

YEAR 9, MASTERY, STATISTICS, MATHS

Rationale and Context of Unit:	Core curriculum content:	Tier 2 & Tier 3 vocabulary explicitly taught:
<p>Prior Key Stage 3 content reviewed using pre-tests and whiteboard work at the start of each topic.</p> <p><b><u>PRESENTATION OF DATA</u></b>  <b><u>Types of data</u></b></p> <ul style="list-style-type: none"> <li>You will explore types of data</li> <li>Know the meaning of continuous data</li> <li>Interpret a grouped frequency table for continuous data</li> <li>Construct a grouped frequency table for continuous data</li> </ul> <p><b><u>Histograms</u></b></p> <ul style="list-style-type: none"> <li>You will discover the difference between a histogram and a bar chart</li> <li>Construct histograms for grouped data with equal class intervals</li> <li>Interpret histograms for grouped data with equal class intervals</li> <li>Construct and use the horizontal axis of a histogram correctly</li> </ul> <p><b><u>Scatter diagrams</u></b></p>	<p><b><u>COLLECTING AND REPRESENTING DATA</u></b></p> <ul style="list-style-type: none"> <li>Interpret and construct tables, charts and diagrams including, for categorical data:</li> <li>frequency tables</li> <li>bar charts</li> <li>pie charts</li> <li>pictograms</li> <li>vertical line charts for ungrouped discrete numerical data</li> <li>tables and line graphs for time series data</li> <li>know their appropriate use</li> <li>Interpret, analyse and compare the distributions of data sets from univariate empirical distributions through appropriate graphical representation involving discrete, continuous and grouped data</li> <li>Construct and interpret diagrams for grouped discrete and continuous data, i.e. histograms and cumulative frequency graphs, and know their appropriate use.</li> </ul>	<p>Collecting, <b>data</b>, representing, frequency table, bar chart, pie chart, pictogram, line chart, <b>discrete</b>, line graph, series, interpret, analyse, <b>continuous</b>, grouped data, scatter graph, <b>correlation</b>, negative, positive, line of best fit, prediction, <b>interpolate</b>, <b>extrapolate</b>.</p> <p><b>Highlighted words <u>MUST</u></b> be explicitly taught, defined and recorded in student books as they are first met. Other listed words may be introduced verbally or written in a similar format.</p>

- You will learn when it is appropriate to draw a scatter diagram and how to interpret the information displayed
- Plot a scatter diagram of bivariate data
- Understand the meaning of 'correlation'
- Interpret a scatter diagram using understanding of correlation

### MEASURING DATA

#### Averages and measures of spread

- You will investigate the three types of average used to summarize data and use these to analyse and compare data sets
- Find the modal class of set of grouped data
- Find the class containing the median of a set of data
- Find the midpoint of a class
- Calculate an estimate of the mean from a grouped frequency table
- Estimate the range from a grouped frequency table
- Analyse and compare sets of data
- Appreciate the limitations of different statistics (mean, median, mode, range)
- Choose appropriate statistics to describe a set of data
- Justify choice of statistics to describe a set of data

### SCATTER GRAPHS

- Use and interpret scatter graphs of bivariate data
- Recognise correlation and know that it does not indicate causation
- Draw estimated lines of best fit
- Make predictions
- Interpolate and extrapolate apparent trends whilst knowing the dangers of doing so.

Challenge and Support:	World wide learning/ links to 21 <sup>st</sup> century:	Cultural capital/ Industry/ Enrichment:
<p><b>Statistics</b></p> <ol style="list-style-type: none"> <li><u>infer properties of populations or distributions from a sample, whilst knowing the limitations of sampling</u></li> <li>interpret and construct tables, charts and diagrams, including frequency tables, bar charts, pie charts and pictograms for categorical data, vertical line charts for ungrouped discrete numerical data, <u>tables and line graphs for time series data</u> and know their appropriate use</li> <li><b>construct and interpret diagrams for grouped discrete data and continuous data, i.e. histograms with equal and unequal class intervals and cumulative frequency graphs, and know their appropriate use</b></li> <li>interpret, analyse and compare the distributions of data sets from univariate empirical distributions through:</li> </ol>	<ul style="list-style-type: none"> <li>We live in a very information-rich world. Knowing how to construct accurate graphs and how to interpret the graphs we see is important. Many graphs in print and other media are carefully designed to influence what we think by displaying the data in particular ways.</li> <li>Analysing large set of data enables financial and insurance companies to make predictions about what might happen in the future. Car insurance premiums are worked out according to typical or “average” behaviour of large groups of people.</li> </ul>	<div data-bbox="1458 507 1715 687" data-label="Image"> </div> <p>Search Algebra for all ages</p> <p>NRICH website – access current articles and enrichment activities.</p> <ul style="list-style-type: none"> <li>NRICH provides thousands of free online mathematics resources for ages 3 to 18 - completely free and available to all via their website (<a href="http://nrich.maths.org/">nrich.maths.org/</a>). These resources aim to:             <ul style="list-style-type: none"> <li>Enrich and enhance the experience of the mathematics curriculum for all learners</li> <li>Develop mathematical thinking and problem-solving skills</li> <li>Offer challenging, inspiring and engaging activities</li> </ul> </li> <li>Problem solving opportunities – Applied Mathematics.</li> <li>Challenge problems.</li> <li>Extension work.</li> <li>Assessment sections in texts</li> </ul>

