The Sutton Academy

Knowledge Rich Curriculum Plan

Year 9 Prime – Data and Statistics 01

Lesson objective	Intended Knowledge:	Tiered Vocabulary	Prior Knowledge:	Steps to Success	Feedback
To learn how to select a stratified sample.	• Students will know how to select a stratified sample. • Students will know that a stratified sample is a sample that is drawn from a number of separate strata of the population rather than at random from the whole population, in order that it should be represented.	**Population -** All the inhabitants of a particular place. **Sample** – a small part or quantity intended to show what the whole is like. **Bias** –prejudice for or against one person or group, especially in a way considered to be unfair. **Strata -** a group that members of a population are divided into	• Students need to understand the differences between discrete and continuous data. • Students need to understand the differences between quantitative and qualitative data. • Students need to express a number as a fraction of another	**Steps to Success – Stratified Sampling** **Step one:** In order to calculate how many people we need from each strata for the sample, find the total population. **Step two:** For the sample to be proportional to the population, the percentage of people within a strata out of the total population needs to be calculated for each strata. **Step three:** Identify the sample size that will be used for the sample, to find the number of people from each strata to be chosen, multiply the sample size by the percentage of each strata. **Step four:** Identify what the question is asking you for, is it asking to identify the number of people from each strata will be chosen or will it ask for one strata? Write your answer down.	
To learn how to solve problems involving the mean	• Students will know how to work backwards from the mean to solve problems involving finding the mean for a group within a group or for a whole group from two smaller sub-groups	**Average –** a number expressing the central or typical value in a set of data, in particular the mode, median, or (most commonly) the mean **Mean –** the average of a set of two or more data values, calculated by adding up all of the data and dividing it by the number of pieces of data.	• Students will need to know how to calculate the mean for discrete data	**Steps to Success – Reverse Mean** **Method 1 - Finding the New Mean When a Value Is Added** **Step 1 -** Multiply the original mean by the original number of items to find the **original total**: **Original Total = Mean × Number of Items** **Step 2:** Add the new value to get the **new total**: **New Total = Original Total + New Value** Step 3: Divide the new total by the new number of items to find the **new mean**: **New Mean = New Total ÷ New Number of Items** **Method 2: How to Find the Mean of One Group (When Given Overall and Another Group)** **Step 1**: Find the Total for Everyone. Formula: Total of everyone = Overall mean × Total number of people **Step 2**: Find the Total for the Known Group. Total of known group = Mean of group × Number in that group **Step 3**: Find the Total for the Missing Group Subtract the total of the known group from the total of everyone. Total of missing group = Total of everyone − Total of known group **Step 4**: Find the Mean of the Missing Group Divide the total of the missing group by how many are in that group. Formula: Mean of missing group = Total of missing group ÷ Number in that group	

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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. • Students will know how to find missing data within a frequency table using the averages and range.	Mean – the average of a set of two or more data values, calculated by adding up all of the data and dividing it by the number of pieces of data. 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. 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 will 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 how to find the modal class from a grouped frequency table by finding the 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. • Students will know how to find missing data within a grouped frequency table using the averages.	Interval – a set of real numbers between two given numbers which are the endpoints of the interval	• Students will 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. Step 4: Divide the total by the total from the frequency column – this is your mean. **Steps to Success – median class** 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. **Steps to Success – modal class** Step 1: Identify the class with the highest frequency. Step 2: Write down the class as your answer.	

