

# Principal Examiner Feedback

Summer 2015

Pearson Edexcel GCSE  
In Statistics (2ST01)  
Controlled Assessment

## **Edexcel and BTEC Qualifications**

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at [www.edexcel.com](http://www.edexcel.com) or [www.btec.co.uk](http://www.btec.co.uk). Alternatively, you can get in touch with us using the details on our contact us page at [www.edexcel.com/contactus](http://www.edexcel.com/contactus).

## **Pearson: helping people progress, everywhere**

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: [www.pearson.com/uk](http://www.pearson.com/uk)

Summer 2015

Publications Code UG042694

All the material in this publication is copyright

© Pearson Education Ltd 2015

# **GCSE Statistics 2ST01**

## **Principal Examiner Feedback – Controlled Assessment**

### **Introduction**

In general the work from centres was well presented, neatly packaged, and arrived in good time. As in previous sessions a significant number of centres did not adhere to all the procedures surrounding the submission of samples of work for moderation- often causing a great deal of extra work for moderators having to resolve these issues. A check list is offered at the end of this report to assist teachers and Examinations Officers in preparing samples of work for submission in future examination sessions.

A surprising number of centres provided data sets for their students. Centres are reminded that students are expected to collect their own data sets, whether primary data or secondary data, e.g. from the Internet, and not to have these provided for them. Students collecting primary data may do this in groups if they wish, but each student must take part in the data collection.

Some centres did not use the Student Record Form to record the relevant teacher-student interactions during the controlled assessment, particularly after the planning stage. Centres are reminded that changes to the initial plan must be agreed by the teacher and recorded on the Student Record Form. Unplanned work must not be awarded credit in the final assessment.

A surprising number of centres submitted work that had not been annotated. Often this work contained significant errors that had not been identified and often caused a great deal of extra work for moderators who effectively had to re-mark the work.

As in previous sessions it was noted that many students produced investigations involving a collection of loosely related hypotheses (usually 3), apparently with the sole intention of demonstrating as many different techniques as possible, rather than as a single coherent investigate with a strategy to compare the interrelationships between variables. This approach generally resulted in a collection of mini investigations, the best of which, on its own, serving as evidence for the overall assessment of the work. Students should be advised not to produce collections of mini investigations as this increases their work load with no obvious benefit to the overall assessment.

Centres are reminded that internal moderation must take place if there are two or more assessors marking the work, and that there should be clear evidence within the sample to demonstrate that this has taken place.

Many students responded well to their chosen theme. The most popular theme this year was Puzzles and Games.

## **Report on individual strands**

### **Strand 1 (Planning)**

As in previous sessions many teachers provided excellent and appropriate feedback to candidates enabling them to pursue investigations commensurate with their ability. This feedback was often well documents on the Student Record Form.

Many students were able to give some indication of which techniques they were going to use but few were able to give more than a simple reason for the choice, e.g. "I am going to use box plots because it shows the data clearly" is a low demand reason for the choice of box plots to display the data; whilst "I am going to draw a scatter graph and calculate Spearman's rank correlation coefficient", states an intention to use particular techniques but does not give a reason for the particular choice. Students are advised to explain in detail why they have chosen particular techniques in their analysis.

As in previous sessions, investigations attracting the highest marks in the assessment were those involving some degree of complexity. Complexity includes the analysis of interrelated variables and the sequencing of techniques over a number of stages. A common approach this year was to set up an hypothesis to investigate the correlation between two variables, A and B say, a second hypothesis to investigate the correlation between variables A and C say, and finally a third hypothesis to investigate which of the variables, B or C, had the greater effect on the variable A.

Many students were able to anticipate possible problems in the collection of their data, and were able to give a clear strategy for dealing with outliers and anomalies. Students should be encouraged to explain their reasons for removing poor data in the context of the investigation and comment specifically on the possible impact the poor data could have on the reliability of the results. Simply stating that any outliers will be removed or replaced is a low demand reason, even if accompanied by sophisticated techniques for identifying them.

