



# STATISTICS

Year 10

## What are the aims and intentions of this curriculum?

The aim of the Key Stage 4 curriculum is to:

- Allow students to develop a mastery of the broad range of topics covered throughout Key Stages 3 and 4.
- Develop a depth of understanding, promote a curiosity and enjoyment of the subject.
- Ensure that all students are able to reach their potential within the subject.
- Ensure students are engaged by recognising how frequently they use Statistics and how their Statistics understanding feeds into other areas.
- comprehend, interpret and communicate mathematical information in a variety of forms appropriate to the information and context.
- To provide students with a holistic experience, prepare them for future success, help them aspire and value mathematics, Personal, Social Health and Economic (PSHE) education and Careers Education (CE) are incorporated into the curriculum.

**Throughout KS4:** Students will need to keep working on key skills as they occur with other topics, as well as when the skills are being explicitly expressed. These include addition, subtraction, multiplication and division; order of operations; fractions, decimals and percentages; rounding and estimation; and algebraic notation.

Term	Topics	Knowledge and key terms	Skills developed	Assessment
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The collection of data

Types of data

Population and sampling

1. The collection of data

Planning

- Hypotheses
- Designing investigations
- Strategies to deal with potential problems

Types of data

- Describing data  
Raw data, quantitative, qualitative, categorical, ordinal, discrete, continuous, ungrouped, grouped, bivariate and multivariate
- Advantages and implications of merging/grouping data
- Primary/secondary data

Advantages and disadvantages

Population and sampling

- Population, sample frame and sample
- Judgment, opportunity (convenience) and quota sampling

Defining a question or hypothesis to investigate.

Developing a strategy for how to process and represent data.

Designing methods for collecting primary data.

Differentiating among the various types of sampling.

- Tests
- Homework
- Research and presentation.

The collection of data

Types of data

Population and sampling

Population and sampling

- Random, systematic and quota sampling
  - Advantages of each method
  - Techniques to avoid bias
- Stratified sampling

Estimation

- Use summary statistics to make estimates of population characteristics
- Use sample data to predict population proportions
- Know that sample size has an impact on reliability and replication

Collecting data

- Collection of data
  - Experimental (laboratory, field and natural), simulation, questionnaires, observation, reference, census, population and sampling
  - Reliability and validity
  - Collecting sensitive content matter
- Questionnaires and interviews
  - Leading questions, avoiding biased sources, time factors, open/closed questions, different types of interview technique
- Problems with collected data
  - Missing data, non-response, 'cleaning' data
- Controlling extraneous variables

Deciding what data to collect and how to collect and record it, giving reasons.

Making inferences and/or predictions.

Organising, processing and 'cleaning' data, using technology.

Apply Petersen capture recapture formula to calculate an estimate of the size of a population.

- Tests
- Homework
- Research and presentation.

## Spring 1

Processing,  
representing and  
analysing data.

### Tabulation

- Tally, tabulation, two-way tables
- Frequency tables

### Representing data

- Pictogram
- Pie chart
- Bar charts
- Stem and leaf diagram
- Population pyramid
- Choropleth map
- Interpret and compare data sets represented pictorially
- Line graphs
- Bar line (vertical line) charts
- Frequency polygons
- Cumulative frequency (discrete and grouped) charts
- Histograms (equal class width)
- Box plots

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, tables and line graphs for time series data and know their appropriate use.

Interpret and compare data sets represented graphically.

Draw comparative pie chart

Draw comparative 2D representations/comparative 3D representations.

- Tests
- Homework
- Research and presentation.

## Spring 2

Processing,  
representing and  
analysing data.

### Representing data

- Histograms unequal class widths
  - Frequency density
  - Interpret and compare data sets displayed in histograms

### Representing data

- Justify appropriate form to represent data
- Graphical misrepresentation
- Determine skewness by inspection
  - Interpreting a distribution of data with reference to skewness
  - Calculating skewness

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.

Comparing data sets represented in different formats

- Tests
- Homework
- Research and presentation.

<p>Summer 1</p>	<p>Measures of central tendency Measures of dispersion</p>	<p>Measures of central tendency</p> <ul style="list-style-type: none"> <li>• Averages from raw or grouped data <ul style="list-style-type: none"> <li>○ Mean, median, mode</li> </ul> </li> <li>• Weighted mean</li> <li>• Geometric mean</li> <li>• Justify appropriate average to use in context</li> </ul> <p>Measures of dispersion</p> <ul style="list-style-type: none"> <li>• Range, quartiles, interquartile range (IQR), percentiles</li> <li>• Interpercentile range, interdecile range</li> <li>• Standard deviation</li> <li>• Identifying outliers by inspection</li> <li>• Identifying outliers by calculation</li> <li>• Comment on outliers in context</li> </ul> <p>Scatter diagrams and correlation</p> <ul style="list-style-type: none"> <li>• Explanatory (independent) variables and response (dependent) variables</li> <li>• Correlation <ul style="list-style-type: none"> <li>○ Positive, negative, zero, weak, strong</li> <li>○ Distinction between correlation and causation</li> </ul> </li> <li>• Line of best fit <ul style="list-style-type: none"> <li>○ Using the regression equation <math>y = a + bx</math></li> </ul> </li> <li>• Calculate Spearman's rank correlation coefficient</li> <li>• Interpret Spearman's rank in context</li> <li>• Interpret Pearson's product moment correlation coefficient (PMCC) in context</li> </ul>	<p>Interpret, analyse and compare the distributions of data sets from univariate empirical distributions.</p> <p>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 while knowing the dangers of so doing.</p> <p>Understand the distinction between Spearman's rank correlation coefficient and Pearson's product moment correlation coefficient (PMCC)</p> <p>Compare data sets using appropriate measure of central tendency and measure of dispersion</p>	<ul style="list-style-type: none"> <li>• Tests</li> <li>• Homework</li> <li>• Research and presentation.</li> </ul>
<p>Summer 2</p>	<p>Alliance Challenge</p>	<p>Behaviour for learning, positive attitudes</p>	<ul style="list-style-type: none"> <li>• Communication</li> <li>• Collaboration</li> </ul>	<ul style="list-style-type: none"> <li>• Discussions</li> <li>• Projects</li> <li>• Presentations</li> </ul>