The Sutton Academy

Knowledge Rich Curriculum Plan

Year 11 Higher+ Geometry 1

Lesson/Learning Sequence	Intended Knowledge: *Students will know that…*	Tiered Vocabulary	Steps to Success	Prior Knowledge: *In order to know this …*	Feedback
To learn how to measure and draw bearings	• Students will know the rules for bearings; 1) Always measure from North 2) Bearings must be written as 3 digits. 3) Always measure in a clockwise direction. • Students will know how to use a protractor to accurately draw bearings from A to B and B to A. • Students will know how to use a protractor and ruler to accurately measure bearings on a map, including measuring from A to B and B to A. • Students will know how to accurately draw and measuring bearings using a protractor to solve problems • Students will know how to use the angle properties of parallel lines to determine bearings	**Bearing –** angles, measured clockwise from north	•	• Students should already know how to measure and draw angles • Students should know how to find missing angles at a point • Students should know how to calculate angles in parallel lines using the fact that co-interior angles add to 180	
To learn how to solve problems involving area and perimeter	• Students will know how to use inverse operations to find the missing lengths of shapes when given the perimeter. • Students will know how to solve real life problems involving perimeter. • Students will know how to solve more complex problems involving perimeter including those involving algebra • Students will know that the formula for the area of a trapezium is $\frac{1}{2}(a+b)h$ where a and b are the parallel sides and h is the height of the trapezium • Students will know how to calculate the area of a trapezium • Students will know how to calculate the area of compound shapes involving trapezia • Students will know how to solve worded problems involving the area of a trapezium • Students will know how to work backwards to find missing lengths given the area of a trapezium	**Perimeter –** the distance around the outside of a shape **Area –** the amount of space inside a 2D shape **Trapezium –** a quadrilateral with one pair of sides parallel. **Quadrilateral –** a four-sided shape	•	• Students should already know how to calculate the area of rectangles, squares, parallelograms and triangles • Students should already know how to calculate the area of compound shapes involving rectangles, squares, parallelograms and triangles	

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To learn how to solve problems involving area and circumference of a circle	• Students will know how to calculate the area of a circle using the formula πr^2 leaving answers rounded to a given degree of accuracy • Students will know how to calculate the area of a circle using the formula πr^2, without a calculator leaving answers in terms of π. • Students will know how to calculate the area of semi circles • Students will know how to calculate the area of quarter circles or three-quarters of a circle • Students will know how to use inverse operations to find the missing radius or diameter when given the area. • Students will know how to solve problems involving the area of circles. • Students will know how to calculate the area of compound shapes involving circles or parts of circles • Students will know how to calculate the circumference of a circle using the formula - πd, giving their answer to a suitable degree of accuracy • Students will know how to calculate the arc length and perimeter of a semi-circle • Students will know how to calculate the arc length and perimeter of quarter circles or three quarters of a circle • Students will know how to use inverse operations to find the missing radius or diameter when given the circumference. • Students will know how to solve problems involving area and circumference of circles	**Radius –** a straight line from the centre to the circumference of a circle or sphere **Diameter –** a straight line passing from side to side through the centre of a body or figure, especially a circle or sphere **Circumference –** the perimeter of a circle **Perimeter –** the distance around the outside of a shape **Arc –** a part of a curve, a part of the circumference of a circle	•	• Students should already know how to calculate the area and circumference of a circle given the radius or diameter • Students should know how to identify the different parts of a circle	
To learn how to calculate the area, arc length and perimeter for a sector	• Students will know how to calculate the area of a sector using the formula, $Area\ of\ a\ Sector = \frac{\theta}{360}\pi r^2$ • Students will know how to calculate the angle of a sector given its area • Students will know how to calculate the radius of a sector given its area • Students will know how to calculate the arc length of the sector using the formula $Arc\ Length = \frac{\theta}{360}\pi d$ • Students will know how to calculate the perimeter of a sector	**Sector –** a pie-shaped part of a circle made of the arc along with its two radii	•	• Students need to know how to calculate area and circumference of a circle • Students need to know that angles around a point add to 360	

