Commentary on candidate 1 evidence

The effect of substrate concentration on enzymes

The evidence for this candidate has achieved the following marks for each section of this course assessment component.

Section	Mark available	Mark awarded		Comments
1 Aim	1	1		The aim of the investigation is clearly stated.
2 Underlying biology	4	4		Four expanded descriptions/explanations, that are relevant to the aim, are given at a depth appropriate to Higher level: ♦ 1 mark (paragraph 1) – 'The presence or absence… in a certain direction.' ♦ 1 mark (paragraph 3) – 'Competitive inhibitors are the… rates of enzyme reactions.' ♦ 1 mark (paragraph 3) – 'Non-competitive inhibitors… enzyme reaction taking place', linked to the first sentence in this paragraph. ♦ 1 mark (paragraph 3) – 'This can be reversed… increasing rates of reaction', linked to 'This however, cannot be reversed … reaction taking place.' No marks were awarded for the second paragraph, as the candidate does not display a full understanding of the concept of affinity.
3 Data collection and handling	5	a	0	The equipment used to measure the dependent variable (volume of foam) is not clearly linked to the measurement.
		b	1	The repeated measurements are included and the raw (unprocessed) data is sufficient, ie 6 concentrations over a suitable range of values (0 to 100%).
		c	0	The heading for the first column is insufficient as the named chemical (hydrogen peroxide) is not included. All averages and rates are correctly calculated.

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		d	1	A line graph is included with headings and values which clearly link to the enzyme catalase, which is mentioned in the brief summary.
		e	0	Although the source of the research data is cited in the body of the report, it is not referenced as directed in the instructions for candidates. It is correctly cited in the text as (1), but not cross referenced as such at the end.
4 Graphical presentation	4	a	1	The graph produced is based on the candidate's experimental data. A line graph has been selected which is the appropriate format for this data.
		b	1	Both axes have suitable scales.
		c	1	Both axes have suitable labels and units. Although the x-axis label is incomplete, this mark was not awarded for the table heading and is not penalised a second time for carrying the error forward. The addition of the % sign in the y-axis label is an improvement rather than writing the % sign after every figure as shown in the candidate's table.
		d	1	All points are plotted accurately and lines drawn to link each of them.
5 Analysis	1	1		A correct calculation based on the experimental data has been completed (% increase) and linked to the aim of the investigation. Values for the independent variable are given. As the rate of reaction for 0% is 0, it is appropriate in this instance not to include it in the calculation.
6 Conclusion	1	1		A valid conclusion is given, supported by both the experimental and the internet data.
7 Evaluation	3	2		1 mark was awarded for the idea of reliability being shown by the similarities in the results of the repeat measurements.

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			Note, however, no mark would be given for simply stating that repeat measurements were made, as candidates are instructed to do this. 1 mark was awarded for evaluation of temperature control. The error in the use of the term 'reliable' is not penalised here as this has already been incorrectly used in place of 'valid' in the statement about syringes (see below). No marks were awarded for the following reasons: ♦ The use of 'previous testings' described and justified, as this does not ensure that the candidate has 'accurately' measured the dependent variable. ♦ The use of syringes to improve accuracy, as the candidate states incorrectly that this improves 'reliability' rather than 'validity'.
8 Structure	1	1	An informative title is given and the report flows in a logical manner.
Total	**20**	**16**	