Whole School Maths Curriculum Overview: Year 6

#TheSmawthorneExperience

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<tr><th>Year 6</th><th colspan="3"></th></tr>
<tr><td>Topic</td><td>Shape</td><td>Geometry – Position and Direction</td><td rowspan="4">Themed Projects, problem solving and consolidation</td></tr>
<tr><td>The Big Ideas</td><td colspan="2">Variance and invariance are important ideas in mathematics, particularly in geometry. A set of quadrilaterals for example may vary in many ways in terms of area, length of sides and the size of individual angles. However there are a set of invariant properties which remain common to all quadrilaterals, namely they have four sides and their internal angles sum to 360o. Some of these properties emerge from naturally occurring constraints, for example the sum of the internal angles will always sum to 360o, they can do nothing else! The questions 'What's the same?' and 'What's different?' can draw pupils' attention to variance and invariance. Shapes can be alike in essentially two different ways: congruent and similar. Congruent shapes are alike in all ways: they could occupy exactly the same space. Similar shapes share identical geometrical properties but can differ in size. All equilateral triangles are similar, but only identically sized ones are congruent. Not all isosceles triangles are similar. Angle properties are a mix of necessary conditions and conventions. It is a necessary condition that angles on a straight line combine to a complete half turn. That we measure the half turn as 180o is conventional.</td></tr>
<tr><td>Key Knowledge and Skills</td><td>Step 1 Measure and classify angles
Step 2 Calculate angles
Step 3 Vertically opposite angles
Step 4 Angles in a triangle
Step 5 Angles in a triangle – special cases
Step 6 Angles in a triangle – missing angles
Step 7 Angles in quadrilaterals
Step 8 Angles in polygons
Step 9 Circles
Step 10 Draw shapes accurately
Step 11 Nets of 3-D shapes
•</td><td>Step 1 The first quadrant
Step 2 Read and plot points in four quadrants
Step 3 Solve problems with coordinates
Step 4 Translations
Step 5 Reflections
•</td></tr>
<tr><td>Sentence Stems</td><td>• General Shape Properties:
• "A ________ has ________ faces, ________ edges, and ________ vertices." (e.g., A cube has 6 faces, 12 edges, and 8 vertices.)</td><td>• Coordinate Identification & Description:
• "The coordinates of point A are (,)."</td></tr>
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	• "The opposite sides of a _______ are _______." (e.g., The opposite sides of a rectangle are parallel.) • "This shape can be classified as a _______ because _______." (e.g., This shape can be classified as a triangle because it has three sides.) • "A _______ has _______ lines of symmetry." (e.g., A square has four lines of symmetry.) • Angles: • "The angles in a triangle add up to _______ degrees." • "An _______ angle is greater than 90 degrees." • "A _______ angle is smaller than 90 degrees." • 2D Shapes: • "A _______ is a polygon with _______ sides." (e.g., A hexagon is a polygon with six sides.) • "A _______ has four equal sides and four right angles." • "A _______ has no lines of symmetry	• "Point B is located at the intersection of the x-axis and the y-axis." • "The x-coordinate represents the horizontal position, and the y-coordinate represents the vertical position." • "To find the coordinates of a point, move along the x-axis first, then the y-axis." • Movement & Translation: • "The shape has been translated by (number) units in the (direction)." • "A translation is a movement of a shape without changing its size or orientation." • "The shape has been moved from (original coordinates) to (new coordinates)." • "A translation of (number) units to the right is the same as adding (number) to the x-coordinate." • "A translation of (number) units upwards is the same as adding (number) to the y-coordinate	
National Curriculum Statements	• describe positions on the full coordinate grid (all four quadrants) • draw and translate simple shapes on the coordinate plane, and reflect them in the axes. • draw 2-D shapes using given dimensions and angles • recognise, describe and build simple 3-D shapes, including making nets • compare and classify geometric shapes based on their properties and sizes and find unknown angles in any triangles, quadrilaterals, and regular polygons • illustrate and name parts of circles, including radius, diameter and circumference and know that the diameter is twice the radius • recognise angles where they meet at a point, are on a straight line, or are vertically opposite, and find missing angles.		

Misconceptions	• Children may confuse the x- and y-values of the coordinates and read or plot them in the wrong order. Children may confuse the x- and y-values of the coordinates and read or plot them in the wrong order. • Some children may need the support of gridlines to work out the coordinates of a point. • Children may look at the gap between shapes, instead of how far a specific vertex has been translated. • Children may not give the direction of the translation and/or confuse left and right.	Children may confuse the x- and y-values of the coordinates and read or plot them in the wrong order. • Children may confuse the x- and y-values of the coordinates and read or plot them in the wrong order. Some children may need the support of gridlines to work out the coordinates of a point • Children may look at the gap between shapes, instead of how far a specific vertex has been translated. • Children may not give the direction of the translation and/or confuse left and right.	
Progression	Year 5: • identify, describe and represent the position of a shape following a reflection or translation, using the appropriate language, and know that the shape has not changed. • identify 3-D shapes, including cubes and other cuboids, from 2-D representations • know angles are measured in degrees: estimate and compare acute, obtuse and reflex angles • draw given angles, and measure them in degrees • identify: angles at a point and one whole turn (total 360o) angles at a point on a straight line and 1/2 a turn (total 180o) other multiples of 90o • use the properties of rectangles to deduce related facts and find missing lengths and angles • distinguish between regular and irregular polygons based on reasoning about equal sides and angles.		
Key Vocabulary	plotting, coordinates, quadrant, point, axis, x-axis, y-axis, grid, x-coordinate, y-coordinate vertices, vertex, square, side, rectangle, triangle, equilateral, oblong, shape, irregular, hexagon, identical, similar, parallelogram perimeter, metre (m), distance, length, long horizontal, vertical halfway, ine, properties, value, reason negative, positive translation, refl ection, original, le , down, up, right, mirror, away, diagonal degrees, measurement, length angle, obtuse, acute, refl ex, right angle, interior protractor, baseline, crosshairs, scale vertex, edge, face parallel properties triangle, isosceles, equilateral, scalene regular, polygon, quadrilateral, parallelogram, kite, rhombus, trapezium diameter, radius, circumference, concentric, centre perimeter pyramid, tetrahedron, cylinder, prism, cuboid, cube		