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**Knowledge Rich Curriculum Plan**

Year 10 Intermediate – 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**  |
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| **To learn how to identify 3D shapes and draw and recognise nets** | * Students will know how to determine the number of faces, edges and vertices for 3D solids.
* Students will know that a face is the individual flat surface of a 3D solid.
* Students will know how to identify a 3D shape from its net
* Students will know how to draw nets of 3D solids.
 | **Prism** – A solid object with two identical ends and flat sides**Vertex (plural vertices) –** corner **Net** – net means a pattern that you can cut and fold to make a model of a solid shape.**Face** – in maths, a face is a flat surface of a solid object**Polygon** – a closed shape with straight sides**Edge** – a line segment where two faces meet | * Students will need to be able to name different prisms, pyramids and spheres.
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| **To learn how to identify and draw plans and elevations from shapes and draw shapes from plans and elevations** | * Students will identify front, side and plan elevations of 3D solids. Students will know that an elevation means a 2D drawing of a 3D shape from different viewpoints.
* Students will draw the front, side and plan elevations of 3D solids.
* Students will know how to sketch a 3D solid using the front, side and plan elevations.
* Students will know how to use isometric grids to sketch 3D solids.
 | **Plan –** A drawing of something as viewed from above**Elevation –** the view of a 3D shape when it is looked at from the side or from the front. | * Students need to be able to recognise 2D shapes
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| **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
* 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
 | **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
* 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 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.
 |  | * Students need to be able to substitute into formulae.
* Students need to be able to find the area of circles.
* Students need to know that π = 3.142 and be able to use the π button on the calculator.
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| **To learn how to calculate the volume of prisms** | * 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
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| **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
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| **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 need to be able to substitute into formulae.
* Students need to be able to multiply an integer by 1/3 and 4/3
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| **To learn how to calculate Density, Mass and Volume** | * Students will know how to convert between units of density.
* Students will know how to calculate mass, density or volume using two variables. Students will know that density means a measure of how much matter is in a certain volume.
* Students will know how to find the mass or density given one of the variables and by working out the volume. Students will know that a variable means a symbol for a value we do not know yet. It is usually a letter like x or y.
 |  | * 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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| **To learn how to calculate speed, distance and time** | * Students will know that $Speed=\frac{distance}{time}$
* Students will know that $Time= \frac{distance}{speed}$
* Students will know that $Distance=Speed×Time$
* Students will know the formula triangle for speed, distance and time
* Students will know how to solve basic SDT problems where the time is an integer number of hours and all units correspond
* Students will know how to make simple conversions for minutes to decimal hours - they will know that 30 minutes is 0.5 hours and 15 minutes is 0.25 hours
* Students will know how to calculate speed, distance or time given the two other variables including where the time needs to be converted into a decimal number of minutes or hours
* Students will know how to calculate speed, distance or time using two variables where they need to convert time written in hours and minutes to a decimal
* Students will know how to calculate average speed given distance and time for multi-stage journeys
* Students will need to know how to solve more complex problems involving speed, distance and time
 | **Speed** – the rate at which someone or something moves or operates or is able to move or operate. | * Students should already know how to convert from minutes to hours and minutes
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| **To learn how to draw and interpret distance-time graphs** | * Students will know how to draw distance–time graphs.
* Students will know how to work out time intervals for graph scales.
* Students will know how to find the total time taken of individual sections of a distance-time graph.
* Students will know how to find the speed of individual sections of a distance-time graph.
* Students will know how to find the total distance in individual sections of a distance-time graph.
* Students will know how to interpret information presented in a range of linear and non-linear graphs;
* Students will know how to interpret graphs with negative values on axes;
* Students will know how to interpret gradient as the rate of change in distance–time and speed–time graphs, graphs of containers filling and emptying, and unit price graphs.
 | Gradient – the change in height divided by the horizontal distance. | * Students need to know how to find the difference between two times
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