Knowledge Rich Curriculum Plan

Year 8 Support – Perimeter and Area

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 how to calculate the perimeter of a shape drawn on a centimetre grid • Students will know how to calculate the perimeter of rectangles, triangles, trapezia and parallelograms. • Students will know that the units used to represent perimeter are mm, cm and m etc. • Students will know that to find the perimeter of a shape that is represent on a cm grid they must count the number of squares around the outside of 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 **Compound shape** – a shape made up of two or more geometric shapes	• 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 the units used to represent area are mm^2, cm^2 and m^2 etc. • Students will know that to find the area of a shape that is represent on a cm grid they must count the number of squares inside the shape. • Students will know how to calculate the area rectangles using the formula $A = length \times width$. • 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 use area to solve real life problems.	**Area** – the amount of space inside a 2D shape **Parallelogram** – a four-sided shape with two pairs of parallel opposite sides.	• 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 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 $A = \frac{1}{2}(a+b) \times height$, where a and b are the parallel sides of the trapezium. **Opportunity for challenge:** • Students will know how to use inverse operations to find the height or missing side of a trapezium.	**Area** – the amount of space inside a 2D 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
To learn how find the area of compound shapes.	• 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. **Opportunity for challenge:** • Students will know how to use inverse operations to find the missing sides of a compound shape.	**Area** – the amount of space inside a 2D shape **Compound shape** – a shape made up of two or more geometric shapes	• Students need to know how to find the area of rectangles, triangles and trapezia. • Students need to know how to add and multiply numbers.	Mini-Assessment 9

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 investigate the properties of a circle.	• Students will know that multiplying the radius by 2 will give the length of the diameter. • Students will know that dividing the diameter by 2 will give the length of the radius. • Students will know that the circumference is the distance around the circle. • Students will know that the number π is an irrational mathematical constant. • Students will know that $\pi = 3.14 \ldots$ • Students will know that π is defined as the ratio of a circle's circumference to its diameter. • Students will know that if you divide the circumference of any circle by its diameter you will always get π. (This should be discovered through investigation) • Students will know how to type the π symbol on to a calculator.	**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 **π** – the ratio of a circle's circumference to its diameter. **Circumference** – the perimeter of a circle	• Students should already know how to label parts of a circle, particularly the radius, diameter and circumference	Mini-Assessment 9
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 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.	**Circumference** – the perimeter 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 **π** – the ratio of a circle's circumference to its diameter.	• 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 $\pi = 3.14 \ldots$ • 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 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 $\frac{3}{4}$).	**Area** – the amount of space inside a 2D shape **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 $\pi = 3.14 \ldots$ • Students need to know how to type the π symbol on to a calculator.	Mini-Assessment 9

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 investigate the link between the three sides of a right-angled triangles.	• Students will know that when a triangle has a right angle (90°) and squares are made on each of the three sides, then the biggest square has the exact same area as the other two squares put together. Students will know that his discovery was made over 2000 years ago by Pythagoras. • Students will know that Pythagoras' theorem states that for all right-angled triangles, 'The square on the hypotenuse is equal to the sum of the squares on the other two sides.' They will know that we write this as $a^2+b^2=c^2$ where the hypotenuse must be labelled as c.	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 know how to find the area of squares. • Students need to know how to square and square root numbers.	Mini-Assessment 9
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 solve equations. • Students need to be able to square and square root numbers.	Mini-Assessment 9