GEOMETRY properties of shapes/ position and direction

SEQUENTIAL LEARNING OSMOTHERLEY CP

Highlighted= 2020 Maths guidance ready-to-progress criteria

Revised September 2021

Year group	sequence	methods
FOUNDATION	*continue, copy and create repeating patterns	Patterns are made with varying rules (including AB, ABB and ABBC) and objects and pupils are invited to continue the pattern. Deliberate mistakes are made and pupils and staff discuss how to fix these.
	*pupils select, rotate and manipulate shapes in order to develop spatial reasoning skills	Pupils use pattern blocks, tangrams,building blocks, magnetic construction tiles and are challenged to copy increasingly complex 2d and pictures and patterns.
	*learn to compose and decompose shapes so that children recognise a shape can have other shapes *within* it, just as numbers can	Pupils investigate using paper folding, shapes,printing.

| ONE | Pupils should be taught to:
* recognise and name common 2-D and 3-D shapes, including:
 2-D shapes [for example, rectangles (including squares), circles and triangles]
 3-D shapes [for example, cuboids (including cubes), pyramids and spheres]
*compose 2D and 3D shapes from smaller shapes to match an example, including manipulating shapes to place them in particular orientations

Pupils should be taught to:
* describe position, direction and movement, including whole, half, quarter and threequarter turns. | Pupils handle common 2-D and 3-D shapes, naming these and related everyday objects fluently.
 They recognise these shapes in different orientations and sizes, and know that rectangles, triangles, cuboids and pyramids are not always similar to each other.

Pupils use the language of position, direction and motion, including: left and right, top, middle and bottom, on top of, in front of, above, between, around, near, close and far, up and down, forwards and backwards, inside and outside.

Pupils make whole, half, quarter and three-quarter turns in both directions and connect turning clockwise with movement on a clock face. |

| TWO | Pupils should be taught to:

* identify and describe the properties of 2-D shapes, including the number of sides and line symmetry in a vertical line | Pupils handle and name a wide variety of common 2-D and 3-D shapes including: quadrilaterals and polygons, and cuboids, prisms and cones, and identify the properties of each |

	* identify and describe the properties of 3-D shapes, including the number of edges, vertices and faces * identify 2-D shapes on the surface of 3-D shapes, [for example, a circle on a cylinder and a triangle on a pyramid] * compare and sort common 2-D and 3-D shapes and everyday objects Pupils should be taught to: * order and arrange combinations of mathematical objects in patterns and sequences * use mathematical vocabulary to describe position, direction and movement, including movement in a straight line and distinguishing between rotation as a turn and in terms of right angles for quarter, half and three-quarter turns (clockwise and anticlockwise)	shape (for example, number of sides, number of faces). Pupils identify, compare and sort shapes on the basis of their properties and use vocabulary precisely, such as sides, edges, vertices and faces. Pupils read and write names for shapes that are appropriate for their word reading and spelling. Pupils draw lines and shapes using a straight edge. Pupils should work with patterns of shapes, including those in different orientations. Pupils use the concept and language of angles to describe 'turn' by applying rotations, including in practical contexts (for example, pupils themselves moving in turns, giving instructions to other pupils to do so, and programming robots using instructions given in right angles).
THREE	Pupils should be taught to:	Pupils' knowledge of the properties of shapes is extended at this stage to symmetrical and non-symmetrical polygons and polyhedra.

*draw polygons by joining marked points and identifying parallel and perpendicular sides * 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 NB no position and direction statutory targets in y3	Pupils extend their use of the properties of shapes. They should be able to describe the properties of 2-D and 3-D shapes using accurate language, including lengths of lines and acute and obtuse for angles greater or lesser than a right angle. Pupils connect decimals and rounding to drawing and measuring straight lines in centimetres, in a variety of contexts. NB no position and direction statutory targets in y3

