Subject: Statistics	Exam Board: AQA 8382

https://www.aqa.org.uk/subjects/mathematics/gcse/statistics-8382/introduction

Revision List
One 90-minute paper. Calculator Allowed

Understand the importance of the careful planning of a clear strategy for collecting, recording and processing data in order to address an identified question or hypothesis.

- ☐ Know that a hypothesis can only be tested through the appropriate collection and analysis of data.
- ☐ Know the constraints that may be faced in designing an investigation to test a hypothesis: these may include factors such as time, costs, ethical issues, confidentiality and convenience etc.
- ☐ Determine proactive strategies to mitigate issues that might arise during the statistical enquiry process. For example, dealing with difficulties in identifying the population, non-response issues or unexpected outcomes.

Recognise the opportunities, constraints and implications for subsequent mathematical analysis involved in obtaining appropriate data through careful design of primary data collection techniques or through the use of reference sources for secondary data to ensure unbiased research.

- ☐ Know and apply terms used to describe different types of data that can be collected for statistical analysis: raw data, categorical, ordinal, discrete, continuous, ungrouped, grouped, quantitative, qualitative, bivariate, multivariate.
- ☐ Know the advantages and implications of merging data into more general categories, and of grouping numerical data into class intervals.
- ☐ Know and apply the terms explanatory or independent variables and response or dependent variables.
- ☐ Know the difference between primary and secondary data.
- ☐ Know that data can be collected from different sources: experimental (laboratory, field and natural), simulation, questionnaires, observation, reference, census, population, sampling.
- ☐ In addition, sources of secondary data should be acknowledged.
- ☐ Know the importance of reliability and validity with regards to collected data.
- ☐ Determine factors that may lead to bias, including issues of sensitivity of the content matter, and know how to minimise data distortion including level of control.
- ☐ Know the difference between population, sample frame and sample.
- ☐ Know that 'population' can have different meanings within a stated context.
- ☐ Know reasons for employing judgement or opportunity (convenience) sampling, and the associated risks of bias when these techniques are used.
- ☐ Use appropriate sampling techniques in the context of the problem to avoid bias: random, systematic, quota.
- ☐ Know the key features of a simple random sample.
- ☐ Demonstrate understanding of how different techniques, both physical and electronic, are used to select random members from a population including, but not limited to: dice, cards, random number lists and calculator functions.
- ☐ Use stratification and know when this is appropriate before sampling takes place.
- ☐ Know the key features to be considered when planning data collection: leading questions, avoiding biased sources, time factors, open/closed questions, different types of interview technique.
- ☐ Know and demonstrate understanding of techniques used to deal with problems that may arise with collected data for example: missing data, incorrect formats, non-responses, incomplete responses etc
- ☐ Know why data may need to be 'cleaned' before further processing, including issues that arise on spreadsheets and apply techniques to clean data in context.
- ☐ Know the importance of identifying and controlling extraneous variables, alongside the use of control groups

Generate data visualisations and understand the mathematics required to derive these visualisations.

- ☐ Represent data sets pictorially using calculated key values as necessary, and interpret and compare data sets displayed pictorially as: tabulation, tally, pictogram.
- ☐ Interpret and compare data sets displayed pictorially: population pyramid, choropleth map, comparative pie chart, comparative 2D representations, comparative 3D representations.
- ☐ Represent data sets graphically using calculated key values as necessary, and interpret and compare data sets displayed graphically: bar charts, line charts, time series, scatter charts, bar line charts, frequency polygons, cumulative frequency (discrete including step frequency diagrams and grouped) charts, histograms (equal width) and box plots.
- ☐ Calculate and use frequency density to draw histograms (unequal width), and interpret and compare data sets displayed in histograms (unequal width).
- ☐ Justify the appropriate format and produce accurate visualisation of data.
- ☐ Recognise where errors in construction lead to graphical misrepresentation including but not limited to incorrect scales, truncated axis, distorted sizing.
- ☐ The misuse of formula when calculating the frequency densities of histograms.

- ☐ Extract and calculate corresponding values in order to compare data sets that have been presented in different formats and be able to present the same information in multiple formats.
- ☐ Select appropriate forms of representation.
- ☐ Select and justify appropriate forms of representation with regard to the nature of data.

Calculate statistical measures to compare data.

