

# GCSE

Specification

## Statistics

For exams June 2014 onwards

For certification June 2014 onwards



# **GCSE**

**Specification**

# **Statistics**

## **4310**

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Unit 2  
Wheel Forge Way  
Ashburton Park  
Trafford Park  
Manchester  
M17 1EH

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# 1 Introduction

## 1.1 Why choose AQA?

AQA is the UK's favourite exam board and more students receive their academic qualifications from AQA than from any other board. But why is AQA so popular?

AQA understands the different requirements of each subject by working in partnership with teachers. Our GCSEs:

- enable students to realise their full potential
- contain engaging content
- are manageable for schools and colleges
- are accessible to students of all levels of ability
- lead to accurate results, delivered on time
- are affordable and value for money.

AQA provides a comprehensive range of support services for teachers:

- access to subject departments
- training for teachers including practical teaching strategies and approaches that really work presented by senior examiners
- personalised support for Controlled Assessment
- 24-hour support through our website and online *Ask AQA*
- past question papers and mark schemes
- comprehensive printed and electronic resources for teachers and students

AQA is an educational charity focused on the needs of the learner. All our income goes towards operating and improving the quality of our specifications, examinations and support services. We don't aim to profit from education – we want you to.

If you are an existing customer then we thank you for your support. If you are thinking of moving to AQA then we look forward to welcoming you.

## 1.2 Why choose Statistics?

- This specification aims to attract candidates to study Statistics by offering an interesting and stimulating programme of study. Candidates will have the opportunity to develop their knowledge and understanding of statistical thinking and practice, and an understanding of how Statistics are used in the real world.
- The skills and knowledge acquired will be relevant and transferable to other settings, enhancing career opportunities and providing a satisfying course of study for candidates of various ages and from diverse backgrounds who may not progress to further study of the subject. The specification also provides direct progression to GCE Mathematics and GCE Statistics, as well as supporting the techniques used in a wide variety of other subjects, for example GCE Sciences and Geography.
- The specification is set out in a way that is clear for teachers to use and offers guidance on possible teaching activities related to individual aspects of the subject content. The two tasks for the controlled assessment will provide choice of a wide variety of topics, and allow centres to contextualise the task as appropriate.
- The specification retains much of the subject content of the previous specification. Some updating of this content has taken place to make the specification even more accessible and relevant to candidates.
- The controlled assessment tasks follow the criteria laid down by ofqual in the *GCSE controlled assessment regulations for statistics*.

## 1.3 How do I start using this specification?

### Already using the existing AQA Statistics specification?

- Register to receive further information, such as mark schemes, past question papers, details of teacher support meetings, etc, at **<http://www.aqa.org.uk/rn/askaqa.php>**. Information will be available electronically or in print, for your convenience.
- Tell us that you intend to enter students. Then we can make sure that you receive all the material you need for the examinations. This is particularly important where examination material is issued before the final entry deadline. You can let us know by completing the appropriate Intention to Enter and Estimated Entry forms. We will send copies to your Exams Officer and they are also available on our website: **[http://www.aqa.org.uk/admin/p\\_entries.php](http://www.aqa.org.uk/admin/p_entries.php)**

### Not using the AQA specification currently?

- Almost all centres in England and Wales use AQA or have used AQA in the past and are approved AQA centres. A small minority is not. If your centre is new to AQA, please contact our centre approval team at **[centreapproval@aqa.org.uk](mailto:centreapproval@aqa.org.uk)**

## 1.4 How can I find out more?

### Ask AQA

You have 24-hour access to useful information and answers to the most commonly-asked questions at **<http://www.aqa.org.uk/rn/askaqa.php>**

If the answer to your question is not available, you can submit a query for our team. Our target response time is one day.

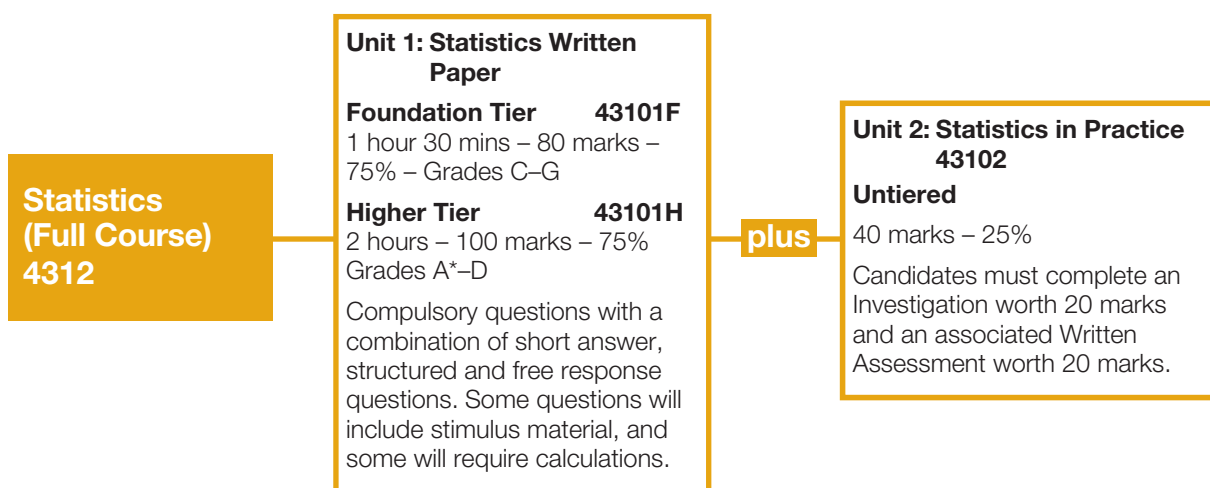
### Teacher Support

Details of the full range of current Teacher Support and CPD courses are available on our web site at **<http://web.aqa.org.uk/qual/cpd/index.php>**

There is also a link to our fast and convenient online booking system for all of our courses at **<http://coursesandevents.aqa.org.uk/training>**

## 2 Specification at a Glance

2



For assessments and subject awards after June 2013 there is a requirement that 100% of the assessment is terminal.

# 3 Subject Content

## 3.1 Unit 1: Statistics written paper

|                                      |                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                      | This specification comprises the following areas of subject content:                                                                                   | Throughout a course of study based on this specification, candidates will be expected to interpret their results and to comment constructively and critically on the suitability, appropriateness and limitations of the techniques used. Candidates should consider and check their results in context, and modify their approaches if necessary. Calculations and/or statistical results should be interpreted in the initial context of the data where appropriate. |
| <b>Planning a strategy</b>           | Hypothesis<br>Planning an investigation<br>Experiments/surveys<br>Appreciation of constraints                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Data Collection</b>               | Types of Data<br>Obtaining Data<br>Census Data<br>Sampling<br>Conducting a survey/experiment                                                           | The subject content is set out on the following pages in three columns. Column 1 shows the content for the Foundation tier, Column 2 shows the additional content for the Higher tier and Column 3 gives notes for the guidance of teachers. The content of the Higher tier includes the content of the Foundation tier.                                                                                                                                               |
| <b>Tabulation and Representation</b> | Tabulation<br>Diagrammatic Representation                                                                                                              |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Data Analysis</b>                 | Measures of Location<br>Measures of Spread<br>Other Summary Statistics<br>Time Series<br>Quality Assurance<br>Correlation and Regression<br>Estimation |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Probability</b>                   | Probability                                                                                                                                            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Data Interpretation</b>           | Limitations of Analysis<br>Inferential Statistics<br>Deductions<br>Conclusions                                                                         |                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

