Commentary on candidate evidence

The candidate evidence has achieved the following marks for each section of the assignment.

1 Aim

Example 1

The candidate was awarded **0 out of 1 mark** because the independent variable is too vague; the aspect of the independent variable is not provided.

Example 2

The candidate was awarded **1 out of 1 mark** because they have provided an appropriate independent and dependent variable.

2 Underlying biology

Example 1

The candidate was awarded **1 out of 4 marks** for the sentence describing competitive inhibitors.

The candidate has quoted the section on non-competitive inhibitors straight from the course specification.

The sentence describing feedback inhibition does not demonstrate an understanding.

Example 2

The candidate was awarded **0 out of 4 marks**. There are no expanded descriptions or explanations at Higher level.

3 Data collection and handling

3(a) A brief summary of the approach used to collect experimental data.

Example 1

The candidate was awarded **0 out of 1 mark** because they have provided more information than is required. The group set-up and distraction task description provide excessive details.

Example 2

The candidate was awarded **1 out of 1 mark** because they have included what was changed (putting words in categories), how it was measured (writing it down), and provided enough detail to visualise the experiment.

Example 3

The candidate was awarded **0 out of 1 mark** because they included excessive detail, although ‘intensity of the pink colour’ is accepted for measuring absorbance.

Example 4

The candidate was awarded **1 out of 1 mark** because they have clearly stated the independent variable, ‘different hydrogen peroxide concentrations’, how they measured the dependent variable, ‘timer’, they have named key chemicals, ‘catalase; hydrogen peroxide’, and included sufficient detail to be able to visualise the experiment.

Example 5

The candidate was awarded **0 out of 1 mark** because it is unclear what the independent variable is. It is not clear what the ‘different concentrations’ refer to.

Example 6

The candidate was awarded **1 out of 1 mark** because they have named the key chemicals, stated the independent variable changed, and described how the dependent variable was measured.

3(b) Sufficient raw data from the candidate's experiment.

3(c) Data, including mean/average values, presented in a correctly produced table(s).

Example 1

The candidate was awarded **2 out of 2 marks**.

They have provided sufficient raw data from their experiment.

Data has been presented in a correctly produced table. (All lines are not required as the table has clear headings).

3(d) Data relevant to the aim from an internet/literature source.

Example 1

The candidate was awarded **0 out of 1 mark** as it is unclear the rate of reaction is referring to enzyme activity and there is no qualifying statement anywhere in the report.

Example 2

The candidate was awarded **0 out of 1 mark** as there is no indication that time taken is an indirect measurement of enzyme activity anywhere in the report, although the candidate indicated that copper sulfate is an inhibitor.

4 Graphical presentation

Example 1

The candidate was awarded **3 out of 4 marks**.

They have:

- selected an appropriate graph format
- included suitable labels and units, as indicated in their table
- accurately plotted the data

The candidate has plotted ‘water’ as 0 on the x-axis scale. This is appropriate as the candidate was penalised for the incorrect use of ‘water’ in the table (3c).

The candidate has not included suitable scales. The x-axis scale is incorrect.

Example 2

The candidate was awarded **4 out of 4 marks**.

They have:

- selected an appropriate graph format
- included suitable scales (3 points to determine a linear scale)
- included suitable labels and units (average does not need to be in label)
- accurately plotted the data (point at 35 is within half-box tolerance)

5 Analysis

Example 1

The candidate was awarded **1 out of 1 mark**. They have provided a good comparison between data sources including x-axis values and units. It also acknowledges the hydrogen peroxide concentrations are different and links the indirect measurement (volume of froth) to the aim (enzyme activity).

Example 2 – Analysis (a)

The candidate was awarded **1 out of 1 mark**. The analysis contains the appropriate two x-axis values and units, a correct calculation, and links the indirect measurement to the aim.

Example 2 – Analysis (b)

The candidate was awarded **0 out of 1 mark** as only one x-axis value is included, and the rounding is incorrect on the calculation.

Example 2 – Analysis (c)

The candidate was awarded **0 out of 1 mark** as no units are provided for the x-axis values and there is no link from the indirect measurement to the aim.

6 Conclusion

Example 1

The candidate was awarded **0 out of 1 mark** because they do not rank tissue types in ascending/descending order.

7 Evaluation

Example 1

The candidate was awarded **0 out of 3 marks**.

Although the candidate identifies that temperature was not controlled, that temperature affects enzyme activity, and suggests a way to control temperature with a water bath, the marks were not awarded as they have used the term ‘reliable’ incorrectly instead of using the term ‘valid’. This negates the evaluation.

Example 2

The candidate was awarded **3 out of 3 marks**.

The candidate identifies that the data in the internet source was not repeated, so affected reliability. Candidates are allowed to discuss reliability for their internet source.

The candidate identifies that the temperature was not kept the same and that this could affect enzyme activity. They suggest using a water bath to control this.

The candidate was awarded a mark for saying their results are reliable as the mass lost in both experiments are fairly similar. This shows understanding of consistent data showing reliability.

Although the candidate was awarded the reliable mark, they would not have been awarded this mark for saying they repeated the experiment twice. The instructions for candidates states that candidates must repeat the experiment, so cannot be awarded a mark for this in the evaluation.

Example 3

The candidate was awarded **1 out of 3 marks**.

1 mark was awarded for the statement, ‘I could also have put the measuring cylinders in a water bath, as enzyme reaction is affected by temperature’.

The candidate was not awarded a mark for their evaluation on substrate concentration as this would not affect the reliability.

The candidate was not awarded the mark for saying they could have found a graph with numbers, as candidates must evaluate the data in the internet data, not the source or presentation.

Example 4

The candidate was awarded **0 out of 3 marks**.

There is no justification given for accurately measuring the size of the liver or for accurately measuring the detergent.

Although the candidate identifies that temperature was not controlled and suggests using a water bath to control this. They have used the term, ‘reliable’ incorrectly, which means there is no justification.

Example 5

The candidate was awarded **1 out of 3 marks**.

The candidate has used the term, ‘reliable’ incorrectly on two occasions; the term ‘valid’ should have been used in both cases. They have not been double penalised so were awarded 1 mark for the statement, ‘To increase reliability … throughout the experiment’.