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	• Students will know how to calculate the angle of a sector given its arc length using inverse operations • Students will know how to calculate the radius of a sector given its arc length • Students will know how to form and solve equations involving the sector of a circle				
To learn how to calculate the surface area of prisms and cylinders	• Students will know how to find the surface area of prisms including cubes, cuboids and triangular prisms • Students will know how to find the surface area of other prisms including compound prisms. • Students will know how to find the surface area of cylinders. Students will know how to calculate this in terms of π as well as by using a calculator. • Students will know how to solve problems involving the surface area of prisms and cylinders	**Surface area** - the total area of all of the faces of a 3D solid added together **Prism** – A solid object with two identical ends and flat sides **Compound Solid** - a solid that is made up of 2 or more solids.	•	• Students need to be able to draw nets of shapes and identify nets of different 3D objects • Students need to know how to calculate the area of squares, rectangles, triangles and compound shapes • Students need to know how to calculate area and circumference of circles	
To learn how to calculate the surface area of cones and spheres	• Students will know how to calculate the curved surface area of a cone using the formula $Curved\ surface\ area\ of\ a\ cone = \pi rl$ • Students will know that to calculate the total surface area for a cone they need to add on the area of the circle on the base • Students will know to use Pythagoras' theorem to calculate missing lengths required for the curved surface area of cone • Students will know how to calculate the surface area of a sphere using the formula $Surface\ area\ of\ a\ sphere = 4\pi r^2$ • Students will know how to calculate the surface area of cones and spheres, leaving their answers in terms of π. • Students will know how to calculate the surface area of hemispheres and quarter-spheres • Students will know how to work backwards from the surface area of a cone or sphere to find missing lengths. • Students will know how to solve problems involving the surface area of cones and spheres		•	• Students need to be able to substitute into formulae • Students need to be able to use Pythagoras' theorem to calculate missing lengths in right-angled triangles	

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To learn how to calculate the volume of prisms and cylinders	• Students will know that: Volume of a Prism = Area of Cross Section x Length • Students will know how to find the volume of cubes, cuboids, triangular prisms and compound prisms by calculating the area of the cross-section and multiplying it by the length of the prism • Students will know how to find the volume of cylinders. Students will know how to leave their answers for this in terms of π. • Students will know how to work backwards from the volume of a prism to find missing lengths • Students will know how to work backwards from the volume of a cylinder to calculate its height or the radius/diameter • Students will know how to solve problems involving the volume of prisms and cylinders	**Volume** – the amount of space inside a 3D object **Prism** – A solid object with two identical ends and flat sides **Compound Solid** - a solid that is made up of 2 or more solids.	•	• Students need to be able to calculate the area of squares, rectangles, triangles, compound shapes and circles •	
To learn how to calculate the volume of pyramids and cones	• Students will know how to find the volume of pyramids and cones. • Students will know how to find the volume of cones, leaving their answers in terms of π. • Students will know how to work backwards from the volume of a pyramid to calculate missing lengths • Students will know how to find the volume of cones. • Students will know how to work backwards from the volume of a cone to calculate its height, radius or diameter • Students will know how to find the volume of compound solids and solve problems involving the volume of pyramids and cones		•	• Students will need to know how to calculate the volume of cuboids, cubes and cylinders • Students need to be able to find 1/3 of a number • Students need to be able to divide an integer by 1/3 • Students will need to know how to substitute numbers into formulae	
To learn how to calculate the volume of a sphere and solve problems involving cones and spheres	• Students will know how to find the volume of spheres and hemi-spheres. • Students will know how to find the volume of sphere and hemi-spheres, leaving their answers in terms of π. • Students will know how to work backwards from the volume of a sphere to calculate its radius or diameter • Students will know how to find the volume of compound solids involving pyramids, cylinders, cones and hemi-spheres, leaving their answers in terms of π where necessary. • Students will know how to solve problems involving working backwards with the volume and surface area		•	• Students need to be able to substitute into formulae. • Students need to be able to multiply an integer by 4/3 • Students need to be able to divide an integer by 4/3	

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	of cones, spheres, hemispheres and compound shapes				
To learn how to calculate Density, Mass and Volume	• Students will know how to calculate mass, density or volume using two variables. • Students will know how to combine the densities, mass and volumes of two materials/liquids to make a third material/liquid. Students will know how to find missing values from a liquid using the density, mass or volumes for the other liquids. • Students will know how to solve more complex problems involving density, mass and volume	**Density** – a measurement of the amount of a substance contained in a certain volume **Mass** – the weight of an object	•	• Students need to be able to convert units for mass • Students need to be able to convert units for length and understand how to convert units for volume	