|              | Foundation tier (F)                                                                                                                                                                                                                                             | Higher tier (H)                                                             | Notes                                                                                             |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
| <b>3.1.1</b> | <b>Planning a strategy</b>                                                                                                                                                                                                                                      |                                                                             |                                                                                                   |
|              | <b>Hypotheses</b>                                                                                                                                                                                                                                               |                                                                             |                                                                                                   |
|              | Specifying a hypothesis to be tested.                                                                                                                                                                                                                           |                                                                             |                                                                                                   |
|              | <b>Planning an Investigation</b>                                                                                                                                                                                                                                |                                                                             |                                                                                                   |
|              | Determining the data needed to address hypotheses and selecting an appropriate method for obtaining the data.                                                                                                                                                   | Justifying the choice of method by comparing it with possible alternatives. | Appreciation of the constraints e.g. time/cost/convenience.                                       |
|              | Specifying a research question to be investigated and breaking it down into sub-questions as necessary.                                                                                                                                                         |                                                                             |                                                                                                   |
|              | <b>Deciding between survey/experiment</b>                                                                                                                                                                                                                       |                                                                             |                                                                                                   |
|              | Awareness of possible problems including: <ul style="list-style-type: none"> <li>identifying the population;</li> <li>questionnaire distribution and collection;</li> <li>non-response;</li> <li>errors in recording answers;</li> <li>missing data.</li> </ul> |                                                                             | Candidates should be aware of strategies for dealing with these problems in practical situations. |

|              |                                                                                                                                                                                                     |                                                                                |                                                                                                                                                                         |                                                                                                                                                                                             |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>3.1.2</b> | <b>Data Collection</b>                                                                                                                                                                              |                                                                                |                                                                                                                                                                         |                                                                                                                                                                                             |
|              | <b>Types of Data</b>                                                                                                                                                                                |                                                                                |                                                                                                                                                                         |                                                                                                                                                                                             |
|              | Raw data.<br>Primary and secondary data sources.<br>Qualitative and quantitative variables.<br>Categorical data.<br>Discrete and continuous data.<br>Grouped and ungrouped data.<br>Bivariate data. | Implications of grouping for loss of accuracy in presentation and calculation. | Primary data: obtaining data from a survey or investigation or experiment and by means of questionnaires.<br>Secondary data: use of published statistics and databases. |                                                                                                                                                                                             |
|              | Classification of data; class limits and intervals.                                                                                                                                                 | Implications of grouping for loss of accuracy in presentation and calculation. |                                                                                                                                                                         |                                                                                                                                                                                             |
|              | <b>Obtaining Data</b>                                                                                                                                                                               |                                                                                |                                                                                                                                                                         |                                                                                                                                                                                             |
|              | Obtaining data by counting or measuring; accuracy of such measures.<br>Design and use of efficient methods of recording data, appropriate to the purpose for which it will be used.                 |                                                                                |                                                                                                                                                                         | To include an awareness of data logging and data collection sheets.                                                                                                                         |
|              | <b>Census Data</b>                                                                                                                                                                                  |                                                                                |                                                                                                                                                                         |                                                                                                                                                                                             |
|              |                                                                                                                                                                                                     |                                                                                |                                                                                                                                                                         | A census obtains information about every element of the population.                                                                                                                         |
|              | Obtaining information from well-defined populations.                                                                                                                                                |                                                                                |                                                                                                                                                                         | The definition of 'population' should be taken as the population in the study, eg a class of pupils or all the packets of biscuits in the school shop.<br>Awareness of the National Census. |

| <b>Sampling</b>                       |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                             |
|---------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                       | Purpose of sampling: variability between samples.                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                             |
|                                       | Randomness. Random numbers from tables, calculators and computers.                                                                                                                                                                                                                                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                             |
|                                       | Sampling from a well-defined population.<br>Sample frame.<br>Simple random sampling: the condition that all members of the population are equally likely to be included in the sample.<br>Use of stratification in sample design using a single category. Awareness of the dangers of convenience sampling. | Stratified sampling with no more than two sets of categories. Cluster sampling and quota sampling with particular reference to <i>its</i> use in conducting large scale opinion polls.<br>An awareness of multi stage sampling.<br>Strengths and weaknesses of the various sampling methods, including the dangers of convenience sampling. The criteria used for selecting sample members in national opinion polls: geographical area, sex, age group, social and economic backgrounds. Associated sources of bias. | Candidates may be required to demonstrate the process of obtaining a random sample by using a given table of random digits.<br>An appreciation of the sample size selected is required.<br>Understand that sample size, design and method of collection impacts on reliability of outcomes. |
|                                       | Biased samples arising from sampling from a wrong population or non-random choice of individual elements.                                                                                                                                                                                                   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | How biased samples can occur in practice.<br>Awareness of bias in self-selecting samples, e.g. telephone polling, pressure groups.                                                                                                                                                          |
| <b>Conducting a survey/experiment</b> |                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                                                             |
|                                       | Obtaining primary data by questionnaire. Use and reasons for pilot studies and pre-testing.<br>Problems of design, wording, biased questions, definitions, obtaining truthful answers. The advantages and disadvantages of closed and open questions.                                                       | The use of opinion scales.<br>The technique of random response, in its simplest form, for obtaining truthful answers to sensitive questions.                                                                                                                                                                                                                                                                                                                                                                          | Use of accurate and exhaustive response sections expected for closed questions.                                                                                                                                                                                                             |
|                                       | Obtaining data by interview. Advantages and disadvantages of interviews compared with written questionnaires.                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | To include on-line and phone surveys.                                                                                                                                                                                                                                                       |

|              |                                                                                                                                                                                                                                                                                                                                                                                                                          |                                                                                                                                                                                                     |                                                                                                                                                                                                   |
|--------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|              | Simulation. Use of, for example, dice, random number tables, ICT.                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                     | Use of ICT methods.                                                                                                                                                                               |
|              | Using secondary data; sources, reliability, accuracy, relevance and bias.<br>Difference between sample and census data.                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                     | Examples of sources of secondary data are Key Data, Annual Abstract of Statistics, Monthly Digest of Statistics, Social Trends, Economic Trends, the Internet and newspapers.                     |
|              | Designing and obtaining data from simple statistical experiments.<br>Obtaining data from observation or experiments (laboratory, field or natural experiments)<br>Examples of extraneous variables.<br>Issues of inter-observer bias.<br>Explanatory and response variables; identification of the variables to be investigated.<br>Use of a control group; use of random allocation to experimental and control groups. | Matched pairs of groups; "before and after" experiments.<br>Identification of extraneous variables and methods of controlling them: the need to hold extraneous variables constant for both groups. | Explanatory and response variables are also referred to as independent and dependent variables respectively.                                                                                      |
|              | Surveys.                                                                                                                                                                                                                                                                                                                                                                                                                 |                                                                                                                                                                                                     | The difference between a census and a survey.                                                                                                                                                     |
| <b>3.1.3</b> | <b>Tabulation and Representation</b>                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                     |                                                                                                                                                                                                   |
|              | <b>Tabulation</b>                                                                                                                                                                                                                                                                                                                                                                                                        |                                                                                                                                                                                                     |                                                                                                                                                                                                   |
|              | Construction of frequency tables by tallying raw data.<br>Use of five bar gates expected.                                                                                                                                                                                                                                                                                                                                |                                                                                                                                                                                                     | Both qualitative and quantitative (discrete or continuous) data will be used, in grouped or ungrouped form appropriately.<br>Criteria applied in the grouping of data (eg non-overlapping limits) |
|              | Class intervals.                                                                                                                                                                                                                                                                                                                                                                                                         | Open-ended classes.                                                                                                                                                                                 |                                                                                                                                                                                                   |

