Knowledge Rich Curriculum Plan

Year 11 Higher- Compound Measures, Bounds and Velocity Time Graphs

Lesson/Learning Sequence	Intended Knowledge: *Students will know that…*	Tiered Vocabulary	Steps to Success	Prior Knowledge: *In order to know this students, need to already know that…*	Feedback
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.	**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	
To learn how to calculate Density, Mass and Volume Boost topic.	• Students will know how to solve more complex problems involving density, mass and volume		•	•	
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 $Distance = Speed \times Time$ • Students will know the formula triangle for speed, distance and time • 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	**Speed** – the rate at which someone or something moves or operates or is able to move or operate.	•	• Students should already know how to solve basic SDT problems where the time is an integer number of hours and all units correspond • Students should already know 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 should already know how to convert from minutes to hours and minutes	
To learn how to calculate speed, distance and time Boost topic.	• Students will need to know how to solve more complex problems involving speed, distance and time		•	•	

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To learn how to calculate with upper and lower bounds	• Students will know and understand that to calculate the upper bound for a problem involving the addition of two rounded numbers you need to add the upper bounds • Students will know and understand that to calculate the lower bound for a problem involving the subtraction of two rounded numbers you need to subtract the upper bound from the lower bound • Students will know and understand that to calculate the upper bound for a problem involving the subtraction of two rounded numbers you need to subtract the lower bound from the upper bound • Students will know and understand that to calculate the lower bound for a problem involving the multiplication of two rounded numbers you need to multiply the lower bounds • Students will know and understand that to calculate the upper bound for a problem involving the multiplication of two rounded numbers you need to multiply the upper bounds • Students will know and understand that to calculate the lower bound for a problem involving the division of two rounded numbers you need to divide the lower bound by the upper bound • Students will know and understand that to calculate the upper bound for a problem involving the division of two rounded numbers you need to divide the upper bound by lower bound • Students will know how to calculate the upper and lower bounds for more complex calculations including those involving substitution, mass, density, volume, speed, distance, time etc.		•	• Students need to know how to find upper and lower bounds for a number that's been rounded	

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To learn how to calculate with upper and lower bounds	• Students will know how to calculate the upper and lower bounds for more complex calculations including those involving substitution, mass, density, volume, speed, distance, time etc. • Students will need to know that to calculate an answer to a 'suitable degree of accuracy' for a question involving numbers that have been rounded, they need to calculate both the upper and lower bound and then compare the two answers to see to what degree of accuracy the bounds are the sam		•	•	
To learn how to interpret real life graphs	• Students will know how to interpret the gradient of a linear graph in real life contexts e.g. financial contexts, rate of change of graphs of containers filling and emptying etc. • Students will know how to interpret the area under a graph formed by line segments linear graph in real-life contexts. Students will know that the area under the graph represents the product of the two axes. • Students will know that for velocity time graphs the area represents distance and the gradient represents acceleration • Students will know that the units for acceleration are given in distance/time^2	**Velocity -** the speed of something in a given direction. **Acceleration -** the rate of change of velocity per unit of time.	•	• Students will know how to interpret a distance-time graph • Students will know how to calculate speed from a distance time graph • Students will know how to complete a distance-time graph given information • Students will need to know how to calculate gradient	The following should be over two lessons
To learn how to estimate area under a curve	• Students will know how to estimate area under a curve by dividing it into triangles and trapezia • Students will know whether or not their estimate is an underestimate or overestimate for the area under the curve and why • Students will know that the area under a velocity-time graph represents distance		•	• Students need to be able to calculate the area of triangles and trapezia	
To learn how to estimate the gradient of a curve	• Students will know how to estimate the gradient at a point on a curve by drawing a tangent • Students will know that the gradient of a tangent at a point on a velocity-time graph tells them the acceleration of the vehicle at that point	**Velocity –** speed **Gradient –** steepness. The gradient of a line tells us how steep the line is. **Tangent –** A line that just touches a curve	•	• Students will need to know how to calculate gradient	

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	• Students will know that the units for acceleration are given in distance/time^2 • Students will know how to solve problems involving velocity-time graphs	but doesn't go through it. **Acceleration –** the rate of change of velocity per unit of time.			