Knowledge Rich Curriculum Plan

Year 8 Prime –Perimeter and Area

The Sutton Academy

Lesson/Learning Sequence	Intended Knowledge: *Students will know that…*	Tiered Vocabulary	Prior Knowledge: *In order to know this students, need to already know that…*	Assessment
To learn how to calculate the perimeter of 2D shapes.	• Students will know that perimeter is the distance around the shape. • Students will know that for perimeter you find the sum of the lengths of each side including any value not immediately show on the shape. • Students will know that the units used to represent perimeter are mm, cm and m etc. • Students will know that perimeter is a measurement of length. • Students will know how to calculate the perimeter of a rectangle. • Students will know how to calculate the perimeter of a triangle. • Students will know how to calculate the perimeter of a trapezium. • Students will know how to calculate the perimeter of a parallelogram. • Students will know how to calculate the perimeter of special triangles. • Students will know that compound shapes are shapes made up more than one shape. • Students will know how to calculate the perimeter of compound shapes. • Students will know how to solve real life problems involving perimeter. • Students will know how to use inverse operations to find the missing lengths of shapes when given the perimeter.	Perimeter – the distance around the outside of a shape	• Students need to know the properties of 2D polygons. • Students need to know how to add and subtract numbers. • Students need to know the different metric units used to measure length. • Students need to know how to convert between different lengths.	Mini-Assessment 9
To learn how to calculate the area of rectangles, triangles and parallelograms.	• Students will know that area is the space inside the shape. • Students will know that the units used to represent area are mm^2, cm^2 and m^2 etc. • Students will know how to calculate the area rectangles using the formula $A = length \times width$. • Students will know to ignore any additional lengths in the rectangle. • Students will know how to calculate the area of a triangle using the formula $A = ½\ base \times height$. • Students will know that the base and height are perpendicular to each other in every triangle. • Students will know that the reason we divide by 2 when finding the area of a triangle is because the $base \times height$ would give the area of a rectangle which is double the triangle. • Students will know to ignore any additional lengths in the triangle. • Students will know how to calculate area of a parallelogram using the formula $A = base \times height$. • Students will know to ignore any additional lengths in the parallelogram. • Students will know that the base and height are perpendicular to each other in every parallelogram. • Students will know how to use inverse operations to find the missing lengths of shapes when given the area. • Students will know how to solve real life problems involving area.	Area – the amount of space inside a 2D shape Quadrilateral – a four-sided shape	• Students need to know the properties of 2D polygons. • Students need to know how to multiply numbers. • Students need to know how to divide by 2.	Mini-Assessment 9
To learn how find the area of compound shapes and trapezia.	• Students will know how to calculate the area of compound shapes, by separating them in to rectangles or triangle and finding the sum of the areas of each individual shape. • 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 $A = ½\ (a + b) \times height$, where a and b are the parallel sides of the trapezium. • Students will know how to use inverse operations to find the missing sides of a compound shape.	Trapezium – a quadrilateral with one pair of sides parallel.	• Students need to know how to find the area of rectangles. • Students need to know how to find the area of triangles. • Students need to know how to calculate using the order of operations. • Students need to know how to divide by 2. • Students need to know how to substitute in to a formula.	Mini-Assessment 9