|  |                                                                                                                                                                                         |                                                                                                                            |                                                                                                                                                                                                                                                      |
|--|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Simplifying tables by combining categories and reducing the number of significant figures; resulting effects on readability: identifying or masking of patterns/trends; loss of detail. | Problems of under and over simplification resulting from unsuitable choice of group size or number of significant figures. |                                                                                                                                                                                                                                                      |
|  | Reading and interpreting data presented in tabular form.                                                                                                                                |                                                                                                                            | Tables of data drawn from the media and from Government and other statistical sources may be used.                                                                                                                                                   |
|  | Design of tables to summarise data effectively.<br>Design and use of appropriate two-way tables.                                                                                        |                                                                                                                            | To include the listing of all outcomes for single events, and for two successive events in a systematic way.                                                                                                                                         |
|  | <b>Diagrammatic Representation</b>                                                                                                                                                      |                                                                                                                            |                                                                                                                                                                                                                                                      |
|  | Qualitative data: bar and pie charts, pictograms. Multiple and composite bar charts.<br>Dot plots for small data sets.                                                                  | Comparative pie charts (area proportional to total frequency).                                                             | Detailed drawing of pictograms will not be expected.                                                                                                                                                                                                 |
|  | Discrete data: vertical line graphs.                                                                                                                                                    | Cumulative frequency step polygons.                                                                                        |                                                                                                                                                                                                                                                      |
|  | Continuous data; grouped frequency diagrams, including histograms, with equal class intervals.<br>Frequency polygons.<br>Cumulative frequency graphs.<br>Population pyramids.           | Histograms with equal or unequal class intervals.                                                                          | Candidates should know the term frequency density.<br>Cumulative frequency graphs for continuous data may be a curve or a polygon.<br>Comparisons of changes over time and the possible practical consequences are required at the Higher tier only. |
|  | Output gap charts.                                                                                                                                                                      |                                                                                                                            |                                                                                                                                                                                                                                                      |
|  | Stem and leaf diagrams.                                                                                                                                                                 |                                                                                                                            |                                                                                                                                                                                                                                                      |
|  | Choropleth maps                                                                                                                                                                         |                                                                                                                            | Shading (or choropleth) maps are widely used in Geography as indication of development (levels of income, diet, etc).                                                                                                                                |

|              |                                                                                                                                                                                                                                                                                                                                                                                                                                                       |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                   |  |
|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--|
|              | Transforming data presentation from one form to another.                                                                                                                                                                                                                                                                                                                                                                                              |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                   |  |
|              | The shapes and simple properties of frequency distributions; symmetrical, positive and negative skew.                                                                                                                                                                                                                                                                                                                                                 | The shape and simple properties of the normal frequency distribution.                                                                                                                                                                                | The normal frequency distribution is symmetrical, has approximately 95% of values within 1.96 standard deviations of the mean; almost all values are within 3.09 standard deviations of the mean. |  |
|              | Bivariate data: scatter diagrams.                                                                                                                                                                                                                                                                                                                                                                                                                     |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                   |  |
|              | Time series: line graphs.                                                                                                                                                                                                                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                   |  |
|              | Other diagrammatic representations for comparisons of data using length.                                                                                                                                                                                                                                                                                                                                                                              | Use of area and volume. Comparison of the various diagrammatic representations using area or volume, including their advantages and disadvantages.                                                                                                   |                                                                                                                                                                                                   |  |
|              | Visual misrepresentation: misuse or omission of origin or scale. Broken, incorrect or changed scales. Incomplete definitions and labelling. Simple misuse of area and volume (calculations not expected at Tier F)                                                                                                                                                                                                                                    | Misuse of length, area and volume in pictorial comparison.                                                                                                                                                                                           |                                                                                                                                                                                                   |  |
|              | Read or interpret information presented in diagrammatic form; distinction between well and poorly presented data. Spotting possible errors in a data set by recognising outliers that do not fit a general pattern.                                                                                                                                                                                                                                   | Diagrams drawn from the media and from Government and other statistical sources may be used. Where these are not of the types named in the specification, the interpretation required will be at an appropriate level for Foundation or Higher tier. |                                                                                                                                                                                                   |  |
| <b>3.1.4</b> | <b>Data Analysis</b>                                                                                                                                                                                                                                                                                                                                                                                                                                  |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                   |  |
|              | Calculations refer to both continuous and discrete data. Where numerical calculations are involved they should be carried out to a sensible degree of accuracy. Candidates are required to analyse written and statistical evidence as appropriate, as well as consider and check results, modifying their approach if necessary. Calculations and/or statistical results should be interpreted in the initial context of the data where appropriate. |                                                                                                                                                                                                                                                      |                                                                                                                                                                                                   |  |

| <b>Measures of Location</b> |                                                                                                                                                                                                             |                                                                                                                                                                                                    |                                                                                                                                                                                                                      |
|-----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             | Mean, median and mode for raw data.                                                                                                                                                                         | Use of change of origin when calculating the mean.<br>Effect on the mean of linear transformations.                                                                                                | e.g. the mean of the numbers 1003, 1005, 1006, and 1009 is equal to 1000 plus the mean of 3, 5, 6 and 9.                                                                                                             |
|                             | Mean, median and mode for discrete frequency distributions.<br>Modal class for grouped frequency distributions.<br>Median for grouped frequency distributions.<br>Mean for grouped frequency distributions. | Use of $\Sigma fx$ notation                                                                                                                                                                        | Graphical methods of obtaining the median or the mode will be acceptable.<br>Candidates may make use of a linear change of scale when calculating the mean. The formula for the mean will be given                   |
|                             | Advantages and disadvantages of each of the three measures of location in a given situation.                                                                                                                | Reasoned choice of a measure of location appropriate to the nature of the data and the purpose of the analysis.                                                                                    |                                                                                                                                                                                                                      |
|                             |                                                                                                                                                                                                             | Geometric mean.                                                                                                                                                                                    | Appropriate use and interpretation.                                                                                                                                                                                  |
| <b>Measures of Spread</b>   |                                                                                                                                                                                                             |                                                                                                                                                                                                    |                                                                                                                                                                                                                      |
|                             | Range.                                                                                                                                                                                                      |                                                                                                                                                                                                    |                                                                                                                                                                                                                      |
|                             | Quartiles for discrete data.<br>Quartiles and percentiles, for grouped frequency distributions.                                                                                                             | Deciles.                                                                                                                                                                                           | Graphical methods will be accepted.                                                                                                                                                                                  |
|                             | Interquartile range for discrete and continuous data.                                                                                                                                                       | Interpercentile ranges.<br>Interdecile range.                                                                                                                                                      |                                                                                                                                                                                                                      |
|                             |                                                                                                                                                                                                             | Variance and standard deviation. Candidates should know how to use the formula for finding the variance and standard deviation. The formula for the variance and standard deviation will be given. | Use of divisor $n$ . To include grouped frequency distributions. Efficient use of a calculator should be encouraged.<br>Values of $\Sigma x$ ; $\Sigma x^2$ ; $\Sigma (x - \bar{x})^2$ or equivalents will be given. |

|  |                                                                                                                                                                   |                                                                                                                                                                              |                                                                                                                                                                                         |
|--|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Advantages and disadvantages of each of these measures of spread.                                                                                                 |                                                                                                                                                                              |                                                                                                                                                                                         |
|  | Construction of box and whisker plots.                                                                                                                            | Use of box and whisker plots to identify outliers.                                                                                                                           | An outlier is defined as an observation less than $Q_1 - 1.5(Q_3 - Q_1)$ or greater than $Q_3 + 1.5(Q_3 - Q_1)$ , where $Q_1$ and $Q_3$ are the lower and upper quartiles respectively. |
|  |                                                                                                                                                                   | Calculation, interpretation and use of standardised scores.                                                                                                                  | Only general interpretation is expected.                                                                                                                                                |
|  | Use of tabulated data, diagrams, measures of location, measures of spread and skew to compare data sets.                                                          | Calculation, interpretation and use of measures of skewness. Candidates should know how to use Pearson's measure. The formula for this will be given.                        |                                                                                                                                                                                         |
|  | <b>Other Summary Statistics</b>                                                                                                                                   |                                                                                                                                                                              |                                                                                                                                                                                         |
|  | Simple index numbers.                                                                                                                                             | Weighted index numbers.<br>Chain base numbers.<br>General Index of Retail Prices (RPI).<br>General Index of Consumer Price (CPI).<br>Indices to measure GDP and Retail sales | Consideration of other National Sources.<br>An awareness of the construction and use of the RPI.                                                                                        |
|  | Crude rates.                                                                                                                                                      | Standardised rates. Candidates are not expected to calculate these rates but should be able to understand and interpret such measures.                                       | For example, birth, death, unemployment.                                                                                                                                                |
|  | <b>Time Series</b>                                                                                                                                                |                                                                                                                                                                              |                                                                                                                                                                                         |
|  | Drawing a trend line by eye and using it for prediction.<br>Evaluating and plotting appropriately chosen moving averages.<br>Trend line based on moving averages. |                                                                                                                                                                              | Trend lines will not be required to pass through the mean.                                                                                                                              |

