The Sutton Academy

Knowledge Rich Curriculum Plan

Year 10 Higher – Geometry 2

Lesson	Intended Knowledge:	Tiered Vocabulary	Prior knowledge:	Steps to Success:	Feedback
To learn how to solve problems involving perimeter and area.	• Students will know how to solve problems involving the perimeter and area of rectangles, parallelograms and triangles. • Students will know how to solve problems involving perimeter and area of compound shapes. • Students will know how to solve problems involving a mixture of perimeter and area.	**Perimeter –** the distance around the outside of a shape **Area –** the amount of space inside a 2D shape **Parallelogram** – a four-sided shape with two pairs of parallel opposite sides. **Compound shape –** a shape made up of two or more geometric shapes **Perpendicular -** at an angle of 90 degrees.	• Students need to know how to calculate the perimeter and area of rectangles, parallelograms and triangles. • Students need to know how to calculate the perimeter and area of compound shapes.	**Steps to Success – Perimeter** To calculate the perimeter, add the length of all of the sides together. Remember even if there are only two measurements on the shape if it has 4 sides you will need to add 4 numbers. **Steps to Success – Perimeter of compound shapes** **Step 1:** Firstly, identify whether you need to find any missing lengths, if it is necessary subtract the smaller length from the larger parallel length. **Step 2:** Add up the lengths of all the sides. **Step 3:** Don't forget to write your units – cm or mm or m. **Key formulae for finding areas:** Rectangles: $Area = length \times width$ Parallelograms: $Area = base \times height$ Triangles: $Area = ½ \times base \times height$ **Steps to Success – Area of compound shapes** **Step 1:** Firstly, identify whether or not you need to find any missing lengths, if it is necessary subtract the smaller length from the larger length. **Step 2:** Divide the compound shape into smaller shapes, and calculate the area of each individual shape. **Step 3:** To find the total area of the compound shape, add the area of the individual shapes together. **Step 4:** Don't forget to write your units - cm^2 or mm^2or m^2.	
To learn how to solve problems involving the area of trapezia.	• Students will know how to identify the parallel lines in a trapezium. • Students will know how to calculate the area of a trapezium using the formula $A = ½ (a + b) h$, where a and b are the parallel sides of the trapezium. • Students will know how to use inverse operations to find the height or missing side of a trapezium. • Students will know how to solve problems involving the area of trapezia. • Students will know how to solve worded problems involving the area of a trapezium.	**Trapezium –** a quadrilateral with one pair of sides parallel. **Parallel –** two lines that are the same distance apart and never touch Formula sheet	• Students need to know how to substitute into expressions/formulae.	**Steps to Success – Area of trapezia ½(a+b)h** **Step 1:** Label your trapezium, a and b are the **parallel** lengths of your trapezium and h is the **perpendicular** height. **Step 2:** Substitute a, b and h into the formula ½(a + b)h. **Step 3:** Calculate using BIDMAS. **Step 4:** Don't forget to write your units - cm^2 or mm^2or m^2. To calculate the missing sides of a trapezia, the **inverse** operations of ½(a + b)h will be used.	

