

## Level 3

### AS91583

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### **91583: Conduct an experiment to investigate a situation using experimental design principles**

Updated September 2015. This document has been updated in its entirety to address new issues that have arisen from moderation.

Students need to provide evidence of each component of the investigation process detailed in Explanatory Note 3 of the standard.

#### **Posing an investigative question about a given experimental situation**

Sufficient time needs to be allocated for students to research the context and acquire appropriate contextual knowledge. For all grades, students need to identify a purpose and develop an investigative question which is informed by this contextual knowledge.

An appropriate investigative question could be: *'Does being blindfolded have an effect on how long you can balance on one leg? I am going to investigate this for year 13 students'*.

#### **Planning the experiment using experimental design principles**

The plan needs to identify the experimental units, the treatment and response variables, and how the experimental units are randomly allocated to the treatment and control groups. It is not appropriate for any experimental unit to be a member of both the treatment and control groups.

#### **Making an appropriate formal statistical inference**

The formal statistical inference needs to be a causal inference based on the strength of the evidence from the re-randomisation of the experimental data.

An appropriate causal inference could be:

*'The fact that the tail proportion is less than 10% tells me that the observed difference in the median length of time year 13s balance on one leg with and without a blindfold is unlikely when chance is acting alone.'*

*'Because the students were randomly assigned to the groups we may claim that wearing a blindfold was effective in lowering the balancing time for these students. Because these volunteers were not randomly selected, we need to consider carefully as to which wider groups the conclusions may apply.'*

**Required quality of student response**

For Merit, students need to justify all findings with reference to evidence from the experiment, and to link the purpose and findings to their research.

For Excellence, students need to integrate the statistical and contextual knowledge gained from their research throughout the response, and also reflect on the process. Reflection could be shown by discussing how possible sources of variation are dealt with during the design phase or considering other variables.