Knowledge Rich Curriculum Plan

Year 8 Support – Perimeter and Area

Lesson objective	Intended Knowledge:	Tiered Vocabulary	Prior Knowledge:	Steps to Success	Feedback
To learn how to calculate the perimeter of 2D shapes.	• 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 how to calculate the perimeter of compound shapes. • Students will know how to use inverse operations to find the missing lengths of shapes when given the perimeter. **Opportunity for challenge:** • Students will know how to solve simple real-life problems involving perimeter.	**Perimeter –** the distance around the outside of a shape **Compound shape –** a shape made up of two or more geometric shapes	• Students will know how to calculate the perimeter of a shape drawn on a centimetre grid.	**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 or not you need to find any missing lengths, if it is necessary subtract the smaller length from the larger 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.	

To learn how to calculate the area of rectangles, parallelograms and triangles.	• Students will know how to find the area of a shape that is represent on a cm grid.
	• Students will know how to calculate the area rectangles.
	• Students will know how to calculate area of a parallelogram.
	Opportunity for challenge:
	• Students will know how to use area to solve simple 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 will know how to find the area of a shape that is represent on a cm grid.	**Steps to Success – Area of shapes**
				Step 1 – Identify the formula from the list needed:
				   • Area of a **Square/Rectangle** = Base x Height
				   • Area of a **Parallelogram** = Base x Height
				   • Area of a **Triangle** = ½ x Base x Height
				Step 2 – Substitute the measurements into the required formula.
				Step 3 – Don't forget to write your units cm^2 or mm^2 or m^2.	

To learn how find the area of trapezia.	• Students will know how to calculate the area of a 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 substitute values into an expression/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^2 or m^2. To calculate the missing sides of a trapezia, the **inverse** operations of ½(a + b)h will be used. **Key formulae:** Trapezia: $Area = ½(a + b)h$	
To learn how find the area of compound shapes.	• Students will know how to calculate the area of compound shapes. **Opportunity for challenge:** • Students will know how to use inverse operations to find the missing sides of a compound shape.	**Compound shape –** a shape made up of two or more geometric shapes	• Students need to know how to find the area of rectangles and triangles.	**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^2 or m^2.	

Lesson objective	Intended Knowledge:	Tiered Vocabulary	Prior Knowledge:	Steps to Success	Feedback
To learn how to find the circumference of a circle.	• Students will know how to calculate the circumference of a circle when given the diameter. • Students will know how to find the circumference of a circle. • Students will be able to leave answers in terms of π and rounded to an appropriate degree of accuracy. **Opportunity for challenge:** • Students will know how to calculate the circumference of a - semi circle/$\frac{1}{4}$ circle/ $\frac{3}{4}$ 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. **Circumference** – the perimeter of a circle	• Students need to know how to round to a given decimal place or significant figure. • Students need to know how to substitute value into expressions/formulae.	**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: Circumference of a semi-circle/quarter 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:** Divide the circumference of the circles by 2 for semi circle, 4 for quarter of a circle. **Step 4:** Add the diameter onto the circumference of the semi circle	
To learn how to find the area of a circle.	• Students will know how to calculate the area of a circle when the radius is given. • Students will know how to calculate the area of a circle when a diameter is given. • Students will be able to leave answers in terms of π and rounded to an appropriate degree of accuracy. **Opportunity for challenge:** • Students will know how to calculate the area of a - semi circle/$\frac{1}{4}$ circle/ $\frac{3}{4}$ circle.	**Area** – the amount of space inside a 2D shape	• Students need to know how to round to a given decimal place or significant figure. • Students need to know how to substitute value into expressions/formulae.	**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 **Steps to Success: Area of a semi circle/quarter 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 – $\frac{\pi r^2}{2}$ for a semi circle or $\frac{\pi r^2}{4}$ for a quarter circle. **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 consolidate understanding of area and perimeter.	• Students will know how to find the perimeter of shapes, including compound shapes. • Students will know how to find the circumference of circles and semi circles. • Students will know how to find the area of rectangles, triangles, parallelograms, compound shapes, trapezia and circles		• Students will be able to identify the formulae used for each shape.	Use steps from previous lessons.	
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.	**Hypotenuse** – the longest side in a right-angled triangle. It can always be found opposite the right angle	• Students will need to substitute values into expressions/formulae.	**Steps to Success: Using Pythagoras' Theorem to find the hypotenuse.** **Step 1:** In order to find the missing side of a triangle using Pythagoras' theorem, we need to work out which side corresponds to each of the letters a, b and c in the equation a²+b²=c², remembering that the longest side is the hypotenuse which	

Lesson objective	Intended Knowledge:	Tiered Vocabulary	Prior Knowledge:	Steps to Success	Feedback
	Opportunity for challenge: • 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.	Theorem – a statement that has been proved, or can be proved	• Students need to be able to square and square root numbers.	is known as c. a and b will be either one of the two perpendicular sides. **Step 2:** Label your diagram. **Step 3:** Next we substitute the values into the equation $a^2 + b^2 = c^2$ **Step 4:** Calculate the square numbers and then add the values (BIDMAS). **Step 5:** Don't forget to square root your value to get the length of the side. **Step 6:** Round your answer to an appropriate degree of accuracy if necessary. **Step 7:** Check that your answer looks right. Is the hypotenuse the longest side? **Steps to Success: Using Pythagoras' Theorem to find one of the perpendicular sides.** **Step 1:** In order to find the missing side of a triangle using Pythagoras' theorem, we need to work out which side corresponds to each of the letters a, b and c in the equation $a^2 + b^2 = c^2$, remembering that the longest side is the hypotenuse which is known as c. a and b will be either one of the two perpendicular sides. **Step 2:** Label your diagram. **Step 3:** Next we substitute the values into the equation $a^2 + b^2 = c^2$ **Step 4:** Rearrange the equation to get either $a^2 = c^2 - b^2$ OR $b^2 = c^2 - a^2$ **Step 5:** Calculate the square numbers and then add the values (BIDMAS). **Step 6:** Don't forget to square root your value to get the length of the side. **Step 7:** Round your answer to an appropriate degree of accuracy if necessary. **Step 8:** Check that your answer looks right. Is the hypotenuse the longest side?	
	Mini-Assessment 9				