|  |                                                                                                     |                                                                                                                                                                                       |                                                                                                                                                                                                              |
|--|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Identification of seasonal variation.                                                               | Seasonal effect at a given data point.<br>Average seasonal effect.<br>Prediction of future values.<br><br>'Z' charts                                                                  | Graphical methods only will be expected.<br>Based on additive model only.                                                                                                                                    |
|  |                                                                                                     |                                                                                                                                                                                       | Construction and interpretation.                                                                                                                                                                             |
|  | <b>Quality Assurance</b>                                                                            |                                                                                                                                                                                       |                                                                                                                                                                                                              |
|  |                                                                                                     | Plotting sample means, medians or ranges over time to view consistency and accuracy against a target value.                                                                           | To include looking for indications where the process is off target or of an increase in variability.                                                                                                         |
|  | <b>Correlation and Regression</b>                                                                   |                                                                                                                                                                                       |                                                                                                                                                                                                              |
|  | Scatter diagrams. Recognition by eye of positive correlation, negative correlation, no correlation. |                                                                                                                                                                                       | Interpretation of these in the context of a problem.                                                                                                                                                         |
|  | The distinction between correlation and causality.                                                  |                                                                                                                                                                                       |                                                                                                                                                                                                              |
|  | Interpret values of Spearman's correlation coefficient in the context of a problem.                 | Spearman's rank correlation coefficient as a measure of agreement; its calculation and limitation in interpretation.                                                                  | Includes the case of tied ranks. Calculations for large samples will not be expected. The formula for Spearman's rank correlation coefficient will be given.                                                 |
|  |                                                                                                     |                                                                                                                                                                                       | Candidates are not expected to be able to calculate PMcc but are expected to be able to interpret and understand its values.                                                                                 |
|  | Interpret bivariate data presented in the form of a scatter diagram.                                | Comparison of the degree of correlation between two or more pairs of data sets with reference to scatter diagrams.<br>Product Moment correlation coefficient, and its interpretation. | Candidates should appreciate when to use the PMcc as against Spearman's rank<br>Candidates are not expected to be able to calculate PMcc but are expected to be able to interpret and understand its values. |

|              |                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                |                                                                                                                                                                                                         |
|--------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|              | Fitting a straight line of best fit by eye through $(\bar{x}, \bar{y})$ to the plotted points on a scatter diagram.                                                                                                                           | Obtaining the regression equation in the form $y = mx + c$ ; the interpretation of the regression coefficients $m$ and $c$ .<br><br>Non-linear data.                                                                                                           | Includes discussion of whether such a straight line is appropriate.<br><br>A 'suggested' relationship will be given, i.e. no more complicated than $x^2$ , $\frac{1}{x}$ , $\sqrt{x}$ .                 |
|              | Interpolation and extrapolation.                                                                                                                                                                                                              |                                                                                                                                                                                                                                                                | Including the dangers of inappropriate extrapolation.                                                                                                                                                   |
|              | <b>Estimation</b>                                                                                                                                                                                                                             |                                                                                                                                                                                                                                                                |                                                                                                                                                                                                         |
|              | Estimation of population mean from a sample.<br>Estimation of a population proportion from a sample; the use of this method of estimation in opinion polls.<br>Variability in estimates from different samples and the effect of sample size. | Estimation of population size based on the capture/recapture method. Conditions for this method to be appropriate.<br><br>An elementary quantitative appreciation of appropriate sample size.<br><br>Understanding what affects the accuracy of the estimates. | Understanding what affects the accuracy of the estimates.<br><br>Higher Tier :<br><br>e.g. to include the concept that to halve the variability in an estimate, four times the sample size is required. |
| <b>3.1.5</b> | <b>Probability</b>                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                |                                                                                                                                                                                                         |
|              | <b>Probability</b>                                                                                                                                                                                                                            |                                                                                                                                                                                                                                                                |                                                                                                                                                                                                         |
|              |                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                | Set notation will not be required.                                                                                                                                                                      |
|              | Probability of an event; impossible events, certain events.<br>Use of words such as possible, likely.<br>Putting events into order of probability.<br>Probability on a scale from 0 to 1.                                                     |                                                                                                                                                                                                                                                                | An appreciation of how probability can be interpreted in real-life situations is expected.                                                                                                              |
|              | Probability as the limit of relative frequency as the number of observations increases. Equally likely events.                                                                                                                                |                                                                                                                                                                                                                                                                | Illustrated practically by example.<br>As a special case of the relative frequency definition.                                                                                                          |

|              |                                                                                                                    |                                 |                                                                                                    |
|--------------|--------------------------------------------------------------------------------------------------------------------|---------------------------------|----------------------------------------------------------------------------------------------------|
|              | Sample space: pictorial representation; probability by counting. Use of Venn diagrams, tables and Cartesian grids. |                                 | List all possible outcomes, e.g. results of throwing one dice or the results of tossing two coins. |
|              | Exhaustive events.                                                                                                 |                                 |                                                                                                    |
|              | Mutually exclusive events, the addition law.                                                                       | The general addition law.       | Candidates should know that the sum of the probabilities of all mutually exclusive outcomes is 1.  |
|              | Independent events, the multiplication law.                                                                        | The general multiplication law. |                                                                                                    |
|              | Tree diagrams.<br>Two stage only.<br>Independent or 'with replacement' only                                        |                                 |                                                                                                    |
|              | An intuitive approach to conditional probability<br>e.g using two-way tables or Venn diagrams.                     |                                 |                                                                                                    |
|              | Expected frequencies.<br>Comparison of actual frequencies with expected frequencies.                               |                                 |                                                                                                    |
| <b>3.1.6</b> | <b>Data Interpretation</b>                                                                                         |                                 |                                                                                                    |
|              |                                                                                                                    |                                 | an appreciation of limitations and conclusions                                                     |

## 3.2 Unit 2: Statistics in practice: controlled assessment

The Controlled Assessment task in GCSE Statistics is split into two distinct sections: an Investigation and related Written Assessment.

Each year, AQA will produce two tasks for Controlled Assessment. Centres may choose to complete either or both of the tasks, but may only submit one task to AQA for moderation.

The task must be completed between 1st February and 5th May in the year it is to be submitted.

The Investigation carries 20 marks and is marked by the teacher to AQA marking criteria. The Written Assessment carries 20 marks and is marked by the teacher using a combination of AQA marking guidelines and a mark scheme.

Tasks should be carried out after the candidates have become familiar with the data handling cycle, and after teaching the relevant sections of the specification. However, tasks can be undertaken at any time during the window in which the qualification is to be completed.

### 3.2.1 Investigation

#### Stage 1: Refinement of hypothesis

Each candidate will carry out and write up an investigation.

The Investigation has two stages.

Candidates are issued with the Candidate Task Sheet, which outlines the broad theme for each investigation. Such themes will need refinement so that candidates are able to produce a testable hypothesis, and this can be explored through class discussion. Teachers will be provided with a Support Sheet, highlighting some key questions that candidates should be considering when developing their hypothesis, as well as links to websites and other databases which may be of use to candidates.

It is expected that whilst all candidates will develop a hypothesis investigating a similar theme, it is the responsibility of the candidate to develop their own hypothesis and explore the theme independently.