- ☐ Calculate averages for discrete and grouped data: mode, median, arithmetic mean, weighted mean, geometric mean, mean seasonal variation.
- ☐ Justify the rationale for selecting appropriate types of average in context
- ☐ Determine skewness from data by inspection and calculation.
- ☐ Calculate different measures of spread: range, quartiles, interquartile range, percentiles, interpercentile range, interdecile range and standard deviation.
- ☐ Identify outliers by inspection and using appropriate calculations.
- ☐ Identify trends in data by inspection, calculation of determined appropriate moving averages.
- ☐ Use collected data to calculate estimate of probabilities.

Use visualisation and calculation to interpret results with reference to the context of the problem, and to evaluate the validity and reliability of statistical findings.

- ☐ Compare the probability of different possible outcomes using the 0–1 or 0–100% scale.
- ☐ Use probability values to calculate expected frequency of a specified characteristic within a sample or population.
- ☐ Use collected data and calculated probabilities to determine and interpret relative risks and absolute risks, and express in terms of expected frequencies in groups.
- ☐ Compare experimental data with theoretical predictions to identify possible bias within the experimental design.
- ☐ Recognise that experimental probability will tend towards theoretical probability as the number of trials increases when all variables are random.
- ☐ Use two-way tables, sample space diagrams, tree diagrams and Venn diagrams to represent all the different outcomes possible for at most three events.
- ☐ Compare different data sets using appropriate calculated or given measure of central tendency: mode, modal group, median and mean.
- ☐ Compare different data sets using appropriate calculated or given measure of spread: range, interquartile range, percentiles and standard deviation.
- ☐ Use calculated or given median and interquartile range to compare data samples and to compare sample data with population data.
- ☐ Use calculated or given interpercentile range or interdecile range or mean and standard deviation.
- ☐ Know and apply the formal notation for independent events.
- ☐ Know and apply the formal notation for conditional probability.
- ☐ Interpret a distribution of data in terms of skewness identified from inspection and calculation
- ☐ Comment on outliers with reference to the original data.
- ☐ Interpret seasonal and cyclic trends in context and use such trends to make predictions.
- ☐ Interpret data related to rates of change over time (including, but not limited to, births, deaths, house prices and unemployment) when given in graphical form.
- ☐ Calculate and interpret rates of change over time from tables using context specific formula.
- ☐ Use different types of index numbers in context, including but not limited to: retail price index, consumer price index, gross domestic product, weighted index numbers.
- ☐ Comment on the differences between experimental and theoretical values in terms of possible bias.
- ☐ Know and interpret the characteristics of a binomial distribution.
- ☐ Use action and warning lines in quality assurance sampling applications
- ☐ Use calculated or given summary statistical data to make estimate of population characteristics.
- ☐ Use sample data to predict population proportions.
- ☐ Apply Peterson capture/recapture formula to calculate an estimate of the size of a population.
- ☐ Know that sample size has an impact on reliability and replication.

Useful revision resources

Websites

- Sparx Maths Independent Learning – https://www.sparxmaths.uk
- Corbett Maths – https://corbettmaths.com/
- GCSEPod - https://www.gcsepod.com/
- Seneca Learning - https://senecalearning.com/en-GB/
- BBC Bitesize Learning - https://www.bbc.co.uk/bitesize/examspecs/z8sg6fr
- Oak National Academy - https://classroom.thenational.academy/subjects-by-key-stage/key-stage-4/subjects/maths
- Third Space Learning - https://thirdspacelearning.com/secondary-resources/

Recommended Revision Guides

CGP Statistics Revision Guide and Workbook (Edexcel version is suitable for AQA also)

Recommended Calculators

Casio fx-83 CW, fx-85 CW, Casio Classwiz EX-991 CW (recommended if continuing onto A-Level Mathematics) – underlined models available on Wisepay

Maths Sets

We have a Maths Sets available on Wisepay and are priced at £2, these come in an exam-friendly transparent pencil case

Revision Tips

Revision for Mathematics is based upon practice (and more practice). You need to be confident at the skills and concepts that make up the course in order to be able to work through the more challenging problems. Revision should be interactive, not just reading notes

Students can work through the Independent Study Sections on Sparx Maths and use the revision list to identify areas that they are good at, alongside areas they are struggling with and need to work on

A potential plan of action would be

- Work through the list given using Sparx (remember that they have a video with each question)
- Work through maths problems and past papers.
- Do not just read your notes/revision guides as you need to practice your Maths skills.