The Sutton Academy

Knowledge Rich Curriculum Plan

Year 9 Support – Data and Statistics 1

Lesson objective	Intended Knowledge:	Tiered Vocabulary	Prior Knowledge:	Steps to Success	Feedback
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 $Distance = Speed \times Time$ **Opportunity for challenge:** • 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.	Speed – the rate at which someone or something moves or operates.	• Students need to know how to make simple conversions between minutes and hours. E.g. 30 minutes = 0.5 hours	See reading	
To learn how to interpret real-life graphs.	• Students will know how to use conversion graphs to do simple conversions with currency. • Students will know how to use conversion graphs to do simple conversions with metric and imperial units. • Students will know how to use conversion graphs to carry out conversions that involve scaling up. • Students will know how to use linear graphs to in order to explore the relationships between costs and variables. • Students will know how to use linear graphs involving money to state a fixed cost. **Opportunity for challenge:** • Students will know how to draw a conversion graph.		• Students need to know how to convert between metric units.		
To learn how to interpret a distance-time graph.	• Students will know how to make simple interpretations from a distance-time graph. • Students will know how to find distances and times from a distance-time graph. • Students will know how to complete a distance-time graph from a worded scenario. • Students will know how to draw a complete distance-time graph from a worded scenario. **Opportunity for challenge:** • Students will know how to interpret the speed within each section of the graph by looking at the steepness of the line.		• Students need to know how to find the difference between two times.	<u>Steps to Success – Calculating speed, distance, time</u> **Step 1:** Check the units! If you are asked to calculate either distance or time, check the units in the question are consistent, if they are, you're good to go but if they aren't you will need to convert them. For example if the speed is given in m/s, check that the distance is also in metres and not km. If they aren't consistent you need to convert the units for distance to match that given in the units for speed. Likewise, if the time is given in hours and minutes but the speed is given in hours you need to convert the time into a decimal number of hours. **Step 2:** Once you have converted any units you are ready to use the formulae below: Speed = Distance ÷ Time Time = Distance ÷ Speed Distance = Speed x Time **Step 3:** Substitute the known variables into the formula and calculate the unknown speed, distance or time. **Step 4:** Check the units for your answer. If you are calculating time you may need to convert back from a decimal number of hours to hours	

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To learn how to find the averages and range from a list of data values.	• Students will know how to find the mode from a set of data values. Students will know there can be more than one mode/more than one mode. • Students will know how to find the median from an odd and even amount of data values. • Students will know how to find the range from a set of data values. • Students will know that to find the mean of a data set. • Students will know how to make basic comparisons between averages or range. **Opportunity for challenge:** • Students will know how to recognise the advantages and disadvantages between measures of average. Note: If students finish please use the opportunity for them to practise a mixture of the different averages and range.	Average –the central or typical value in a set of data, in particular the mode, median, or (most commonly) the mean Mode – the value that occurs most often in the data. There may be no mode, or more than one mode. Median – the middle piece of data when it is ordered from smallest to largest. Mean – a mathematical average calculated by adding up all of the data and dividing it by the number of pieces of data. Range – the difference between the largest and smallest values. This isn't actually an average but it tells us how spread out the data is.	• Students need to know how to identify and categorise data as qualitative and quantitative. • Students need to know how to identify and categorise data as discrete and continuous.	Steps to Success - Averages Calculating the mean Step 1: Add all of the data together Step 2: Divide the answer by the number of pieces of data that there are Calculating the median Step 1: Arrange all of the data in order from smallest to largest Step 2: Cross the data out from either end to find the middle piece of data – this is the **median** Finding the mode **Identify** the one that appears the most – this is the **mode**. If there is more than one then write down both. Calculating the range Step 1: Identify the smallest and largest data in your data set Step 2: Subtract the smallest data from the largest data to determine the **range**	
To learn how to find the averages and range from frequency tables.	• Students will know how to find the mode from a frequency table by finding the data value which corresponds to the highest frequency. • Students will know how to find the median from a frequency table by finding the data value which corresponds to the middle frequency value. • Students will know how to find the mean of a frequency table by finding the sum of the products of each data value and the corresponding frequency and then dividing this by the total frequency. • Students will know how to find the range from a frequency table by finding the difference between the highest and lowest data value. **Opportunity for challenge:** • Students will know how to find missing data within a frequency table using the averages and range.		• Students need to know how to find the averages and range from a list of data values.	**Steps to Success – mean from a table** Step 1: Add another column onto the table Step 2: Multiply the number in the group by the frequency for that group Step 3: Add up all of your answers Step 4: Add up all of the frequencies Step 5: Divide the total from step 3 by the sum of the frequency column **Steps to Success – median from a table** Step 1: Add up the total frequency Step 2: Add one to the total frequency and divide by 2 Step 3: Add up the frequencies one at a time until you go past your answer to step 2. Once you go past it, write down the last group you added on as your answer. **Steps to Success – mode from a table** Step 1: Identify the one with the highest frequency Step 2: Write down that group as your answer	
To learn how to find the averages from grouped frequency tables.	• Students will know that a grouped frequency table represents data that falls within class intervals. • Students will know that the actual data values are unknown. • Students will know how to find the modal class from a grouped frequency table by finding the		• Students need to know how to find the averages from frequency tables.	**Steps to Success – mean from a grouped table** Step 1: Find the midpoints of each class. You need the exact value that is halfway between the numbers of the class. Step 2: Multiply your midpoint by the frequency for that group. Step 3: Add together all of your resulting products – this finds the total number of the population.	

