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**Knowledge Rich Curriculum Plan**

Year 10 Higher – Geometry 3



| **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 surface area of prisms and cylinders** | * 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 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 prisms and cylinders | **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 be able to draw nets of shapes and identify nets of different 3D objects * Students need to know how to calculate the area of squares, rectangles, triangles and compound shapes * Students need to know how to calculate area and circumference of circles |  |
| **To learn how to find the surface area of pyramids and spheres** | * Students will know how to find the surface area of pyramids. * Students will know how to find the surface area of sphere and hemi-spheres. * Students will know how to find the surface area of compound solids involving pyramids spheres, leaving their answers in terms of π where necessary. |  |  |  |
| **To learn how to calculate the surface area of cones** | * Students will know how to calculate the curved surface area of a cone using the formula * Students will know that to calculate the total surface area for a cone they need to add on the area of the circle on the base * Students will know to use Pythagoras’ theorem to calculate missing lengths required for the curved surface area of cone * Students will know how to work backwards from the surface area of a cone or sphere to find missing lengths. * Students will know how to solve problems involving the surface area of cones and spheres |  | * Students need to be able to substitute into formulae * Students need to be able to use Pythagoras’ theorem to calculate missing lengths in right-angled triangles |  |
| **To learn how to calculate the volume of prisms and cylinders** | * 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 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 prism to find missing lengths * 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 prisms and cylinders | **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, compound shapes and circles |  |
| **To learn how to calculate the volume of pyramids and cones** | * Students will know how to find the volume of pyramids and cones. * Students will know how to find the volume of cones, leaving their answers in terms of π. * Students will know how to work backwards from the volume of a pyramid to calculate missing lengths * Students will know how to find the volume of cones. * Students will know how to work backwards from the volume of a cone to calculate its height, radius or diameter * Students will know how to find the volume of compound solids and solve problems involving the volume of pyramids and cones |  | * Students will need to know how to calculate the volume of cuboids, cubes and cylinders * Students need to be able to find 1/3 of a number * Students need to be able to divide an integer by 1/3 * Students will need to know how to substitute numbers into formulae |  |
| **To learn how to calculate the volume of a sphere and solve problems involving cones and spheres** | * Students will know how to find the volume of spheres and hemi-spheres. * Students will know how to find the volume of sphere and hemi-spheres, leaving their answers in terms of π. * Students will know how to work backwards from the volume of a sphere to calculate its radius or diameter * Students will know how to find the volume of compound solids involving pyramids, cylinders, cones and hemi-spheres, leaving their answers in terms of π where necessary. * Students will know how to solve problems involving working backwards with the volume and surface area of cones, spheres, hemispheres and compound shapes |  | * Students need to be able to substitute into formulae. * Students need to be able to multiply an integer by 4/3 * Students need to be able to divide an integer by 4/3 |  |
| **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 |  |