It is expected that a class discussion could take place in one timetabled lesson.

#### Stage 2: Investigation

Once the candidates have generated their hypothesis, they should collect secondary data to test the validity of the hypothesis. Candidates should work through the stages of the data handling cycle to analyse collected data and produce a conclusion. There are no marks attributed to the evaluation of their findings at this stage.

The marking criteria for the Investigation comprise section 3.2.4 of this Specification. Completed Investigations should be collected in by the teacher and held under secure conditions until the Written Assessment, which is taken at the centre's convenience. Completed investigations should not be marked by the teacher until after the candidate has taken the Written Assessment.

It is permissible for candidates to take a copy of their Investigation prior to submission for their own reference.

There is no requirement to supervise candidates when they are undertaking the investigation, but teachers should have some mechanism to establish that the work submitted is the candidate's own. Further guidance on this is available in the *Teacher Resource Bank*.

### 3.2.2 Written Assessment

The Written Assessment is in two sections and is taken at the centre's convenience, but should be taken under controlled (examination) conditions. At the start of the Written Assessment, candidates must have their completed Investigations returned to them, and both the Investigation and Written Assessment must be collected in at the end and held under secure conditions.

#### (a) SECTION A

This consists of a number of questions relating to the candidate's own Investigation and requires the candidate to evaluate their own findings.

#### (b) SECTION B

At the start of this section, candidates will either be supplied with additional data on a related topic, or will be asked to expand their original investigation. A number of questions relating to methodology, analysis and evaluation of the data then follow.

The Written Assessment will always total 20 marks, but there may be slight variations in the allocation of marks to each Section, according to the nature of the task in a given session.

Candidates are not allowed to bring any notes with them into the assessment, and must refer only to their completed Investigation during the examination. It is recommended that candidates undertake the Written Assessment as soon as possible after the completion of their Investigation, so that the topic remains relatively fresh in their minds.

Candidates may make one attempt only at a Written Assessment and re-drafting is not permitted.

### 3.2.3 General Regulations for Controlled Assessment

#### Material from AQA

For each task, AQA will provide

- Candidate task sheet
- Teacher Support sheet
- Written Assessment
- Marking Guidance

*marking guidance* comprises the marking criteria for the Investigation (Section 3.2.4 of this Specification) and the marking guidelines and mark scheme for the Written Assessment.

The material will be provided in the academic year for which the task is valid. This material should be kept locked away securely until used. If it is to be used on more than one occasion, then the centre must ensure security between sessions.

#### Work to be submitted

The task can only be undertaken during the window of opportunity, defined as 1st February to 5th May.

The work to be submitted for each candidate consists of the task (or better of the two tasks if two have been attempted) and a Candidate Record Form showing the marks for both the Investigation and associated Written Assessment. The Candidate Record Form must be signed by both the candidate and the teacher.

In any year a candidate may attempt either or both of the two tasks supplied by AQA and the better mark submitted.

The mark must be submitted in the academic year that the task was undertaken.

#### Use of ICT

Candidates may use ICT where appropriate in the course.

#### Security of assignments

When teachers have marked the complete task, they may tell candidates their un-moderated marks but they may not return the papers. Completed tasks should be treated like examination papers and kept under secure conditions while the Task is valid.

Practice tasks from specimen or training material can be used to teach candidates the skills required, feeding back their marks as formative assessment. However, tasks which are currently valid must not be returned to the candidates.

### 3.2.4 Investigation Marking Criteria

#### Strand 1 – Hypotheses and Strategy

| Mark | Description                                                                                                                                                 |
|------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0    | No hypothesis nor any strategy is stated                                                                                                                    |
| 1    | Hypothesis or hypotheses stated, little in the way of strategy. Some use of accurate language                                                               |
| 2    | Hypothesis or hypotheses stated with a strategy giving detail about how the work may develop and the methods to be used. Frequent use of accurate language. |

#### Strand 2 – Selection and Collection of Data

| Mark | Description                                                                                                                                                                                                                                                                                                                      |
|------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0    | No suitable data is collected.                                                                                                                                                                                                                                                                                                   |
| 1–2  | Appropriate data is collected with the source and reason for selection described. Brief mention of sampling. Some use of accurate language.                                                                                                                                                                                      |
| 3–4  | Appropriate data is collected with full details of the source and reasons for the selection of data fully described.<br>Appropriately justified sampling methods are used with all details of the sampling procedure given so that replication would be possible. Appropriate sample size(s). Frequent use of accurate language. |

### Strand 3 – Use of Graphs and Diagrams to Test Hypotheses

| Mark | Description                                                                                                                                                                                                                                                                                                              |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0    | No graphs or diagrams present in work.                                                                                                                                                                                                                                                                                   |
| 1–2  | Simple appropriate graph(s) and diagram(s) present in work, little or no attempt to use these or to make comments based upon them..                                                                                                                                                                                      |
| 3–4  | Appropriate types of graphs and diagrams drawn with a good level of accuracy. These are used well to make appropriate comments and draw suitable conclusions.                                                                                                                                                            |
| 5–7  | Appropriate and different types of graphs and diagrams, including some from the Higher Tier, accurately drawn, which are ideal to display the data. Sophisticated use to make inferences and draw conclusions related to decision making about the validity of the hypotheses. Conclusions ongoing and in final summary. |

### Strand 4 – Use of Calculations to Test Hypotheses

| Mark | Description                                                                                                                                                                                                                                                                                            |
|------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 0    | No calculations present in work.                                                                                                                                                                                                                                                                       |
| 1–2  | Simple appropriate calculations present in work, little or no attempt to use these or to make comments based upon them..                                                                                                                                                                               |
| 3–4  | Appropriate types of calculation with a good level of accuracy shown. These are used well to make appropriate comments and draw suitable conclusions.                                                                                                                                                  |
| 5–7  | Appropriate and different types of accurate calculations, including some from Higher Tier, which are ideal to summarise the data. Sophisticated use to make inferences and draw conclusions related to decision making about the validity of the hypotheses. Conclusions ongoing and in final summary. |

## 4 Scheme of Assessment

### 4.1 Aims and learning outcomes

GCSE courses based on this specification should encourage candidates to be inspired, moved and changed by following a broad, coherent, satisfying and worthwhile course of study and gain an insight into related sectors, such as mathematics. They should prepare learners to make informed decisions about further learning opportunities and career choices.

GCSE courses based on this specification should encourage candidates to:

- actively engage in the process of enquiry to develop as effective and independent learners, and as critical and reflective thinkers with enquiring minds
- acquire an understanding of the basic concepts of statistical problem-solving in a way that encourages confidence and enjoyment of the subject in everyday and real-life situations and out-of-classroom learning
- develop knowledge, skills and understanding in statistical methods and concepts and in probability, including an awareness of the potential and limitations of data and methods
- develop an understanding of the importance of statistical information to society as a whole as well as its limitations, including recognising misleading representations and uses of statistics.

### 4.2 Assessment Objectives (AOs)

The assessment units will assess the following assessment objectives in the context of the content and skills set out in Section 3 (Subject Content).

- |     |                                                                                       |
|-----|---------------------------------------------------------------------------------------|
| AO1 | Analyse a statistical problem and plan an appropriate strategy                        |
| AO2 | Describe and use appropriate methods to select and collect data                       |
| AO3 | Process, analyse and present data appropriately                                       |
| AO4 | Use statistical evidence to identify inferences, make deductions and draw conclusions |

#### Quality of Written Communication (QWC)

In GCSE specifications which require candidates to produce written material in English, candidates must:

- ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear
- select and use a form and style of writing appropriate to purpose and to complex subject matter
- organise information clearly and coherently, using specialist vocabulary when appropriate.

In this specification QWC will be assessed in units 1 and 2 by means of credit given for the accurate use of statistical language.

