot specified points and draw sides to complete a given polygon



A, B and C are three corners of a rectangle. What are the coordinates of the fourth corner?

1

GEOMETRY (GEO - 6 weeks)

Position, direction, movement	Symmetry and reflection	<p>mathematical objects in patterns</p> <p>Make patterns with shapes</p> <p>Identify symmetry in a vertical line</p> <p>Describe the patterns in sequences and predict what comes next in the sequence and continue the pattern.</p> <p>Fill in the missing shape to complete the pattern.</p>  <p>If the pattern continued what would the tenth shape be?</p> <p>Explain your reasoning.</p>	<p><i>(Year 4 objective) identify lines of symmetry in 2-D shapes presented in different orientations</i></p> <p><i>(Year 4 objective) complete a simple symmetric figure with respect to a specific line of symmetry</i></p> <p>Horizontal and vertical lines of symmetry only</p>	<p>identify lines of symmetry in 2-D shapes presented in different orientations</p> <p>Lines of symmetry</p>  <p>Here are five shapes on a square grid.</p> <p>Write the letters of the two shapes which have a line of symmetry.</p> <p>Draw a line of symmetry on each diagram below. Use a ruler.</p>  <div style="display: flex; justify-content: flex-end; gap: 5px;"> 1 2 3 </div> <p>complete a simple symmetric figure with respect to a specific line of symmetry</p> <p>Symmetric figures</p> <p>Here is a shaded square on a grid. Shade in 3 more squares so that the design is symmetrical in both mirror lines.</p>  <div style="display: flex; justify-content: flex-end; gap: 5px;"> 1 2 </div>
	NCETM Reasoning			