

Geometric reasoning 6.4	Length of unit: 2 weeks	Week beg:	Year: 6	Teacher:
<p>Success Criteria</p> <p>Pupils can use their understanding of angle and properties of shapes to solve problems.</p> <p>Pupils can explain how to reflect and translate shapes on a grid with four quadrants and use this knowledge and understanding to solve problems. They can explain how to find the volume of cubes and cuboids and use this understanding to solve problems.</p>	<p>Prior Learning:</p> <ul style="list-style-type: none"> • 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: <ul style="list-style-type: none"> • angles at a point and one whole turn (total 360°) • angles at a point on a straight line and $\frac{1}{2}$ a turn (total 180°) • other multiples of 90° • 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 • 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 • measure and calculate the perimeter of composite rectilinear shapes in centimetres and metres • calculate and compare the area of rectangles (including squares), and including using standard units, square centimetres (cm²) and square metres (m²) and estimate the area of irregular shapes • estimate volume, for example, using 1 cm³ blocks to build cuboids (including cubes) and capacity, for example, using water 		<p>Resources</p> <p>Maths vocabulary book</p> <p>Using and Applying in every maths lesson</p> <p>Assessment through guided maths</p> <p>Think Maths!</p> <p>Pitch and Expectations Y6 and Y7</p> <p>Mind the Gap (L3 to L4)</p> <p>Overcoming Barriers to Learning – L3 to 4 and L4 to 5 (available online)</p> <p>Securing Level 4 and Securing Level 5 documents</p> <p>Errors and Misconceptions in Maths at KS2</p>	
<p>Guidance</p> <p>They relate the area of rectangles to parallelograms and triangles, for example, by dissection, and calculate their areas, understanding and using the formulae (in words or symbols) to do this.</p> <p>Pupils draw shapes and nets accurately, using measuring tools and conventional markings and labels for lines and angles.</p> <p>Pupils describe the properties of shapes and explain how unknown angles and lengths can be derived from known measurements.</p> <p>These relationships might be expressed algebraically for example, $d = 2 \times r$, $a = 180 - (b + c)$.</p> <p>Pupils should be introduced to the use of symbols and letters to represent variables and unknowns in mathematical situations that they already understand, such as:</p> <p style="padding-left: 20px;">missing numbers, lengths, coordinates and angles</p> <p style="padding-left: 20px;">formulae in mathematics and science.</p> <p>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.</p> <p>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.</p>				

Learning objectives

Geometry: properties of shapes

- 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

Geometry: position and direction

- 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

Algebra

- use simple formulae
- express missing number problems algebraically
- find pairs of numbers that satisfy an equation with two unknowns
- enumerate possibilities of combinations of two variables

Measurement

- recognise that shapes with the same areas can have different perimeters and vice versa
- calculate the area of parallelograms and triangles
- recognise when it is possible to use the formulae for area and volume of shapes.
- calculate, estimate and compare volume of cubes and cuboids using standard units, including cubic centimetres (cm^3) and cubic metres (m^3) and extending to other units, for example, mm^3 and km^3

Ratio and proportion

- Solve problems involving similar shapes where the scale factor is known or can be found.

Pupil outcomes:

I can explain and represent how I know that any parallelogram can be split into two congruent triangles and use this understanding to find the area of different parallelograms. I can create a net for a square-based pyramid, describe the properties of the triangles in the net and suggest other nets that would make the same pyramid.

I can draw a kite on a grid, identify the coordinates of the vertices and explain what happens to the coordinates if the kite is reflected in the x and y axes and how I know that the kites are congruent. I can explain, represent and record calculations showing how a box of staples with a volume of 24 cm^3 can have different dimensions.