Knowledge Rich Curriculum Plan

Year 9 Prime – Data and Statistics

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
To learn how to select a stratified sample.	• Students will know that different sample sizes may affect the reliability of conclusion. • Students will know that the bigger the sample size the more representative it will be of the whole population. • Students will be able to explain why a sample may not be representative of the whole population. • 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. • Students will know how to select a stratified sample by selecting the total from each separate strata, divide by the total population and multiply by the sample size required. • Students will know to round to an integer value as people or objects will only be represented by integers. • Students will understand the benefits of a stratified sample.	**Stratified** – formed or arranged into strata or layers. **Sample** – a small part or quantity intended to show what the whole is like. **Stratified Sample** – a sample that is drawn from a number of separate groups of the population, rather than at random from the whole population, in order to ensure that the sample is representative **Bias** – inclination or prejudice for or against one person or group, especially in a way considered to be unfair. **Population** – all the inhabitants of a particular place In statistics, a population is a set of similar items or events which is of interest for a question or experiment	• Students need to understand the differences between discrete and continuous data. • Students need to understand the differences between quantitative and qualitative data.	Mini-Assessment 10
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.	**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 mathematical average of the set of two or more data values. It is calculated by adding up all of the data and dividing it by the number of pieces of data **Median** – the middle piece of data when the data is ordered from smallest to largest **Mode** – the value that occurs most often in the data. If no number in the list is repeated, then there is no mode for the list. If there is more than one it is considered to be multi-modal **Range** – the difference between the largest and smallest values. This isn't actually an average – instead 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.	Mini-Assessment 10
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.	**Interval** – in maths, an interval is a set of real numbers between two given numbers called the endpoints of the interval	• Students will know how to find the averages from frequency tables.	Mini-Assessment 10

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	• 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.			
To learn how to draw comparative and composite bar charts.	• Students will know that a comparative bar chart places bars representing sections from the same category adjacent to each other. • 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 that composite bar charts are charts where each bar displays multiple data point stacked in a single row or column. • 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.		• Students need to know how to draw and interpret a bar chart.	Mini-Assessment 10
To learn how to draw and interpret stem and leaf diagrams.	• Students will know that a stem and leaf is a diagram that quickly summarizes data while maintaining the individual data points. • Students will know that we use stem and leaf diagrams to group all the data in to categories whilst still showing each individual result. • Students will know to draw stem and leaf diagrams by splitting the tens and units column. The tens column becomes the 'stem' and the units become the 'leaf'. • Students will know that stem and leaf diagrams must be in order to read them properly. • Students will know that stem and leaf diagrams require a key so that the data can be interpreted correctly. • Students will know that they must use the key to interpret the values on a stem and leaf diagram, eg. 3|7 = 37 and not just 7. • 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.	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 and be able to indicate the tens and units of numbers.	Mini-Assessment 10

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	Opportunity for challenge: • Students will know how to compare the median, mode and range for data represented in a back-to-back stem and leaf diagram.			
To learn how to draw and interpret pie charts.	• Students will know that a pie chart is a circular statistical graphic which is divided in to slices to illustrate numerical proportion. • Students will know that we use a pie chart for expressing a part-to-whole relationship in a visual way which makes it easy to compare results. • Students will know how to construct pie charts for categorical data and discrete/continuous numerical data. • Students will know how to interpret simple 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 that a sector is portion of a circle enclosed by two radii and an arc. • 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 angles using a protractor. • Students need to know how to draw a pie chart. • Students need to know how to find the mode from a list of values. • Students need to know that there are 360° in a full turn. • Students need to understand proportional reasoning.	Mini-Assessment 10
To learn how to draw and interpret scatter graphs.	• Students will know how to draw scatter graphs from given data values. • Students will know how to finish a scatter graph that has been partially completed. • Students will know how to draw a line of best fit. • Students will know if the data has positive correlation, negative correlation or no correlation. • Students will know how to describe the relationship between the two variables on a scatter graph. • Students will know that an outlier is a data point which falls outside the normal range of data. • Students will know how to identify outliers on a scatter graph. • Students will know how to interpret points on a scatter graph. • Students will know how to use their line of best fit to estimate values from a scatter graph. • Students will know how to explain an isolated point on a scatter graph within the real-life scenario. • Students will know that causality is where one event affects the other. • Students will know that correlation does not imply causality.	Scatter Graph – a type of mathematical diagram using coordinates to display values for two variables Outlier – a person or thing differing from all other members of a particular group or set Correlation – a mutual relationship or connection between two or more things.	• Students need to know how to plot and read coordinates. • Students need to know how to draw a straight line. • Students need to understand the relationship between two variables and be able to describe it. • Students need to know how to recognise positive correlation, negative correlation and no correlation.	Mini-Assessment 10