## Weighting of Assessment Objectives for GCSE Full Course

The table below shows the approximate weighting of each of the Assessment Objectives in the GCSE components.

| Assessment Objectives               | Component Weightings (%) |         |                       | Overall Weighting of AOs (%) |
|-------------------------------------|--------------------------|---------|-----------------------|------------------------------|
|                                     | Paper F                  | Paper H | Controlled Assessment |                              |
| AO1                                 | 10                       | 10      | 3                     | 10–20                        |
| AO2                                 | 13                       | 13      | 3                     | 10–20                        |
| AO3                                 | 30                       | 30      | 12                    | 40–50                        |
| AO4                                 | 22                       | 22      | 7                     | 25–30                        |
| Overall weighting of Components (%) | 75                       | 75      | 25                    | 100                          |

### 4.3 National criteria

This specification complies with the following.

- The Subject Criteria for Statistics including the rules for Controlled Assessment
- The Code of Practice
- The GCSE Qualification Criteria
- The Arrangements for the Statutory Regulation of External Qualifications in England, Wales and Northern Ireland: Common Criteria
- The requirements for qualifications to provide access to Levels 1 and 2 of the National Qualification Framework

### 4.4 Prior learning

There are no prior learning requirements.

However, any requirements set for entry to a course following this specification are at the discretion of centres.

### 4.5 Access to assessment: diversity and inclusion

GCSEs often require assessment of a broader range of competences. This is because they are general qualifications and, as such, prepare candidates for a wide range of occupations and higher level courses.

The revised GCSE qualification and subject criteria were reviewed to identify whether any of the competences required by the subject presented a potential barrier to any candidates regardless of their ethnic origin, religion, gender, age, disability or sexual orientation. If this was the case, the situation was

reviewed again to ensure such competences were included only where essential to the subject. The findings of this process were discussed with groups who represented the interests of a diverse range of candidates.

Reasonable adjustments are made for disabled candidates in order to enable them to access the assessments. For this reason, very few candidates will have a complete barrier to any part of the assessment. Further details are given in Section 5.4.

## 5 Administration

### 5.1 Availability of assessment units and certification

Examinations and certification for this specification are available as follows:

|           | Availability of units |        | Availability of certification |
|-----------|-----------------------|--------|-------------------------------|
|           | Unit 1                | Unit 2 | Full course                   |
| June 2012 | ✓                     | ✓      | ✓                             |
| Jan 2013  |                       |        |                               |
| June 2013 | ✓                     | ✓      | ✓                             |
| Jan 2014  |                       |        |                               |
| June 2014 | ✓                     | ✓      | ✓                             |

Ofqual's revisions to the Code of Practice mean that from June 2014: assessments (both external assessments and moderation of controlled

assessment) will only be available once a year in June with 100% of the assessment being taken in the examination series in which the qualification is awarded.

### 5.2 Entries

Please refer to the current version of *Entry Procedures and Codes* for up to date entry procedures. You should use the following entry codes for the units and for certification.

Unit 1 – 43101F or 43101H

Unit 2 – 43102

GCSE certification – 4312

Candidates have to enter all the assessment units at the end of the course, at the same time as they enter for the subject award.

5

### 5.3 Private candidates

This specification is available to private candidates. Private candidates should write to AQA for a copy of *Supplementary Guidance for Private Candidates*.

Arrangements must be agreed with AQA for the assessment and authentication of controlled assessment.

## 5.4 Access arrangements and special consideration

We have taken note of equality and discrimination legislation and the interests of minority groups in developing and administering this specification.

We follow the guidelines in the Joint Council for Qualifications (JCQ) document: *Access Arrangements, Reasonable Adjustments and Special Consideration: General and Vocational Qualifications*. This is published on the JCQ website (<http://www.jcq.org.uk>) or you can follow the link from our website (<http://www.aqa.org.uk>).

### Access arrangements

We can make arrangements so that candidates with special needs can access the assessment. These arrangements must be made **before** the examination. For example, we can produce a Braille paper for a candidate with a visual impairment.

### Special consideration

We can give special consideration to candidates who have had a temporary illness, injury or indisposition at the time of the examination. Where we do this, it is given **after** the examination.

Applications for access arrangements and special consideration should be submitted to AQA by the Examinations Officer at the centre.

## 5.5 Language of examinations

We will provide units for this specification in English only.

## 5.6 Qualification titles

Qualifications based on this specification are:

- AQA GCSE in Statistics

## 5.7 Awarding grades and reporting results

The GCSE and GCSE short course qualifications will be graded on an eight-grade scale: A\*, A, B, C, D, E, F and G. Candidates who fail to reach the minimum standard for grade G will be recorded as U (unclassified) and will not receive a qualification certificate. Individual assessment unit results will be certificated.

We will publish the minimum raw mark for each grade, for each unit, when we issue candidates' results. We will report a candidate's unit results to centres in terms of uniform marks and qualification results in terms of uniform marks and grades.

For each unit, the uniform mark corresponds to a grade as follows.

**Written paper** (maximum uniform mark = 180)

| Grade | Uniform Mark Range |
|-------|--------------------|
| A*    | 162–180            |
| A     | 144–161            |
| B     | 126–143            |
| C     | 108–125            |
| D     | 90–107             |
| E     | 72–89              |
| F     | 54–71              |
| G     | 36–53              |
| U     | 0–35               |

**Controlled assessment** (maximum uniform mark = 60)

| Grade | Uniform Mark Range |
|-------|--------------------|
| A*    | 54–60              |
| A     | 48–53              |
| B     | 42–47              |
| C     | 36–41              |
| D     | 30–35              |
| E     | 24–29              |
| F     | 18–23              |
| G     | 12–17              |
| U     | 0–11               |

We calculate a candidate's total uniform mark by adding together the uniform marks for the units. We convert this total uniform mark to a grade as follows.

**GCSE Statistics** (maximum uniform mark = 240)

| Grade | Uniform Mark Range |
|-------|--------------------|
| A*    | 216–240            |
| A     | 192–215            |
| B     | 168–191            |
| C     | 144–167            |
| D     | 120–143            |
| E     | 96–119             |
| F     | 72–95              |
| G     | 48–71              |
| U     | 0–47               |

## 5.8 Examination series

Candidates have to enter all the assessment units at the end of the course, at the same time as they enter for the subject award.

As a consequence of the move to linear assessment, candidates will be allowed to carry forward their controlled assessment unit result(s) following the initial moderation and aggregation during the lifetime of the specification.

## 6 Controlled Assessment Administration

The Head of Centre is responsible to AQA for ensuring that controlled assessment work is conducted in accordance with AQA's instructions and JCQ instructions.

### 6.1 Authentication of controlled assessment work

In order to meet the requirements of Code of Practice AQA requires:

- **candidates** to sign the Candidate Record Form to confirm that the work submitted is their own
- **teachers/assessors** to confirm on the Candidate Record Form that the work assessed is solely that of the candidate concerned and was conducted under the conditions laid down by the specification
- **centres** to record marks of zero if candidates cannot confirm the authenticity of work submitted for assessment.

The completed Candidate Record Form for each candidate should be attached to his/her work. All teachers who have assessed the work of any candidate entered for each component must sign the declaration of authentication.

If teachers/assessors have reservations about signing the authentication statements, the following points of guidance should be followed.

- If it is believed that a candidate has received additional assistance and this is acceptable within the guidelines for the relevant specification, the teacher/assessor should award a mark which represents the candidate's unaided achievement. The authentication statement should be signed and information given on the relevant form.
- If the teacher/assessor is unable to sign the authentication statement for a particular candidate, then the candidate's work cannot be accepted for assessment.

If, during the external moderation process, there is no evidence that the work has been properly authenticated, AQA will set the associated mark(s) to zero.

### 6.2 Malpractice

Teachers should inform candidates of the AQA Regulations concerning malpractice.

Candidates must **not**:

- submit work which is not their own
- lend work to other candidates
- allow other candidates access to, or the use of, their own independently sourced source material (this does not mean that candidates may not lend their books to another candidate, but candidates should be prevented from plagiarising other candidates' research)
- include work copied directly from books, the internet or other sources without acknowledgement and attribution
- submit work typed or word processed by a third person without acknowledgement.