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	• Students will know how to use inverse operations to find the height or missing side of a trapezium.			
To learn how to find the circumference of a circle.	• Students will know how to calculate the circumference of a circle using the formula $C = \pi d$, where d is the diameter. • Students will know how to find the circumference of a circle where only the radius is given by using the formula $C = 2\pi r$, where r is the radius or by finding the diameter by multiplying the radius by 2 and then using the formula $C = \pi d$. • Students will know how to find the circumference of a circle when the diameter or radius is known. (mixture) • Students will know how to calculate the circumference of a circle, without a calculator, giving their answer in terms of π. • Students will know how to calculate the perimeter of a semi-circle by finding the circumference, dividing it by 2 and adding the diameter. • Students will know how to calculate the perimeter of a quarter circle by finding the circumference, dividing it by 4 (or multiply by $\frac{1}{4}$) and adding both radii. • Students will know how to calculate the perimeter of a three-quarter circle finding the circumference, dividing it by 4, multiplying by 3 (or multiply by $\frac{3}{4}$) and adding the radii. • Students will know how to solve problems involving the circumference of circles.	**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 **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	• Students need to know how to round to a given decimal place or significant figure. • Students need to know that multiplying the radius by 2 will give the length of the diameter. • Students need to know that dividing the diameter by 2 will give the length of the radius. • Students need to that the number π is an irrational mathematical constant. • Students need to know that $\pi = 3.14 …$ • Students need to know how to type the π symbol on to a calculator.Students need to know how to round to a given decimal place or significant figure. • Students need to know that multiplying the radius by 2 will give the length of the diameter. • Students need to know that dividing the diameter by 2 will give the length of the radius. • Students need to that the number π is an irrational mathematical constant. • Students need to know that $\pi = 3.14 …$ • Students need to know how to type the π symbol on to a calculator.	Mini-Assessment 9
To learn how to find the area of a circle.	• Students will know how to calculate the area of a circle using the formula $A = \pi r^2$, where r is the radius. • Students will know how to calculate the area of a circle when a diameter is given by using the formula $A = \pi(\frac{d}{2})^2$, where d is the diameter or by dividing the diameter by 2 and using the formula $A = \pi r^2$. • Students will know how to find the area of a circle when the diameter or radius is known. (mixture) • Students will know how to calculate the area of a circle, without a calculator, giving their answer in terms of π. • Students will know how to calculate the area of a semi-circle by finding the area of the circle and dividing it by 2. • Students will know how to calculate the area of a quarter circle by finding the area of the circle and dividing it by 4 (or multiply by $\frac{1}{4}$) . • Students will know how to calculate the area of a three-quarter circle finding the area dividing it by 4 and multiplying by 3 (or multiply by $\frac{3}{4}$). • Students will know how to solve problems involving the area 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	• Students need to know how to round to a given decimal place or significant figure. • Students need to know that multiplying the radius by 2 will give the length of the diameter. • Students need to know that dividing the diameter by 2 will give the length of the radius. • Students need to that the number π is an irrational mathematical constant. • Students need to know that $\pi = 3.14 …$ • Students need to know how to type the π symbol on to a calculator.	Mini-Assessment 9

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To learn how to calculate missing sides using Pythagoras' Theorem.	• Students will know how to find the hypotenuse, using Pythagoras' theorem • Students will know that the hypotenuse is the longest side in a right-angled triangle. • Students will know how to find the shorter sides of the triangle using Pythagoras' theorem. Students will know that they subtract when finding the shorter side. • Students will know how to identify whether they need to add or subtract when using Pythagoras' theorem. They will know that it is important to label the sides.	**Hypotenuse** – the longest side in a right-angled triangle. It can always be found opposite the right angle **Theorem** – a statement that has been proved, or can be proved	• Students need to be able to identify right angled triangles. • Students need to be able to use basic mathematical operations. • Students need to be able to solve equations. • Students need to be able to square and square root numbers.	Mini-Assessment 9
To learn how to solve problems using Pythagoras' Theorem.	• Students will know how to use Pythagoras' Theorem to solve problems involving perimeter or area.		• Students need to know how to use Pythagoras' Theorem.	Mini-Assessment 9
To learn how to calculate missing sides in right-angled triangles using trigonometry.	• Students will know the trigonometric ratio sine, cosine and tan. • Students will know how to label the sides of a right-angled triangle; hypotenuse, opposite, adjacent. Students will know hypotenuse to mean, the longest side of a right-angled triangle, opposite to be the side opposite the angle in the question and adjacent being the side next to the angle. • Students will know how to identify the correct trigonometric ratio, by eliminating the side that they do not need. • Students will know how to use the correct trigonometric ratio to find the missing side in a triangle.	**Trigonometry** – a branch of mathematics that studies 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 **Adjacent** – next to, in maths the adjacent side in a right-angled triangle is the side that is adjacent to the angle, forming the angle with the hypotenuse **Opposite** – for right angled triangles the opposite is the side opposite the angle that we know or are trying to find.	• Students need to be able to rearrange equations. • Students need to know that Pythagoras is used when the problem includes three sides.	Mini-Assessment 9
To learn how to calculate missing angles in right-angled triangles using trigonometry.	• Students will know that to calculate the missing angle in a right-angled triangle using trigonometry they will use the inverse operation. **Opportunity for challenge:** • Students will know how to use trigonometry to solve problems involving perimeter or area.		• Students need to know how to find the missing sides of a right-angled triangle using trigonometry and Pythagoras' theorem.	Mini-Assessment 9