The Sutton Academy

Knowledge Rich Curriculum Plan

Year 11 Foundation+ Compound Measures and Ratio and Proportion

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 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 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	**How do you convert minutes to hours without a calculator?** **Step 1** – Express the number of minutes as a fraction over 60. The reason we use 60 minutes is due to the fact that 60 minutes are in 1 hour. **Step 2** – Simplify the fraction, we do this by dividing the denominator and numerator by the Highest Common Factor **Step 3** – Convert the fraction to a decimal; this can be done by dividing the numerator by the denominator or converting the fraction over 100 and then dividing the numerator by the denominator If you are given a calculator convert the hours to minutes, add them and divide by 60. For example if it is 1 hour 40 minutes we know 1 hour is 60 minutes. So 60 + 40 = 100 Then calculate 100/60 to convert it to a decimal answer. Calculating SDT Step 1: Identify if you are finding speed distance or time Step 2: If necessary convert time to decimal form. Step 3: Substitute the values into the correct formula: $Speed = \frac{distance}{time}$ $Time = \frac{distance}{speed}$ $Distance = Speed \times Time$
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.		• Students need to know how to find the difference between two times	

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To learn how to share in a ratio	• Students will know how to share a quantity into a two-part given ratio. • Students will know how to share a quantity into a three-part given ratio. • Students will know how to find quantities within a ratio when the difference between two parts is given. • Students will know how to solve sharing in ratio problems within context.		• Students should already know how to share in a ratio	**How do we share in a given ratio?** **Step 1:** Firstly, **represent** the ratio in the form of boxes – remember to **assign** the ratio in the order of the question. **Step 2:** Count the number of the parts within the question. Divide the total amount by the number of parts. This will give you the amount that each part is worth. **Step 3:** Write the value of each part within the box and calculate the totals for each section of the ratio. **Step 4:** Check if the question is asking to share between a ratio or for a specific value within the ratio.
To learn how to solve problems involving ratio	• Students will know how to share an amount in a given ratio • Students will know how to find quantities within a ratio when the value of one part is given. • Students will know how to find quantities within a ratio when the difference between two parts is given. • Students will know how to solve more complex ratio problems including those which involve percentages and fractions • Students will know how to combine two ratios in the form a:b, b:c etc. and use them for comparison between three parts.		• Students will need to know how to find the lowest common multiple of two numbers	**Ratio - Given one value** Step 1: Firstly, represent the ratio in the form of boxes – remember to assign the ratio in the order of the question. Step 2: If you are given one value divide the amount by the number of parts for the person it is referring to. Step 3: Write the value of each part within the box and calculate the totals for each section of the ratio. Step 4: Check if the question is asking for one value or for the total amount. **Ratio – Given the difference** Step 1: Firstly, represent the ratio in the form of boxes – remember to assign the ratio in the order of the question. Step 2: Count the difference in the number of the parts within the question. Divide the difference by the difference in the number of parts. This will give you the amount that each part is worth. Step 3: Write the value of each part within the box and calculate the totals for each section of the ratio. Step 4: Check if the question is asking for one value or for the total amount.
To learn how to identify the best buy and convert currencies.	• Students will know how to find the best buy by either finding the value of one item for each option or finding the value of a common multiple of each item.	Value – how much money something is worth Currency – a system of money in general use in a particular country.	• Students will need to know how to find the lowest common multiple of two numbers	**Method 1 – Finding the price of one item and comparing.**