These actions constitute malpractice, for which a penalty (for example disqualification from the examination) will be applied.

If malpractice is suspected, the Examinations Officer should be consulted about the procedure to be followed.

Where suspected malpractice in controlled assessments is identified by a centre after the candidate has signed the declaration of authentication, the Head of Centre must submit full details of the case to AQA at the earliest opportunity. The form JCQ/M1 should be used. Copies of the form can be found on the JCQ website (<http://www.jcq.org.uk/>).

Malpractice in controlled assessments discovered prior to the candidate signing the declaration of authentication need not be reported to AQA, but should be dealt with in accordance with the centre's internal procedures. AQA would expect centres to treat such cases very seriously. Details of any work which is not the candidate's own must be recorded on the Candidate Record Form or other appropriate place.

## 6.3 Teacher standardisation

AQA will hold annual standardising meetings for teachers, usually in the autumn term, for controlled assessment. At these meetings we will provide support in contextualising the tasks and using the marking criteria.

If your centre is new to this specification, you must send a representative to one of the meetings. If you have told us you are a new centre, either by submitting an intention to enter and/or an estimate of entry or by contacting the subject team, we will contact you to invite you to a meeting.

AQA will also contact centres if

- the moderation of controlled assessment work from the previous year has identified a serious misinterpretation of the controlled assessment requirements, or
- a significant adjustment has been made to a centre's marks.

In these cases, centres will be expected to send a representative to one of the meetings. For all other centres, attendance is optional. If a centre is unable to attend and would like a copy of the written materials used at the meeting, they should contact the subject administration team at

**Statistics-gcse@aqa.org.uk**

It is likely that during the lifetime of this specification AQA will move to **online teacher standardisation**.

## 6.4 Internal standardisation of marking

Centres must standardise marking to make sure that all candidates at the centre have been marked to the same standard. One person must be responsible for internal standardisation. This person should sign the Centre Declaration Sheet to confirm that internal standardisation has taken place.

Internal standardisation may involve:

- all teachers marking some trial pieces of work and identifying differences in marking standards;
- discussing any differences in marking at a training meeting for all teachers involved in the assessment;
- referring to reference and archive material such as previous work or examples from AQA's teacher standardising meetings.

## 6.5 Annotation of controlled assessment work

The Code of Practice states that the awarding body must require internal assessors to show clearly how the marks have been awarded in relation to the marking criteria defined in the specification and that the awarding body must provide guidance on how this is to be done.

The annotation will help the moderator to see as precisely as possible where the teacher considers that the candidates have met the criteria in the specification.

Work could be annotated by either of the following methods:

- key pieces of evidence flagged throughout the work by annotation either in the margin or in the text;
- summative comments on the work, referencing precise sections in the work.

## 6.6 Submitting marks and sample work for moderation

The total mark for each candidate must be submitted to AQA and the moderator on the mark forms provided, by Electronic Data Interchange (EDI) or through the e-Portfolio system (only available for certain units/components) by the specified date (see <http://www.aqa.org.uk/deadlines.php>).

Centres will normally be notified which candidates' work is required in the sample to be submitted to the moderator (please refer to section 7.1 for further guidance on submitting samples).

## 6.7 Factors affecting individual candidates

Teachers should be able to accommodate the occasional absence of candidates by ensuring that the opportunity is given for them to make up missed controlled assessments.

If work is lost, AQA should be notified immediately of the date of the loss, how it occurred, and who was responsible for the loss. Centres should use the JCQ form JCQ/LCW to inform AQA Centre and Candidate Support Services of the circumstances.

Where special help which goes beyond normal learning support is given, AQA must be informed through comments on the Candidate Record Form so that such help can be taken into account when moderation takes place.

Candidates who move from one centre to another during the course sometimes present a problem for a scheme of controlled assessment work. Possible courses of action depend on the stage at which the move takes place. If the move occurs early in the course the new centre should take responsibility for controlled assessment work. If it occurs late in the course it may be possible to arrange for the moderator to assess the work through the 'Educated Elsewhere' procedure. Centres should contact AQA at the earliest possible stage for advice about appropriate arrangements in individual cases.

## 6.8 Retaining evidence

The centre must retain the work of all candidates, with Candidate Record Forms attached, under secure conditions, from the time it is assessed, to allow for the possibility of an enquiry about results. The work

may be returned to candidates after the deadline for enquiries about results. If an enquiry about a result has been made, the work must remain under secure conditions in case it is required by AQA.

# 7 Moderation

## 7.1 Moderation procedures

Moderation of the controlled assessment work is by inspection of a sample of candidates' work, sent by post or electronically through the e-Portfolio system from the centre to a moderator appointed by AQA. The centre marks must be submitted to AQA and to the moderator by the specified deadline (see <http://www.aqa.org.uk/deadlines.php>).

Centres entering fewer candidates than the minimum sample size and centres submitting through the e-Portfolio system should submit the work of all of their candidates. Centres entering larger numbers of candidates will be notified of the candidates whose work will be required in the sample to be submitted for moderation.

Following the re-marking of the sample work, the moderator's marks are compared with the centre marks to determine whether any adjustment is needed in order to bring the centre's assessments into line with standards generally. In some cases it may be necessary for the moderator to call for the work of additional candidates in the centre. In order to meet this possible request, centres must retain under secure conditions and have available the controlled assessment work and Candidate Record Forms of every candidate entered for the examination and be prepared to submit it on demand. Mark adjustments will normally preserve the centre's order of merit, but where major discrepancies are found, AQA reserves the right to alter the order of merit.

## 7.2 Consortium arrangements

If there are a consortium of centres with joint teaching arrangements (i.e. where candidates from different centres have been taught together but where they are entered through the centre at which they are on roll), the centres must inform AQA by completing the JCQ/CCA form.

The centres concerned must nominate a consortium co-ordinator who undertakes to liaise with AQA on

behalf of all centres in the consortium. If there are different co-ordinators for different specifications, a copy of the JCQ/CCA form must be submitted for each specification.

AQA will allocate the same moderator to each centre in the consortium and the candidates will be treated as a single group for the purpose of moderation.

## 7.3 Post-moderation procedures

On publication of the results, we will provide centres with details of the final marks for the controlled assessment work.

The candidates' work will be returned to the centre after the examination. The centre will receive a report,

at the time results are issued, giving feedback on the accuracy of the assessments made, and the reasons for any adjustments to the marks.

We may retain some candidates' work for archive or standardising purposes.

# Appendices

## A Grade Descriptions

Grade descriptions are provided to give a general indication of the standards of achievement likely to have been shown by candidates awarded particular grades. The descriptions should be interpreted in relation to the content outlined in the specification; they are not designed to define that content.

