

Statistics GCSE

GCSE Statistics develops students' knowledge of statistical techniques and their application in the outside world.

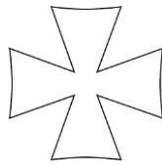
This course builds an understanding of the full process of statistical investigation from planning an investigation, to collecting and analysing data and then forming conclusions. Our curriculum allows students to see the application of these methods in areas such as Business, Science and Sports Science.

Statistics is an important skill in a variety of subjects and can facilitate future studies. It is particularly suitable for students who wish to progress to a range of A Level subjects, including Sciences, Geography and Economics. In addition, a good understanding of statistical methods can be an advantage for the modern workplace in an assortment of different career paths.

Topics within GCSE Statistics

The Collection of Data

- Planning-selecting an appropriate method of obtaining data
- Types of data-quantitative, qualitative, discrete, continuous, primary, secondary
- Understand the meaning of bivariate data which may be discrete, continuous, grouped or ungrouped.
- Population and Sampling- generate and use random numbers
- Understand, design and use a sampling frame
- Understand and use systematic, quota and cluster sampling
- Understand the strengths and weakness of various sampling methods including bias, influences and convenience
- Collecting data- looking at the advantages and disadvantages of the different ways we can collect data e.g. by observation, surveys, experiments



Processing, Representing and Analysing Data

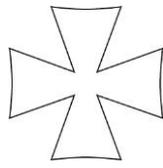
- Tabulation-frequency/tally tables including open ended classes and classes of varying widths
- Diagrams and representations- pictograms, bar charts, multiple or composite bar charts, pie charts, comparative pie charts with area proportional to frequency, cumulative frequency step polygons, cumulative frequency diagrams, histograms, population pyramids, stem and leaf, scatter diagrams, Choropleth maps, skewness, outliers, populations that can be modelled by the normal distribution
- Measures of central tendency- mode, median and mean for raw data, frequency distributions including grouped data, weighted mean, geometric mean
- Measures of dispersion- range, quartiles, percentiles, Inter-quartile range, box-plots, variance and standard deviation, standardised scores
- Further summary statistics- simple index numbers, chain base numbers, weighted index numbers, retail price index
- Scatter diagrams and correlation plus understand the distinction between correlation, causality and a non-linear relationship, find the equation of the line of best fit in the form $y = ax + b$ and interpret a and b , fit non-linear models, spearman's rank correlation
- Time series-plot points as a time series, draw a trend line, calculate and use moving averages, establish a trend line with its equation based on moving averages, seasonal variation including the mean seasonal variation.
- Quality assurance-plot sample means, median and ranges over time.
- Estimation-estimate population means from samples, estimate population size

Reasoning, Interpreting and Discussing Results

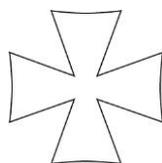
- Be able to interpret all forms of statistical tables, diagrams and graphs
- Be able to compare distributions and make comparisons using measures of central tendency and dispersion.
- Interpret correlation
- Make predictions using your trend line
- Compare or choose by eye between a line of best fit and a non-linear model

Probability

- Produce, understand and use a sample space
- Understand and use Venn diagrams and Cartesian grids
- Relationship between 'odds' and probability
- Compare expected frequencies and actual frequencies
- Understand the terms mutually exclusive and exhaustive
- Understand the addition law $P(A \text{ or } B) = P(A) + P(B)$
- Form and use tree diagrams for independent events and conditional cases (with and without replacement for up to three outcomes and three sets of branches)
- Understand, use and apply the addition and multiplication laws for independent events and conditional events and outcomes
- $P(A \text{ and } B) = P(A) \times P(B)$, $P(A \text{ or } B) = P(B/A) \times P(A)$
- Use simple cases of the binomial and discrete uniform distribution
- The shape and properties of the normal distribution



- Venn Diagrams



Structure of the Examination

Assessment is via two papers which are both taken in the summer of Year 11.

Paper 1	Paper 2
What's Assessed: 1. The collection of data 2. Processing, representing and analysing data 3. Probability	What's Assessed: 1. The collection of data 2. Processing, representing and analysing data 3. Probability
How it is assessed: <ul style="list-style-type: none">● Written examination● Calculator allowed● 1 hour and 30 minutes● 80 marks available	How it is assessed: <ul style="list-style-type: none">● Written examination● Calculator allowed● 1 hour and 30 minutes● 80 marks available
Questions: Questions on statistical methods, familiar and unfamiliar contexts and the component parts of the statistical enquiry cycle	Questions: Questions on statistical methods, familiar and unfamiliar contexts and the component parts of the statistical enquiry cycle