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	• Students will appreciate that correlation is a measure of the strength of the association of the two variables and that zero correlation does not necessarily imply no relationship but simply no linear correlation. • Students will know how to state how reliable their predictions are, ie. Not reliable if extrapolated. **Opportunity for challenge:** • Students will know that interpolation is a statistical method by which related known values are used to estimate an unknown. • Students will know that extrapolation is the action of estimating or concluding something by assuming that existing trends will continue.			
To learn how to interpret scatter graphs.	• Students will know that an outlier is a data point which falls outside the normal range of data. • Students will know how to identify outliers on a scatter graph. • Students will know how to interpret points on a scatter graph. • Students will know how to use their line of best fit to estimate values from a scatter graph. • Students will know how to explain an isolated point on a scatter graph within the real-life scenario. **Opportunity for challenge:** • Students will understand causality, extrapolation and interpolation.		• Students need to know how to plot a scatter graph. • Students will know how to draw a line of best fit.	Mini-Assessment 10
To learn how to draw a time series graph.	• Students will know that time-series graphs can be used to visualise trends in numerical values over time. • Students will know how to draw line graphs for time-series. • Students will know how to interpret time-series tables and graphs.		• Students need to know how to plot coordinates.	Mini-Assessment 10
To learn how to draw frequency polygons.	• Students will know that a frequency polygon is a graph constructed by plotting the midpoints of each interval with the corresponding frequency and connecting the points with straight lines. • Students will know how to draw a frequency polygon for grouped data. • Students will know how to read off frequency values from a frequency polygon. **Opportunity for challenge:** • Students will know how to recognise simple patterns, characteristics and relationships in frequency polygons.	Frequency Polygon – a line graph of class frequency plotted against class midpoint	• Students need to know how to plot coordinates.	Mini-Assessment 10
To learn how to draw a cumulative frequency graph.	• Students will know how to draw a cumulative frequency graph given the cumulative frequency. • Students will know how to calculate cumulative frequency and draw the resulting curve. • Students will know how to estimate values from a cumulative frequency curve. • Students will know how to estimate the median, quartiles and interquartile range from a cumulative frequency curve. • Students will know that the lower quartile is 25% of the way through the data. • Students will know that the upper quartile is 75% of the way through the data. • Students will know how to use a cumulative frequency graph to estimate the interquartile range.		• Students need to know how to plot coordinates. • Students need to know how to estimate values from a graph.	Mini-Assessment 10

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	• Students will know that the interquartile range represents the spread of the middle 50% of the data.			
To learn how to draw box plots.	• Students will know how to draw a box plot from a given median, upper quartile, lower quartile, minimum value and maximum value for a data set. • Students will know how to determine the median, upper quartile, lower quartile, minimum value and maximum value for a data set. • Students will know how to draw a box plot by first working out the median, upper quartile, lower quartile, minimum value and maximum value for a data set. **Opportunity for challenge:** • Students will know how to draw a box plot from information where the interquartile range and either the UQ or LQ or given, or when given the range and either the minimum or maximum value is given.		• Students need to be able to calculate the median for data in a list. • Students need to know how to calculate the range for a data set.	Mini-Assessment 10
To learn how to interpret box plots.	• Students will know that each section of a box plot represents 25% of the data • Students will know how to compare box plots. They will know that to do this they must compare the medians and either the range or interquartile range, giving their comparisons in the context of the question. **Opportunity for challenge:** • Students will know how to find estimates for values above or below a certain data point.		• Students need to know how to draw a box plot.	Mini-Assessment 10