The grade awarded will depend in practice upon the extent to which the candidate has met the assessment objectives (see Section 4) overall. Shortcomings in some aspects of the candidates' performance may be balanced by better performances in others.

| Grade | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|-------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| A     | <p>Candidates analyse statistical problems and use appropriate strategies to conduct a statistical investigation. They identify and specify research questions and hypotheses that are appropriate to the context. They plan and execute a statistical investigation, working through the statistical problem-solving process accurately and rigorously, justifying their chosen approaches.</p> <p>They use data collection methods appropriate to the context and recognise their limitations. They understand different types of data, the concepts of a population and different methods of sampling. They understand bias and how it might arise. They use probability to model real-life situations.</p> <p>They select from a range of different methods to process and analyse data accurately and effectively. They recognise that some methods are more appropriate than others and can rationalise their choices. They understand and can illustrate how different representations and statistics may distort outcomes. They review their work, identify their errors and correct them. They are able to overcome minor difficulties in their investigations.</p> <p>They apply statistical reasoning, using evidence to draw sensible inferences. They make deductions and communicate complex conclusions in an understandable way, using an appropriate mixture of writing and suitable tabular and graphical methods. They read and interpret published tables of secondary data and identify the major features. They use interpolation and extrapolation sensibly. They compare actual with expected frequencies and draw appropriate conclusions. Their accurate conclusions are securely based on data and relevant to the original question or hypothesis.</p> |
| C     | <p>Candidates work through the statistical problem-solving process, selecting appropriate statistical methods and drawing conclusions that are relevant to their original question or hypothesis.</p> <p>They plan for and use different methods for collecting data. They understand the problem of bias and can use different methods of sampling. They understand that different outcomes may result from repeating an experiment. They can use probability to model simple, real-life situations.</p> <p>They process and analyse data accurately using different methods. They recognise the advantages and disadvantages of different methods. They can identify how different representations can distort outcomes.</p> <p>They draw inferences and communicate conclusions in writing, tabular and graphical forms. They read and interpret tables of secondary data, including tables involving percentages. They recognise that the reliability of results can be affected by the size of a sample or data. Their conclusions are usually correct.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| F     | <p>Candidates work through the statistical problem-solving process using suitable statistical methods and drawing simple conclusions that are relevant to their original question.</p> <p>They use suitable methods for collecting data. They understand the importance of using a suitably large sample when the entire population cannot be investigated. They understand that different outcomes may result from repeating an experiment. They have some knowledge of probability.</p> <p>They use some methods for analysing and processing data accurately. They select methods to present straightforward, simple data. They may need some support to complete their investigations.</p> <p>They use evidence to draw simple conclusions, which they communicate in writing and by using tabular and graphical presentation. They read frequency tables, bar charts, pie charts, line graphs and scatter diagrams.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |

## B Spiritual, Moral, Ethical, Social, Legislative, Sustainable Development, Economic and Cultural Issues, and Health and Safety Considerations

AQA has taken great care to ensure that any wider issues, including those particularly relevant to the education of students at Key Stage 4, have been identified and taken into account in the preparation of this specification. They will only form part of the assessment requirements where they relate directly to the specific content of the specification and have been identified in Section 3: Content.

The specification offers a range of opportunity for exploring cultural issues in a subject specific environment. AQA would cite the following as examples, though others are found within the specification.

|                               |                                      |
|-------------------------------|--------------------------------------|
| Bias                          | (3.1 sampling)                       |
| Questionnaires                | (3.1 conducting a survey/experiment) |
| Probability (of data)         | (3.1 conducting a survey/experiment) |
| Reading and interpreting data | (3.3 tabulation and representation)  |
| Recognising outliers          | (3.3 tabulation and representation)  |
| Crude rates                   | (3.4 other summary tables)           |
| Correlation and causality     | (3.4 correlation and regression)     |
| Extrapolation                 | (3.4 correlation and regression)     |

Additionally, there are opportunities for candidates to gain insights into moral/ethical issues by, for example, consideration of the role of questionnaires and census details in modern life, the way in which conclusions are drawn and inferences made, and the resulting affects this can have on the lives of particular social groups.

Moreover, statistics, depending on context, may be used to explore spiritual/moral beliefs. Awareness can also be gained of the uses in these contexts to which statistical material may be put.

In broad terms, there will be a range of social and cultural issues which can be examined according to the contexts which are used in teaching and delivering the specification.

### European Dimension

AQA has taken account of the 1988 Resolution of the Council of the European Community in preparing this specification and associated specimen units.

### Environmental Education

AQA has taken account of the 1988 Resolution of the Council of the European Community and the Report “Environmental Responsibility: An Agenda for Further and Higher Education” 1993 in preparing this specification and associated specimen units.

### Avoidance of Bias

AQA has taken great care in the preparation of this specification and specimen units to avoid bias of any kind.

Sustainable Development and Health and Safety

Considerations will be added to the titles of Appendix B in the specifications.

As stated at the outset, such issues will only form part of the assessment requirements where they relate directly to the specific content of the specification. Therefore, the opportunities to address these issues will, in the case of this specification, depend upon the teaching approach adopted by the centre/teacher. Teaching about genetic engineering can be used to illustrate this point. It is possible for a student to be taught about the principles, requirements and outcomes of genetic engineering without going into the social issues associated with it. Unless the criteria and specification identify that assessment could incorporate an awareness or understanding of the social issues it would not be legitimate to set such questions or tasks nor to expect that all students had followed a course that had included consideration of such wider issues. Therefore, the provision of any additional information must go into the guidance material produced, following accreditation, as part of the support strategy for teachers. AQA will provide additional information about such opportunities in the Teacher Resource Bank materials that will be circulated to centres prior to teaching starting in September.

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## C Overlaps with other Qualifications

Some topics from probability, measures of spread, measures of location and the data handling cycle are included in GCSE Mathematics.

## D Wider Key Skills

### The replacement of Key Skills with Functional Skills

The Key Skills qualifications have been replaced by the **Functional Skills**. However, centres may claim proxies for Key Skills components and/or certification in the following series: January, March and June 2012. The **Administration Handbook for the Key Skills Standards 2012** has further details. All Examination Officers in centres offering AQA Key Skills and Wider Key Skills have been sent a letter outlining the details of the end dates of these subjects. Copies of the letters have also been sent to the Head of Centre and Key Skills coordinator. This is a brief outline of that information. It is correct as at August 2011 and replaces the information on the same subject found in other documents on the AQA website:

- **Key Skills Levels 1, 2 and 3 Test and Portfolio**  
The final opportunity for candidates to enter for a level 1, 2 or 3 Key Skills test or portfolio was June 2011 with the last certification in 2012.
- **Key Skills Level 4** The last series available to candidates entering for the Key Skills Level 4 test and portfolio was June 2010 with the last certification in the June series 2012.
- **Basic Skills Adult Literacy Levels 1 and 2, Adult Numeracy Levels 1 and 2** AQA Basic Skills qualifications will now be available until, at least, the June 2012 series.

### Funding

We have received the following advice on the funding of learners undertaking these qualifications:

- Currently the **Skills Funding Agency** funds Basic Skills in literacy and numeracy for adult, 19 plus, learners only. There are various support funds for learners aged 16-18 administered by the **Young People's Learning Agency (YPLA)**. These include EMA (until the end of the 2010/11 academic year), Care to Learn and discretionary learner support hardship funding for learners living away from home.
- This information is correct at the time of publication. If you would like to check the funding provision post-June 2011, please call the **Skills Funding Agency** helpdesk on 0845 377 5000.
- **Wider Key Skills** The AQA Wider Key Skills qualifications are no longer available. The last portfolio moderation took place in June 2011.

Further updates to this information will be posted on the website as it becomes available.

**[http://web.aqa.org.uk/qual/keyskills/wider\\_noticeboard.php](http://web.aqa.org.uk/qual/keyskills/wider_noticeboard.php)**



## GCSE Statistics Teaching from September 2012 onwards

**Qualification Accreditation Number: 500/4473/4**

Every specification is assigned a national classification code indicating the subject area to which it belongs. The classification code for this specification is 2510.

Centres should be aware that candidates who enter for more than one GCSE qualification with the same classification code will have only one grade (the highest) counted for the purpose of the School and College Performance Tables.

Centres may wish to advise candidates that, if they take two specifications with the same classification code, schools and colleges are very likely to take the view that they have achieved only one of the two GCSEs. The same view may be taken if candidates take two GCSE specifications that have different classification codes but have significant overlap of content. Candidates who have any doubts about their subject combinations should check with the institution to which they wish to progress before embarking on their programmes.

To obtain free specification updates and support material or to ask us a question register with Ask AQA:

**[www.aqa.org.uk/ask-aqa/register](http://www.aqa.org.uk/ask-aqa/register)**

Support meetings are available throughout the life of the specification.

Further information is available at:

**<http://events.aqa.org.uk/ebooking>**

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Registered address: AQA, Devas Street, Manchester M15 6EX.