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	class interval which corresponds to the highest frequency. • Students will know how to find the median class from a grouped frequency table by finding the class interval which corresponds to the middle frequency value. • Students will know how to find an estimate for the mean from a grouped frequency table by finding the sum of the products of each mid-point of the class interval and the corresponding frequency and then dividing this by the total frequency. • Students will know that the mean is an estimate because the data values are unknown. • Students will know that by using the mid-points to find the mean you are assuming that the data is equally spread out within each interval. **Opportunity for challenge:** • Students will know how to find missing data within a grouped frequency table using the averages.			Step 4: Divide the total by the total from the frequency column – this is your mean. **<u>Steps to Success – median class</u>** Step 1: Add up the total frequency. Step 2: Add one to the frequency and divide by 2 Step 3: Add up the frequencies one at a time until you go past your answer to step 2. Once you go past it, write down the median class. **<u>Steps to Success – modal class</u>** Step 1: Identify the class with the highest frequency. Step 2: Write down the class as your answer.	
To learn how to draw and interpret bar charts.	• Students will know how to draw bar charts for discrete data. • Students will know how to construct a bar chart from information given in a tally chart. • Students will know how to use a tally chart to draw a bar charts which involves continuous data. • Students will know how to read frequency values from a bar chart. • Students will know how to recognise simple patterns, characteristics and relationships in bar charts. • Students will know how to calculate total population from a bar chart or table. • Students will know how to find the greatest and least values from a bar chart. • Students will know how to compare data within a bar chart. • Students will know how to compare two different bar charts. **Opportunity for challenge:** • Students will know how to recognise misleading bar charts and explain how it is misleading.	**Tally Chart –** a simple way of recording and counting frequencies. Each occurrence is shown by a tally mark and every fifth tally is drawn diagonally to make a "gate" of five **Bar Chart –** a diagram in which the numerical values of variables are represented by the height or length of lines or rectangles of equal width	• Students need to know how to complete and read a tally chart.	**<u>Steps to success - Bar charts</u>** When drawing bar charts there are a certain set of rules we need to follow, a bar chart must have: • An appropriate title • Frequency on vertical axes • Labels on axes • Right scales • Space between bars • Bars with equal widths Often exam questions may ask you to identify errors in bar charts, so it is important to remember these rules.	
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