### **Strand 2a (Data collection)**

Many students collected sufficient data for their investigations, identified the source of the data, and commented on the possible presence of outliers. Often the data collection was poorly described and ill defined.

Centres are advised not to provide sets of data for their students as this usually denies them the opportunity to access the full range of marks in this strand.

Students should be advised to give more detail when describing their sampling techniques, e.g. when selecting a random sample they should explain the unique numbering of the data items and the specific technique used to generate the random numbers, such as  $30 \div \text{Ran\#}$ .

There still appears to be a popular misconception that the use of stratified sampling is a pre-requisite for gaining a high mark in this strand. The use of stratified sampling, often to sub-sample from a small population, is a low

demand application of the technique if it is clear that it is more appropriate to use the whole population.

Students should be advised to think more carefully about the amount of data they are using in their analyses. The sample size should be justified in terms of the techniques that will be employed. For example, using 25 items of data may be appropriate for some techniques, e.g. a box plot, but may not be appropriate for other techniques, e.g. a histogram, where more data is expected.

Many students are able to identify outliers formally and represent them in diagrams. But it should be noted that it is not only the calculation of the outliers that drives the assessment but also the purpose of the calculation. For example, the formal identification of outliers merely to represent them in a box plot is a low demand application of the technique, whereas the formal identification of outliers to remove as a prerequisite to, e.g. calculating a standard deviation, is a more demanding application.

### **Strand 2b (Processing, analysing and representing data)**

Most students were able to select appropriate techniques to analyse the data they had collected.

Moderators reported that the mark awarded in this strand was generally too high.

It should be noted that the notional difficulty of a technique does not mean that it will automatically be awarded a high mark in this strand. It is how the technique is used that drives the assessment, e.g. the use of standard deviation to compare the spreads of data sets is, in principle, no more sophisticated than using interquartile ranges to compare the spreads of data sets, particularly when ICT is being used. Whereas the use of standard deviation for a more demanding purpose, e.g. to test for normality and/or to calculate a standardised score, is a more demanding application of the technique.

To access the higher marks in this strand students are expected to produce a diagram and a calculation. These should be related activities. For instance, in a formal proof of normality it is expected that students will not only produce correct calculations for the comparison of normality but also a suitable representation for the comparison, e.g. a histogram.

The overall assessment in this strand is affected by the quality of the diagrams and accuracy of the calculations that are produced. Errors in calculation and omissions in graphs are penalised in this strand. For example, the omission of units in box plots is usually penalised by the deduction of 1 mark.

The use of ICT to do the more arduous calculations and representations is to be commended, but students should be advised to be more critical of the accuracy of answers and the quality of representations. Often students give the impression of being controlled by the technology rather than of being in control of it.

### **Strand 3 (Interpretation and discussion of results)**

Many students were able to draw their investigation together in a final conclusion and relate their findings to their initial hypotheses.

Students should be advised to give a practical interpretation of their results in the context of their aims. Interpreting a Spearman's rank correlation coefficient as "positive" is considered to be a low demand interpretation of the correlation coefficient and consequently a low demand application of the technique.

Many students were able to comment on the reliability of their results in terms of the size of the samples they had taken, but it should be noted that a comment such as "I could have improved my results by taking a larger sample", is considered to be a low demand comment on reliability. Few students commented on the reliability of their results in terms of the techniques they had employed, e.g. the amount of data used to populate individual class intervals in histograms.

Only the best students were able to discuss the range of applicability of their results beyond the immediate sample or population.

### **Summary**

Based on their performance on this paper, students should be advised to:

- not produce collections of mini investigations, as this increases their work load with no obvious benefit to the overall assessment
- give a practical interpretation of their results in the context of their aims
- give more detail when describing their sampling techniques
- think more carefully about the amount of data they are using in their analyses
- be more critical of the accuracy of their answers and the quality of their representations
- give a practical interpretation of their results in the context of their aims.

## **Grade Boundaries**

Grade boundaries for this, and all other papers, can be found on the website on this link:

<http://www.edexcel.com/iwantto/Pages/grade-boundaries.aspx>