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	• Students will know how to find the best buy in more complex scenarios where percentage discounts or fractions are also involved • Students will know how to convert between different currencies. •	Convert – change/ swap to		**Step one: Identify** if you are being asked to **compare** prices or find the **cheapest** option, if so do the following. **Step two:** You need to compare the price, this can be done by dividing the price by the **quantity** you have of each item. This will give you the cost for 1 unit of that item. **Step three:** Compare the prices for each unit, the lowest price is the best buy. **Step four:** Identify what the question is asking you for, is it asking for the cheapest item? Remember to write the name of the cheapest item and give your **reasoning**. Do not circle which is cheapest. **Method 2 – Finding the LCM of each item and comparing.** **Step one:** Identify if you are being asked to compare prices or find the cheapest option, if so do the following. **Step two:** You need to find the lowest common multiple (LCM) of the quantities of each item. **Step three:** Multiply the cost of each item in order to get the LCM quantity of each item, this is so you can compare. **Step four:** Compare the prices for each item, the lowest price is the best buy. **Step five:** Identify what the question is asking you for, is it asking for the cheapest item? Remember to write the name of the cheapest item and give your reasoning. Do not circle which is cheapest. **Steps to Success – Currency Conversion** Step one – Write out the conversions and label with arrows. Step two – Decide which direction involves multiplication and label this arrow. Step three – Decide which direction involves division and label this. Step four – Use the diagrams to convert appropriately. (When multiple conversions are needed work through those one at a time.)
To learn how to solve real life problems involving inverse proportion	• Students will know the difference between direct and inverse proportion • Students will know how to solve real life problems involving inverse proportion without using algebra (e.g. number of worker problems etc.)	Inverse – Opposite Inverse Proportion – If two things are inversely proportional then as one increases the other decreases or vice versa	• Students will need to know how to multiply and divide	**Direct Proportion – Steps to Success** **Step 1**: Express the proportions as a **ratio** and decide if you are increasing or decreasing the proportion. If you are finding a greater amount than the value in the question you are increasing, if you are finding a smaller amount you are decreasing.

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				Step 2: Dependant on the question you may need to find the unitary value for one of the proportions, to do this you would divide both parts of the ratio by the original proportion. **Step 3:** If you then needed to find a greater amount, you would multiply both parts of the ratio to find the required proportion. <u>Inverse Proportion – Steps to Success</u> **Step 1**: Express the proportions as a **ratio.** **Step 2:** Decide which proportion is being changed and how, remembering if one side of the proportion increases, then the other would have to decrease. **Step 3:** If you then needed to find a greater amount, you would multiply both parts of the ratio to find the required proportion. **Double check that your answer makes sense for what is being asked.**
To learn how to solve algebraic direct proportion problems	•Students will know how to solve algebraic direct proportion problems by writing an algebraic statement in the form y = kx before substituting in given values to find the value of k and then using the resultant formula to find further missing values. •Students will know that k is known as the constant of proportionality	Direct Proportion – If two things are directly proportional then if one increases, so does the other, if one decreases, then so does the other Constant – a quantity or parameter that does not change its value whatever the value of the variables	• Students will need to know how to substitute numbers into formulae • Students will need to know how to solve simple one step equations in the form a = bx	If y is directly proportional to x, this can be written as $y \propto x$ An equation of the form $y = kx$ represents direct proportion, where k is the **constant of proportionality**. **Step 1:** Write out the equation y = kx, attaching the appropriate power to the 'x' and using the **variables** given in the question. **Step 2: Substitute** in the given values. **Step 3: Solve** the resulting **equation** to find k. **Step 4:** Rewrite the equation with the value for k.
To learn how to solve algebraic inverse proportion problems	•Students will know how to solve algebraic inverse proportion problems by writing an algebraic statement in the form y = k/x before substituting in given values to find the value of k and then using the resultant formula to find further missing values. •Students will know that k is known as the constant of proportionality	Inverse Proportion – If two things are inversely proportional then as one increases the other decreases or vice versa Constant – a quantity or parameter that does not change its value whatever the value of the variables	• Students will need to know how to substitute numbers into formulae • Students will need to know how to solve one step equations involving fractions	If y is inversely proportional to x, this can be written as $y \propto \frac{1}{x}$. An equation of the form $y = \frac{k}{x}$ represents inverse proportion. **Step 1:** Write out the equation $y = \frac{k}{x}$ with the **variables** given in the question **Step 2: Substitute** in the given values **Step 3: Solve** the resulting **equation** to find k **Step 4:** Rewrite the equation with the value for k **Step 5:** Substitute in the given value to find the missing variable the question asks for