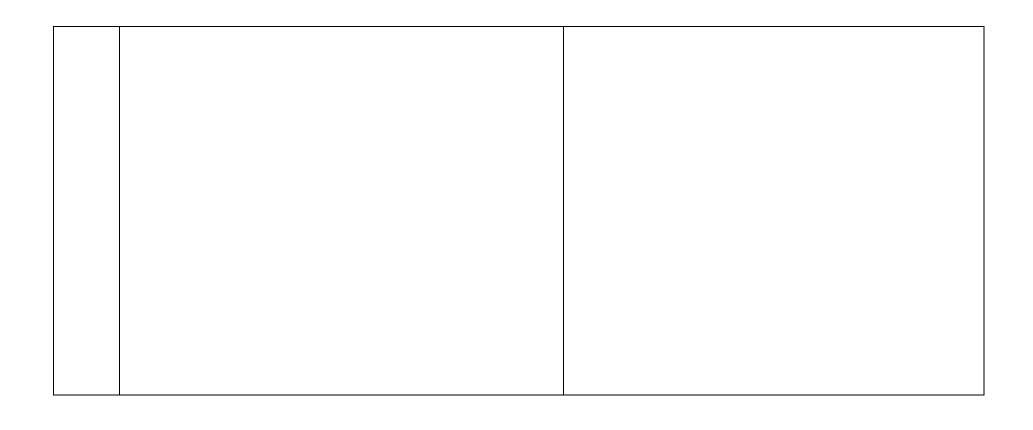| FOUR		
	Pupils should be taught to: * compare and classify geometric shapes, including quadrilaterals and triangles, based on their properties and sizes * identify acute and obtuse angles and compare and order angles up to two right angles by size * identify lines of symmetry in 2-D shapes presented in different orientations * complete a simple symmetric figure with respect to a specific line of symmetry ***draw polygons specified by coordinates in the first quadrant, and translate within the first quadrant*** ***identify regular polygons, including equilateral triangles and squares, as those in which the side-lengths are equal and the angles are equal. Find the perimeter of regular and irregular polygons***	Pupils continue to classify shapes using geometrical properties, extending to classifying different triangles (for example, isosceles, equilateral, scalene) and quadrilaterals (for example, parallelogram, rhombus, trapezium). Pupils compare and order angles in preparation for using a protractor and compare lengths and angles to decide if a polygon is regular or irregular. Pupils draw symmetric patterns using a variety of media to become familiar with different orientations of lines of symmetry; and recognise line symmetry in a variety of diagrams, including where the line of symmetry does not dissect the original shape.

FOUR Contd.	*identify line symmetry in 2D shapes presented in different orientations. Reflect shapes in a line of symmetry and complete a symmetric figure or pattern with respect to a specified line of symmetry*	Pupils draw a pair of axes in one quadrant, with equal scales and integer labels. They read, write and use pairs of coordinates, for example (2, 5), including using coordinateplotting ICT tools.
	Pupils should be taught to: * describe positions on a 2-D grid as coordinates in the first quadrant * describe movements between positions as translations of a given unit to the left/right and up/down * plot specified points and draw sides to complete a given polygon.	

| FIVE | Pupils should be taught to:

 * 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 (o)

* identify: angles at a point and one whole turn (total 360 degrees)angles at a point on a straight line and half a turn (total 180degrees)

* other multiples of 90degrees

* 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 | Pupils become accurate in drawing lines with a ruler to the nearest millimetre, and measuring with a protractor.

They use conventional markings for parallel lines and right angles.

Pupils use the term diagonal and make conjectures about the angles formed between sides, and between diagonals and parallel sides, and other properties of quadrilaterals, for example using dynamic geometry ICT tools.

Pupils use angle sum facts and other properties to make deductions about missing angles and relate these to missing number problems. |

FIVE Contd.		*compare areas and calculate the areas of rectangles including squares, using standard units* Pupils should be taught to: * 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	Pupils recognise and use reflection and translation in a variety of diagrams, including continuing to use a 2-D grid and coordinates in the first quadrant. Reflection should be in lines that are parallel to the axes.
SIX		Pupils should be taught to: *draw, compose and decompose shapes according to given properties, including dimensions, angles and area and solve related problems* * 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	Pupils draw shapes and nets accurately, using measuring tools and conventional markings and labels for lines and angles. Pupils describe the properties of shapes and explain how unknown angles and lengths can be derived from known measurements. These relationships might be expressed algebraically for example, $d = 2 \times r$; $a = 180 - (b + c)$.

SIX Contd.	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 Pupils should be taught to: * 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	Pupils draw and label a pair of axes in all four quadrants with equal scaling. This extends their knowledge of one quadrant to all four quadrants, including the use of negative numbers Pupils draw and label rectangles (including squares), parallelograms and rhombuses, specified by coordinates in the four quadrants, predicting missing coordinates using the properties of shapes. These might be expressed algebraically for example, translating vertex (a, b) to $(a - 2, b + 3)$; (a, b) and $(a + d, b + d)$ being opposite vertices of a square of side d