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To learn how to draw comparative and composite bar charts.	• Students will know how to draw a comparative bar chart. • Students will know how to interpret a comparative bar chart. • Students will know how to write a key and interpret a key for each set of bars within a comparative bar chart. • Students will know how to draw a composite bar chart. • Students will know how to interpret a composite bar chart. • Students will know how to write a key and interpret a key for each set of bars within a composite bar chart. **Opportunity for challenge:** • Students will know how to find the averages and range of comparative and composite bar charts.	**Composite -** made up of several parts **Comparative -** Measured or judged by the similarity or dissimilarity between one thing and another; relative.	• Students need to know how to draw and interpret a bar chart.	**Steps to success - Bar charts** 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.	
To learn how to use the capture recapture method	• Students will know how to estimate answers to capture recapture problems using equivalent fractions	**Population** – a set of similar items or events which is of interest for a question or experiment	• Students will need to know how to find equivalent fractions • Students will need to know how to express one amount as a fraction of another •	**Steps to Success – Capture Recapture** **Step 1**: Express the number originally captured and marked as a fraction over x (we call the total population x) **Step 2**: Express the second capture as a fraction with the number marked as the numerator and the total number captured as the denominator **Step 3**: Write the two fractions from step 1 and 2 equal to each other. **Step 4**: Work out the multiplier between the two numerators and use this to work backwards to find the denominator of the first fraction	
To learn how to draw and interpret stem and leaf diagrams.	• Students will know how to draw stem and leaf diagrams correctly ensuring they include a key. • Students will know how to read values from a stem and leaf diagram. • Students will know how to find how many pieces of data are above or below a certain value. • Students will know how to use fractions to represent how many pieces of data are above or below certain values. • Students will know how to find the averages from a stem and leaf diagram. • Students will know how to draw a back-to-back stem and leaf diagram. **Opportunity for challenge:**	**Stem and Leaf Diagram –** a diagram where each data value is split into a "leaf" (usually the last digit) and a "stem" (the other digits)	• Students need to know how to order numbers. • Students need to know how to identify the value of a digit within a number. • Students need to know how to calculate averages	**Steps to Success - Drawing** **Step 1:** Work out what 'stems' you need. The 'stems' are all of the digits that make up the beginning of a number except for the last digit. *E.g. the number 31 has a stem of 3 and a leaf of 1.* **Step 2:** Draw a vertical line and list the stem numbers to the left of the line in order from smallest to largest. **Step 3:** Fill in the leaves by listing them in order after their respective stem. The leaves are the last digit of each number in the data set. If there is more than one of the same numbers then you must list the leaf however many times it appears. **Step 4:** You must then provide a key explaining how to interpret your stem and leaf diagram.	

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	• Students will know how to compare the median, mode and range for data represented in a back-to-back stem and leaf diagram.			**Steps to Success – Interpreting** **Range** **Step 1 –** Identify the smallest and largest value in your stem and leaf diagram. **Step 2 –** Subtract the largest value from the smallest value, this is your range. **Mode** **Step 1 –** It is easy to mistake that the mode is the most common integer, but it is actually the most common integer in a row! **Median -** **Step 1 –** Cross the smallest number and largest value in the stem and leaf diagram. **Step 2 –** Repeat this until you have either one or two digits left. - If you have one digit left, this is your median. Remember to use the key to find the value. - If you have two digits left, add both together and half it to find the median. Remember to use the key to find the value of this item.	
To learn how to draw and interpret pie charts.	• Students will know how to construct pie charts for categorical data and discrete/continuous numerical data. • Students will know how to interpret pie charts using simple fractions and percentages such as a half or 25%. • Students will know how to find the mode from a pie chart. • Students will know how to find the total frequency from a pie chart. • Students will know how to find the frequency represented by each sector. • Students will know how to compare angles with values in a real-life context and use this to calculate the values of other angles or find the angles of other values. • Students will know how to understand that the frequency represented in corresponding sectors in two pie charts is dependent upon the total populations represented by each of the pie charts. • Students will know how to compare two pie charts.	Pie Chart – a circular diagram which is divided into slices to illustrate numerical proportion Sector – a pie-shaped part of a circle made of the arc along with its two radii	• Students need to know how to draw and measure angles using a protractor.	**Steps to success – Drawing Pie Charts** **Step 1:** Find the total frequency. This total needs to be represented by 360° within your pie chart. **Step 2:** Divide 360 by the total frequency, this will give you the number of degrees each person is represented within the pie chart. **Step 3:** Multiply each group by the number you found in step two, this will let you know how many degrees is needed for each group. **Step 4:** Measure the degrees for each group on your pie chart and draw each sector. **Step 5:** Label your pie chart appropriately. **Steps to success – Interpreting pie charts** **Step 1:** Find the number of degrees for each sector within your circle. You may need to measure the angles with a protractor. **Step 2:** Find the fraction of the circle you have for your chosen sector, this will be your number of degrees out of 360°. Simplify, if possible. **Step 3:** Multiply the fraction you have found by the total frequency. This will give you the frequency for that sector.	
Mini-Assessment 10					