The Sutton Academy

Knowledge Rich Curriculum Plan

Year 11 Foundation+ Geometry 4

Lesson/Learning Sequence	Intended Knowledge: *Students will know that…*	Tiered Vocabulary	Prior Knowledge: *In order to know this, students need to already know that…*	Steps to success
To learn how to calculate the surface area of prisms	• 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 solve problems involving the surface area of prisms	**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 know how to calculate the area of squares, rectangles, triangles and compound shapes	**Step 1** –Calculate the area of each of the faces of the shape. It is important to remember how many faces the shape has. **Step 2** – To find the total surface area add the area of each face together.
To learn how to calculate the surface area of cylinders	• 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 cylinders		• Students need to know how to calculate area and circumference of circles	**Step 1:** Find the area of both circles by using the circle formula A = πr^2. **Step 2:** Find the area of the rectangle by multiplying the height of the cylinder by the circumference of the circle. C=πx diameter **Step 3:** Add all three areas together and this is your surface area of the cylinder. Don't forget your units ($m^2/cm^2/mm^2$).
To learn how to calculate the surface area of pyramids, cones and spheres	• Students will know how to find the surface area of pyramids. • Students will know how to find the surface area of cones. • Students will know how to find the surface area of sphere and hemi-spheres.	**Pyramid –** A shape of which one face is a polygon of any number of sides, and the other faces are triangles with a common vertex.	• Students will need to know how to find missing lengths using Pythagoras' theorem	<u>Steps To Success – Cones</u> **Step 1:** Identify each part needed for the formula. You may need to use Pythagoras' theorem to find missing parts. **Step 2:** Substitute the value identified in to the formula. **Step 3:** Calculate. You may be asked to round your answer to a given degree. <u>Steps To Success – Spheres</u> **Step 1:** Identify each part needed for the formula. You may need to use Pythagoras' theorem to find missing parts. **Step 2:** Substitute the value identified in to the formula. ($4\pi r^2$) **Step 3:** Calculate. You may be asked to round your answer to a given degree. ***For a hemi-sphere we need to divide the surface area for the sphere by 2 and add on the area of the circle***

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To learn how to calculate the volume of prisms Combine with the lesson below	• 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 solve problems involving the volume of prisms	**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 and compound shapes	**Step 1: Ensure** that the question requires you to find the volume of a prism. (Note: spheres, cones and pyramids are not prisms) **Step 2:** Find the area of the cross section of your prism. Remember your **units**. **Step 3: Calculate** the volume of your prism using the calculation: ***Volume of prism = area of cross section x length of prism.*** **Step 4:** Check the units of your answer, volume is always measured in units^3.
To learn how to calculate the volume of cylinders	• 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 cylinder to calculate its height or the radius/diameter • Students will know how to solve problems involving the volume of cylinders		• Students need to be able to calculate the area of circles	**Step 1** – Firstly you need to calculate the area of the circle, you do this by using the formula π x radius^2 It is important to consider that if the diameter is shown you will need to divide it by 2 to find the radius. **Step 2** – Secondly substitute the values into the equation volume = π x radius^2 x height **Step 3** – Ensure the answer has the units of cm^3 If you are given the volume, remember to use the inverse operations to find a missing side.
To learn how to calculate the volume of pyramids, cones and spheres	• Students will know how to find the volume of pyramids. • Students will know how to find the volume of cones. • Students will know how to find the volume of spheres and hemi-spheres.		• Students will need to know how to substitute into formulae	<u>Volume of pyramids and cones.</u> **Step 1: Ensure** that the question requires you to find the volume. **Step 2:** Find the area of the cross section of your prism. Remember your **units**. **Step 3: Calculate** the volume of your cone/ pyramid using the calculation: ***Volume of pyramid/cone =*** $\frac{1}{3}$ ***x area of cross section x length of prism.*** **Step 4:** Check the units of your answer, volume is always measured in units^3. <u>Volume of spheres</u> **Step 1:** Identify each part needed for the formula. **Step 2** Substitute the value identified in to the formula. $\frac{4}{3}\pi r^3$

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				Step 3: Calculate. You may be asked to round your answer to a given degree. ***For a hemi-sphere we need to divide your answer by 2 ***
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	**Step 1:** Check all of the units in the question are consistent. If they are not you need to convert the units for either mass or volume so that they are consistent with the units stated for density **Step 2:** Draw out the triangle for Density, Mass and Volume and identify the formula you need **Step 3:** Substitute the two variables that you know into the correct formula and calculate your answer **Step 4:** Check you include the correct units in your answer