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To learn how to solve problems using the circumference and area of a circle	• Students will know how to solve problems involving the circumference of circles. • Students will know how to solve problems involving the circumference of a circle in terms of π. • Students will know how to solve problems involving the area of circles. • Students will know how to solve problems involving the area of a circle in terms of π. • Students will know how to solve problems involving the use of inverse operations to find the missing radius or diameter when given the area. • Students will know how to solve problems involving the perimeter and area of compound shapes involving circles or parts of circles. • Students will know how to solve problems involving a mixture of circumference and area of circles.	**Circumference –** the perimeter of a circle **Arc –** a part of a curve, a part of the circumference of a circle **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 circle or sphere **Formula sheet**	• Students need to know how to find the area and circumference of a circle.	**Steps to Success: Circumference of a circle** **Step 1:** Find the diameter of your circle, if you are given the radius, double it to find the diameter. **Step 2:** Substitute your diameter into the formula – π x d **Step 3:** Type your calculation in the calculator. **Step 4:** Write your answer from the calculator, check to see if the question wants you to round or answer in terms of π. **Steps to Success: Area of a circle** **Step 1:** Find the radius of your circle, if you are given the diameter, half it to find the radius. **Step 2:** Substitute your radius into the formula – πr^2 **Step 3:** Type your calculation in the calculator. **Step 4:** Write your answer from the calculator, check to see if the question wants you to round or answer in terms of π	
To learn how to find the arc length and perimeter of a sector.	• Students will know how to find the length of an arc. • Students will know how to find the perimeter of a sector. • Students will know how to find the arc length or perimeter of a sector in terms of Pi. **Opportunity for challenge:** • Students will know how to solve problems involving the arc length and/or perimeter of sectors.	**Arc –** a part of a curve, a part of the circumference of a circle. **Sector –** A part of the circle, formed by 2 radii and an arc of the circle **Formula sheet**	• Students need to know how to find the circumference of a circle.	**Steps to Success – Arc lengths and perimeter of a Sector.** To calculate arc length, you need to find the fraction of the circle that you have, this is the same as the angle in the sector divided 360 degrees. You then multiply the fraction by the **circumference** of the circle. **The formula for arc length is:** $\frac{\theta}{360} \times \pi \times diameter$ If you need to find the perimeter of the sector you must remember to add on the two radii once you have calculated the **arc length.**	
To learn how to calculate the area of a sector.	• Students will know how to find the area of a sector. • Students will know how to find the area of a sector in terms of Pi. • Students will know how to find use inverse operations to find the missing radius or diameter. **Opportunity for challenge:** • Students will know how to solve problems involving the area of sectors.	**Formula sheet**	• Students need to know how to find the area of a circle.	**Steps to Success – Area of a Sector.** To calculate the area of a **sector** you need to find the fraction of the circle that you have, this is the same as the angle in the sector divided 360 degrees. You then multiply the fraction by the area of the circle. **The formula for the area of a sector is:** $\frac{\theta}{360} \times \pi r^2$	
To learn how to solve problems in 2D shapes using Pythagoras' Theorem	• Students will know that to prove a triangle is right angled using Pythagoras' theorem. • Students will know how to solve problems involving multiple right-angled triangles using Pythagoras' theorem. • Students will know how to solve simple perimeter and area problems involving the use of Pythagoras' Theorem.	**Hypotenuse** – the longest side in a right-angled triangle. It can always be found opposite the right angle	• Students need to know how to use Pythagoras' theorem to find the missing sides of a right-angled triangle.		

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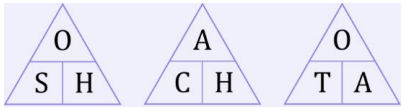
	• Students will know how to solve worded problems using Pythagoras' theorem.	**Theorem** – a statement that has been proven to be true **Formula sheet**			
To learn how to solve problems involving the use of trigonometry.	• Students will know how to calculate missing sides in right angled triangles using SOHCAHTOA. • Students will know how to calculate missing angles in right angled triangles using SOHCAHTOA. • Students will know how to use the formula triangles for SOHCAHTOA to find missing sides. • Students will know how to solve multi-step problems involving more than one right-angled triangle using SOHCAHTOA. • Students will know how to use trigonometry to solve simple problems involving perimeter or area. • Students will know how to solve worded problems involving SOHCAHTOA	**Trigonometry –** Relationships between side lengths and angles of triangles **Hypotenuse** – the longest side in a right-angled triangle. It can always be found opposite the right angle **Opposite** – for right angled triangles the opposite is the side opposite the angle that we know or are trying to find. **Adjacent** – next to **Inverse** – Opposite **Opposite** – for right angled triangles the opposite is the side opposite the angle that we know or are trying to find.	• Students will need to substitute values into expressions/formulae.	**Steps to Success – Calculating a missing side using SOHCAHTOA:** **Step 1:** Label the sides O, H and A. **Step 2:** Circle the side you know and the side you are trying to find. **Step 3:** Identify the trigonometric function you are using (sin, cos or tan). **Step 4:** Substitute the lengths and angles into the correct place in the formula triangle. **Step 5:** Write down the calculation you need to do and then use your calculator to work out the answer. **Step 6:** Round your answer to an appropriate degree of accuracy, this is usually given in the question. **Steps to Success – Calculating a missing angle using SOHCAHTOA:** **Step 1:** Label the sides O, H and A. **Step 2:** Circle the two sides you know. **Step 3:** Identify the trigonometric function you are using (sin, cos or tan). **Step 4:** Substitute the lengths and angles into the correct place in the formula triangle. **Step 5:** Write out the formula that is created. **Step 6:** Use the inverse trig function to calculate the missing angle (Sin^{-1}, Cos^{-1}, Tan^{-1}). **Step 7:** Round your answer to an appropriate degree of accuracy, this is usually given in the question. 	
Exam Preparation 4					