<ul style="list-style-type: none"> <li>• appropriate graphical representation involving discrete, continuous and grouped data, <b>including box plots</b></li> <li>• appropriate measures of central tendency (median, mean, mode and modal class) and spread (range, including consideration of outliers, <b>quartiles and inter-quartile range</b>)</li> </ul> <p>5. apply statistics to describe a population</p> <p>6. use and interpret scatter graphs of bivariate data; recognise correlation <u>and know that it does not indicate causation; draw estimated lines of best fit; make predictions; interpolate and extrapolate apparent trends whilst knowing the dangers of so doing</u></p>		
<p><b>Historical, Social, Moral, Spiritual, Cultural context:</b></p>	<p><b>Cross curricular links/ literacy/numeracy:</b></p>	<p><b>Common misconceptions:</b></p>
<ul style="list-style-type: none"> <li>• We live in an information rich world. Knowing how to construct accurate graphs and how to interpret data is important. Many graphs in newspapers are carefully designed to influence what we think by displaying the data in a particular way.</li> </ul>	<ul style="list-style-type: none"> <li>• Science: science can provide the context for many basic statistics problems such as: calculation of average speed, distance and time; predictions of bacteria growth rates and understanding key factors effecting a healthy population.</li> </ul>	<ul style="list-style-type: none"> <li>• Some pupils may think that the lines on a line graph are always meaningful</li> <li>• Some pupils may think that each square on the grid used represents one unit</li> <li>• Some pupils may confuse the fact that the sections of the pie chart total 100% and 360°</li> </ul>

<ul style="list-style-type: none"> <li>Analysing large sets of data enables financial and insurance companies to make predictions about what might happen in the future. Young drivers have more accidents so their insurance costs more.</li> </ul>	<ul style="list-style-type: none"> <li>Geography: <a href="#">statistics</a> on populations in different parts of the world at different periods, given as percentages and represented in a variety of forms (for example: Pie Charts).</li> <li>Literacy: Interpretation of written problems with conversion between these types of problems to pictorial and number representation.</li> <li>Correct use of specialised vocabulary.</li> </ul>	<ul style="list-style-type: none"> <li>Some pupils may not leave gaps between the bars of a bar chart</li> <li>If using a calculator some pupils may not use the '=' symbol (or brackets) correctly; e.g. working out the mean of 2, 3, 4 and 5 as <math>2 + 3 + 4 + 5 \div 4 = 10.25</math>.</li> <li>Some pupils may think that the range is a type of average</li> <li>Some pupils may think that a set of data with an even number of items has two values for the median, e.g. 2, 4, 5, 6, 7, 8 has a median of 5 and 6 rather than 5.5</li> <li>Some pupils may not write the data in order before finding the median.</li> </ul>
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### Assessment timeline:

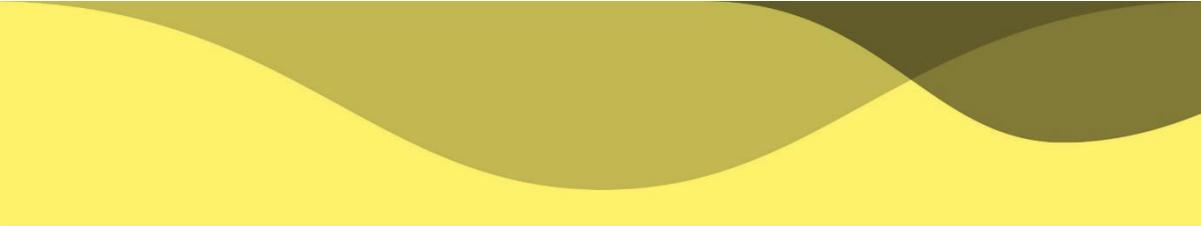
- Topic test assessments are conducted at the end of each topic. These are roughly after 2 weeks per topic, but this may vary.
- Pre-checks are conducted at the start of the topic to test student prior knowledge. This informs lesson planning and delivery.
- Tracking assessments are conducted once a term with end of year formal exams, for reporting and checking cumulative knowledge.
- Testing data leads to discussions about setting, intervention groups and individual in-class intervention.
- All students have access to a wide range of resources to develop their understanding.

### Home learning

- Homework is set weekly for each group. This will often be via interactive websites with immediate feedback and support.
- Teachers have the autonomy to use whichever resource they wish within the criteria set for the topic.
- Students have access to lots of resources at home, including: Kerboodle, MyMaths, Mathswatch, PiXL Maths APP, PiXL Tmes Table App.

### Feedback

- Feedback is given after each topic test, tracking assessment and end of year exams. After tracking and end of year exams, this will include "Formative Marking" sheets which give feedback question by question to help support the students with priorities for further work.



**Length of unit (duration indicated in lessons)**

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30
<b>Unit:</b>																													