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**Knowledge Rich Curriculum Plan**

Year 10 Intermediate – 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**  |
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| **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 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 | * Students will need to know how to calculate the mean for discrete data
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| **To learn how to calculate averages from frequency tables** | * Students will know how to calculate the mean from a frequency table
* Students will know how to calculate the median from a frequency table
* Students will know how to find the mode from a frequency table
* Students will know how to calculate the range from a frequency table
 | **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 need to know how to calculate the median, mode and range for discrete data
* Students will need to know how to interpret a frequency table
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| **To learn how to calculate averages from grouped frequency tables** | * Students will know how to calculate the mean for a grouped frequency table
* Students will know how to identify the modal class from a grouped frequency table.
* Students will know how to find where the median lies in a grouped frequency table.

 | **Interval –** in maths, an interval is a set of real numbers between two given numbers called the endpoints of the interval | * Students will need to know how to calculate the mean and median and identify the mode for a non-grouped frequency table
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| **To learn how to use the capture recapture method** | * Students will know how to estimate answers to capture recapture problems using equivalent fractions
 | **Population** – all the inhabitants of a particular placeIn statistics, a population is 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
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| **To learn how to draw and interpret stem and leaf diagrams** | * 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 how to produce stem and leaf diagrams.
* Students will know how to produce back to back stem and leaf diagrams.
* Students will know how to interpret stem and leaf diagrams.
* Students will know how to find the median, mode and range from stem and leaf diagrams.
* Students will know how to compare the median, mode and range for data represented in back to back stem and leaf diagrams.
 | **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 will need to know how to calculate averages and range
* Students will need to know how to order integers
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| **To learn how to draw and interpret pie charts** | * Students will know how to accurately draw a pie chart
* Students will know how to interpret a pie chart
* Students will know how to solve more complex problems involving 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 will need to know how to draw and measure angles
* Students will need to know that there are 360° around a point
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| **To learn how to plot points and interpret scatter graphs** | * Students will know how to plot points on a scatter graph
* Students will know how to interpret scatter graphs in terms of the relationship between two variables.
* Students will know how to identify outliers on scatter graphs and give reasons why there may be an outlier
* Students will know how to draw the line of best fit on a scatter graph
* Students will know how to use a line of best fit to make predictions; interpolate and extrapolate apparent trends whilst knowing the dangers of doing so.
* Students will know that correlation is a mutual relationship or connection between two or more things.
* Students will know how to distinguish between positive, negative and no correlation using lines of best fit and interpret correlation in terms of the problem.
* Students will know that correlation does not imply causality.
* 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.
 | **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 will need to know how to plot coordinates on a graph
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| **To learn how to draw and interpret time series graphs** | * Students will know how to construct tables for time-series data.
* Students will know how to draw line graphs for time-series
* Students will know how to interpret time-series tables and graphs.
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| **To learn how to draw and interpret frequency polygons** | * Students will know how to draw and interpret a frequency polygon
 | **Frequency Polygon –** a line graph of class frequency plotted against class midpoint | * Students will need to know how to plot coordinates
* Students will need to know how to calculate averages
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| **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
* 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
 | **Box Plot –** a statistical diagram used for graphically demonstrating the locality, spread and skewness groups of numerical data**Median –** the middle piece of data when the data is ordered from smallest to largest**Lower Quartile –** the median of the lower half of a data set. This is located by dividing the data set with the median and then dividing the lower half that remains with the median again**Upper Quartile –** the median of the upper half of a data set. This is located by dividing the data set with the median and then dividing the upper half that remains with the median again**Range –** the difference between the largest value in the data set and the smallest value in the data set**Interquartile Range** – the difference between the upper quartile and the lower quartile | * Students will need to be able to calculate the median for data in a list
* Students will need to know how to calculate the range for a data set
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| **To learn how to interpret and compare box plots** | * Students will know how to determine the minimum value, maximum value, upper quartile, lower quartile, median, range and, interquartile range from a drawn box plot
* 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
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* Students will need to know how to calculate the range for a data set
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| **To learn how to draw and interpret cumulative frequency curves** | * Students will know how to draw a cumulative frequency table 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
 | **Cumulative** - increasing or increased in quantity, degree, or force by successive additions | * Students will need to know how to estimate values from a graph
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| **To learn how to draw histograms** | * Students will know that histograms show frequency density
* Students will know that $frequency density=\frac{frequency}{class width}$
* Students will know how to draw a histogram for grouped data
 | **Histogram** – a graphical representation of discrete or continuous data where the area of a bar in a histogram is equal to the frequency**Frequency Density –** the frequency per unit for the data in each class | * Students will need to know how to draw a bar chart
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