Pearson Edexcel

Examiners' Report
Principal Examiner Feedback

October 2022

Pearson Edexcel International Advanced Subsidiary In Biology (WBI16) Paper 1: Practical Biology and Investigative Skill

WBI16 2210

Some general points:

The paper followed a similar format to past papers. However, there were mark distribution differences in each question.

Question one always asks candidates to describe a method based on a core practical they are expected to have personally carried out.

Question two can be based around any biological context, the key parts of the question are always the same, data presentation and analysis.

Question three is based on a core practical, the context may be unfamiliar, however, they can describe aspects of a suitable method from the practical they should have carried out personally.

In general Candidates showed knowledge of the core practical methods. Students clearly identified variables that needed to be controlled but their descriptions as to how the control could be achieved lacked the precision required for this examination in many cases. However, most students did try to tailor their answers to the given context of each question.

Question 1

1a
This question asked students to describe a suitable method to measure the rate of photosynthesis at different temperatures. Many candidates displayed at least some familiarity with this investigation. However, only a minority of candidates clearly measures the volume of gas released rather than counting bubbles. In addition, there were only occasional descriptions of how to calculate the rate of gas production.

1b
Candidates were asked to describe how oxygen is produced during photosynthesis.
Most candidates described the splitting of water by photolysis. Only a minority of candidates carefully described exactly how each molecule of oxygen was formed.

Question 2
The context of this question was the rate of diffusion through samples of amphibian skin.

2a
Many candidates found it difficult to describe a suitable method of producing a solution of the correct concentration.

2aii and 2aiii
Most candidates completed the calculations correctly.

2aiv
Many candidates gave descriptions of processes that did not quite identify the change in concentration gradient over time. Very few candidates suggested that facilitated diffusion or the presence of channel proteins might account for the differences over time.

2bi
Many candidates correctly identified one abiotic and one biotic variable other than the independent variable. A minority of candidates seemed not to distinguish between abiotic and biotic variables, giving answers in the wrong section of the question paper.

2bii
Candidates were then asked to choose one of the variables they had identified and explain how it could be controlled. Most students selected an appropriate variable with a method of control. Some candidates then went on to describe how the function of cell membranes might be altered if the variable was not controlled.

Question 3
This question was about investigating the effect arsenic ions on the germination of wheat seeds.

3ai
Nearly all Candidates correctly identified one safety issue and how they would reduce the risk to the experimenter.

3aii
Many candidates gave a null hypothesis that was appropriate to the investigation. In this instance the investigation aimed to find out if there was a correlation between the concentration of arsenic ions and the percentage germination after 4 days.

3aiii
Most candidates presented graphs with both axes fully labelled. The plotting was usually easily checked as a sensible scale had been chosen in most cases. Only a small number of students failed to include any range bars on their graphs.

3bi
Most candidates provided working that was appropriate and usually gave rise to the correct value.

3bii
Most candidates correctly identified the critical value of 0.786 from the table and compared this with the calculated value of the correlation coefficient. Some candidates made the mistake of accepting the null hypothesis and suggesting there was no significant correlation.

3ci
Most candidates found it difficult to comment on the possible differences in arsenic ion absorption. Differences in alleles or a reference to mutation were given regularly.

3cii
Candidates that kept the context of the investigation in mind gave creditworthy suggestions as to how to extend the investigation to determine the effect of arsenic ions on wheat plants grown from seed. Many suggestions were about improvements of the investigation that was carried out rather than progressing the investigation.

The context of this investigation was to investigate the habituation of a protective response in a marine worm.

4a
Candidates were asked to describe preliminary work to ensure a proposed method would work. The candidates that had engaged with the context of the investigation gave descriptions that covered at least one of the points on the mark scheme.
Candidates were not given credit for the idea of practising the method to see if it works unless they provided some specific details.

4b
Nearly all the candidates described a method of their investigation in a logical sequence. However, a significant number of answers had the potential to gain more marks by making clear statements, for example, by specifying time intervals between each touch of the fan. All the marking points were seen regularly.

4c
Candidates were asked to explain how the data from their investigation would be recorded presented and analysed. Most candidates either described or drew tables with headings and graphs with labelled axes. Only a small number of students suggested a statistical test that was not a suitable for the data they decided to collect, as shown in their table.

4d
Most candidates suggested at least one of the points on the mark scheme.

Advice for students:

- Read the whole question before you start to answer, and check that your answer covers everything the question asks for.
- Make sure your answer relates to the specific context of the question.
- When studying Core Practicals, think about what the techniques might be used for and the types of scientific question they might help to answer.
- Carry out every Core Practical for yourself, so you understand how it works and any difficulties that might be encountered.
- If you are given the procedure for a practical technique, put yourself in the shoes of the person writing the procedure: how would they have worked out the details (such as volumes, concentrations, and times)? They will have used preliminary practical work.
- Consider the strengths and limitations of each Core Practical technique.
- Practice writing null hypotheses for experiments you carry out, even if you will not necessarily be applying a statistical test.