Pearson

Examiners' Report
Principal Examiner Feedback

October 2017

Pearson Edexcel International Advanced Level Biology (WBI03) Paper 1
Practical Biology and Research Skills

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Introduction

Overall, the standard on this paper was generally in line with previous series.

In terms of question 1, there are still issues with understanding the difference between a control and controlled variable. Fewer students, but still a significant number, have an issue with distinguishing the dependent variable from the independent variable. However, the appreciation of the use of replication, the mean **with** error bars or standard deviation/error, is much improved over previous years.

Question 1(a)(i)

Most students were aware that the dependent variable was something to do with a zone of inhibition or a clear zone. However, a very significant number were content to say that the dependent variable was the **size** of this zone. This gained no marks because size cannot be measured. However, many then redeemed themselves on the next line by suggesting that size could be measured by finding the diameter or area. They were then awarded the mark.

Only a proportion took careful note of the necessity to suggest a method of measuring accurately. Some therefore contented themselves with the use of a ruler without any indication as to its accuracy, such as marked in millimetres. Pleasingly, however, a significant number of students suggested the use of Vernier calipers. When measuring area, graph paper was frequently made as a sensible suggestion.

Question 1(a)(ii)

Over half of the students made a sensible suggestion for a control. This included the use of filter paper discs on their own, dipped in water or some other sensible solvent or just the use of water or solvent.

The remaining students either suggested inappropriate controls such as an agar plate with no bacteria or did not understand what was meant by control and talked about controlling a variable, such as temperature.

Question 1(a)(iii)

Again, over half of the entry gained full marks on this question. The loss of one mark was nearly always due to a rather vague suggestion as to how the named variable could be controlled.

Temperature was by far the most commonly suggested variable. However, a stock answer of "use a water bath" did not gain a mark. Although this is a common way of controlling temperature in school laboratories, it would not be suitable for the incubation of bacteria on an agar plate.

Those who suggested controlling the size of the disc rarely gave an appropriate method of doing so.

Question 1(b)(i)

Most students have a reasonable level of competence in graph plotting. Over 60% gained full marks on this question and 98% gained at least three. The main reason for loss of marks was a lack of units on the y-axis, putting a discontinuity on the y-axis, which is inappropriate on a bar chart, or not clearly labelling the two extract chemicals. A significant number felt that a line graph was appropriate and therefore could not access marking point 1.

Students should also be urged to think carefully about the y-axis scale, some were inappropriate and it made it very difficult to plot the points.

Question 1(b)(ii)

This question showed a very good spread of marks with a third of students gaining all three. Very few failed to get one mark, usually for stating that phenols had a bigger effect than alkaloids. This was a pleasing outcome as, in the past, students have found the idea of comparing two things quite difficult to do.

Question 1(b)(iii-iv)

These two questions were marked together and provided a good spread of marks. Most were able to suggest repeating the experiment under the same conditions. However, their reasons for doing this were often too vague for the second mark for question (b)(iii). Again, a significant number understood the need to plot some indication of variability, such as standard deviation or range bars, in part (iv). However, far fewer were clear that they would also plot the mean with this measure of variability.

A significant number, unfortunately suggested new experiments in part (iii) and were very unlikely to gain any marks in part (iv) due to this.

Question 1(c)

A few of the marks on WBI03 are for AO1, and it was pleasing to see the students were able to make some sensible suggestions, presumably based, at least partly, on their work on historic and modern drug trials. Over 80% of students gained at least one mark on this question.

Question 2(a)

The performance on this question was almost equally split between one or no marks. Having to provide two correct answers was probably the major reason for this. Both answers were clearly stated in the passage.

Question 2(b)

There were some very good attempts at visuals, an aspect of this paper which students have got better at over the years. The most common mark awarded was three out of four. The main reason for the loss of a mark was for an inadequately detailed title. After that, students would forget to include both the species experimented on and the treatment given in the labels of the bars, table columns/rows or pie chart segments.

Question 2(c)(i)

The evidence from this question was that most students had understood the graph with which they were presented. Nearly 85% got this right.

Question 2(c)(ii)

In view of their performance on 2(c)(i), it was something of a surprise at how difficult students found this question. It was by far the most demanding question on the paper and only about 20% gained any marks, with less than 10% gaining all three. Where a correct age range was given it was quite common to be able to award at least one further mark. However, if the age range was incorrect or telomere lengths were quoted, marks were difficult to come by.

Question 2(d)(i)

An understanding of the meaning of peer review seems to be developing amongst students with over half gaining at least one mark on this question. In the past, few marks have been attained when this topic has been examined.

Question 2(d)(ii)

Students seem to be well schooled in writing references in the proper format with over 20% gaining three marks and over 50% gaining two. However, a significant minority still make mistakes in the detail, which can lead to them gaining no marks whatsoever. So an extra piece of information, such as the word volume, an incorrect order and authors' names not correctly expressed could easily lose all three marks. Nevertheless, these types of errors are less common than they used to be.

Question 2(e)(i)

The vast majority of students were able to make at least one good suggestion of a social implication and well over 60% made two.

Question 2(e)(ii)

Discussing ethical implications proved rather more difficult for students with a third unable to make any suggestions that gained a mark. However, over 60% could make one or two suggestions and a fifth of the entry were able to make three.

Paper Summary

Based on their performance on this paper, students are offered the following advice:

- Ensure that you are familiar with all of the nine core practicals
- Within the context of the 9 core practicals learn the details of the scientific method including variables, accuracy and validity
- Be aware that a dependent variable must be something that can be measured to give a numerical answer in a scientific experiment
- When making suggestions for the control of non-experimental variables, be sure to think that they are relevant to the situation described in the question
- Make sure that you understand the difference between a control in an experiment and variables that must be controlled, these are not the same thing.

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