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**Knowledge Rich Curriculum Plan**

Year 10 Higher+ Geometry 4



| **Lesson/Learning Sequence**  | **Intended Knowledge:***Students will know that…* | **Tiered Vocabulary**  | **Prior Knowledge:***In order to know this…* | **Assessment**  |
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| **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
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| **To learn how to calculate the surface area of cones and spheres** | * Students will know how to calculate the surface area of a sphere using the formula $Surface area of a sphere=4πr^{2}$
* Students will know how to calculate the curved surface area of a cone using the formula $Curved surface area of a cone=πrl$
* 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 calculate the surface area of hemispheres and quarter-spheres
* 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 will know how to calculate the surface area of cones and spheres, leaving their answers in terms of π.
 |  | * 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
* Students need to be able to calculate the area of a circle
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| **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
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| **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
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| **To learn how to calculate the volume of a sphere**  | * 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 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
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| **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
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