Shape, space and measure

Grade	I can….
9	Use the sine and cosine rule to solve complex problems, including bearings Use circle theorems to prove geometrical results Solve related problems e.g. area and volume scale factors
8	Sketch the sin, cos and tan graphs with features Use similarity to calculate the missing length or volume of a frustrum Calculate the area of segments Prove the circle theorems Complete geometric proof using algebra Solve complex problems involving vectors Calculate the angle between a line and a plane in 3D
7	Use Pythagoras' theorem and trigonometry to solve problems in 3D Use the sine and cosine rule to calculate lengths, angles and areas Use similarity to calculate area and volume Know the effect of enlargement on area and volume Calculate lengths of arcs and areas of sectors Prove that two triangles are congruent from constructions Calculate vectors in 2D, finding resultants from commutative and associative laws Find angles in circles using the alternate segment theorem
6	Find missing lengths in similar shapes Enlarge by a negative scale factor Use trigonometry in right-angled triangles Use a combination of trigonometry and Pythagoras to solve problems including bearings Solve angle problems using circle theorems Calculate and derive the volume and surface area of cones, spheres and hemi-spheres Construct an angle of 60 degrees
5	Solve problems in context using Pythagoras' theorem Calculate and use the surface area of cubes, cuboids, triangular prisms and cylinders Construct the locus of a point or region for a given rule Know a measurement given to the nearest whole number could be half a unit bigger or smaller Calculate compound measure, such as density Know simple circle theorems Understand that vectors represent movement and can be combined Solve simple problems with vectors Use trigonometry to find angles and sides in right angled triangles Know sin and cos for 0, 30, 45, 60 and 90 and know tan for 0, 30, 45 and 60.
4	Calculate the length of the hypotenuse using Pythagoras' theorem Calculate and use the volume of triangular prisms and cylinders Enlarge a shape by a fractional scale factor Calculate with speed Describe a combination of transformations as a single transformation. Construct a perpendicular from a point to a line
3	Use isometric drawings and plans and elevations Know the names and angle properties of different quadrilaterals Calculate and describe missing angles on parallel lines Calculate interior and exterior angles in polygons Construct and describe bearings Calculate the circumference and area of a circle Calculate the area of trapeziums, parallelograms and kites Calculate the area of compund shapes involving rectangles and triangles Calculate the volume of cubes and cuboids Perform and describes translations, rotations and reflections Enlarge a shape by a positive scale factor Construct perpendicular lines, angle bisectors and triangles with SSS or RHS
2	Draw and measure angles and construct triangles using SAS and ASA Calculate angles on a straight line, around a point, in a triangle, in a quadrilateral or vertically opposite Identify lines of symmetry in a shape State the rotational symmetry of a shape Calculate the area and perimeter of rectangles and squares Calculate the area of a triangle Construct and identify nets for cubes, cuboids and triangular prisms
1	Recognise the net of a 3D shape Reflect simple shapes in a mirror line Use a compass and protractor to construct circles or measure angles Identify and use correct units of measurement Find the area by counting squares Find the perimeter of simple shapes Know and be able to label different angles
E3	Identify parallel and perpendicular lines Begin to measure surface area and perimeter length, using standard and non standard units Read a 12-hour clock Use metric terms to measure length, capacity and mass Use terms such as left and right, clockwise and anti clockwise. Know a whole turn is 360 degrees and a quarter turn is 90 Know some properties of common 2D and 3D shapes. Spot lines of symmetry in 2D shapes.
E2	Name some 2D and 3D shapes and use what you know about their properties to sort them Read the time using o-clock, half past, quarter past and quarter to the hour Begin to measure length and mass, using non-standard and standard units. Choose suitable apparatus Understand angle as a measure of turn. Know a right angle is a quarter of a full turn Describe the position and order of objects e.g. know the difference between left and right, clockwise and anti-clockwise
E1	Know the difference between 2D and 3D and begin to name some shapes Read the time to the hour and begin to learn half hour Order daily happenings e.g. know the days of the week in order Compare lengths and weights of objects