



T Level Technical Qualification in Science

Employer set project (ESP)

Laboratory Sciences

Mark scheme

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Mark scheme

Task 1: research a strategy

AO2: Apply core knowledge and skills to the development of a scientific project

Band	Mark	Descriptor
		The student has:
4	10–12	Produced a literature review that includes a balanced and well-justified rationale for the selection, prioritisation, and rejection of wide range of sources with detailed reference to all the following factors: <ul style="list-style-type: none"> • relevance to the required investigation • reliability, such as from recognised and trusted scientific publications and whether there is any potential research bias associated with the source • availability of quantitative data • the strategies used in the literature in relation to what could be used in the setting
3	7–9	Produced a literature review that includes a credible explanation for the selection and rejection of a range of sources with reference to all the following factors: <ul style="list-style-type: none"> • relevance to the required investigation • reliability, such as from recognised and trusted scientific publications • availability of quantitative data • the strategies used in the literature in relation to what could be used in the setting
2	4–6	Produced a literature review that describes some of the following factors: <ul style="list-style-type: none"> • relevance to the required investigation • reliability, such as from recognised and trusted scientific publications • the strategies used in the literature in relation to what could be used in the setting
1	1–3	Produced a literature review that identifies some of the following factors: <ul style="list-style-type: none"> • relevance to the required investigation • reliability, such as from recognised and trusted scientific publications • references to the availability of quantitative data or the strategies used in the literature in relation to what could be used in the setting will be limited or absent
0	0	No creditworthy material as described in bands 4 to 1.

AO2: Apply core knowledge and skills to the development of a scientific project

Band	Mark	Descriptor
		The student has:
3	5–6	Correctly referenced all quotes and articles in their literature review using a recognised academic referencing technique (for example Harvard referencing), with consistent use of the referencing technique used. A wide range of sources are referenced.
2	3–4	Referenced most quotes and articles in their literature review using a recognised academic referencing technique (for example Harvard referencing) with consistent use of the referencing technique used. A range of sources are referenced.
1	1–2	Referenced some quotes and articles in their literature review without using a clearly recognised academic referencing technique.
0	0	No creditworthy material as described in bands 3 to 1.

AO4: Use English, mathematics, and digital skills as appropriate

Band	Mark	Descriptor
		The student has:
4	4	Communicated all aspects of the literature review with excellent use of level 2 English spelling, punctuation, and grammar, conveying meaning clearly and effectively throughout, using appropriate professional tone as expected for a literature review. Use of scientific/technical terminology and language is excellent with no errors.
3	3	Communicated most aspects of the literature review with a well-developed use of level 2 English spelling, punctuation, and grammar, conveying meaning clearly and coherently throughout the review, using appropriate professional tone as expected for a literature review. There is a good use of scientific/technical terminology and language with minimal errors.
2	2	Communicated most aspects of the literature review with inconsistent use of level 2 English spelling, punctuation, and grammar throughout the review, conveying the required meanings overall, although may lack some clarity and conciseness. Use of scientific/technical terminology and language is sound but contains some errors.

Band	Mark	Descriptor The student has:
1	1	Communicated most aspects of the literature review with simplistic use of English at level 1 or below throughout the review. There may be some errors which do not affect meaning or coherence. The use of scientific/technical terminology and language is minimal and includes some errors.
0	0	No creditworthy material. Spelling, punctuation, and grammar, or structure, makes most or all the literature review difficult to understand for the reader.

Indicative Content

The student should conduct a methodical literature review which is structured to highlight common themes. These could include, but are not limited to:

- presenting the findings from their research grouped together in common themes:
 - an overview of what diabetes is, it's causes, symptoms and impacts, utilising a range of reliable sources, in particular the peer reviewed articles linked and information from reliable sources such as the NHS and recognised charities
 - a brief description of how diabetes is managed via blood glucose monitoring and the injection of insulin, referencing reliable sources such as <https://wchh.onlinelibrary.wiley.com/doi/10.1002/pdi.2215> and <https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD003816.pub2/full>
 - a description of the differences between animal derived insulin and synthetic human insulin, with a focus on the different methods of manufacture, for example, <https://www.nlm.nih.gov/exhibition/fromdnatobeer/exhibition-interactive/recombinant-DNA/recombinant-dna-technology-alternative.html> and <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4203937/>, and the benefits of each to the patient, for example, <https://www.cochranelibrary.com/cdsr/doi/10.1002/14651858.CD003816.pub2/full>
- providing an explanation of the mechanism by which type 1 diabetes is treated by the injection of insulin. For example, a referenced description of diabetes as a metabolic disorder resulting from a defect in the secretion and/or action of insulin, resulting in a disturbance to general metabolism. Thus, patients who do not properly secrete insulin can be treated by the injection of insulin, which allows for proper controlled treatment of the disease
- conducting a methodical review of the use of both animal derived and synthetic human insulin in treatment of type 1 diabetes, with a focus on the benefits and drawbacks of each kind of insulin such as:
 - the methods required to produce each kind of insulin
 - the complexities and costs associated with producing each kind of insulin
 - the potential scale of production for each kind of insulin
 - ethical considerations associated with the production of each type of insulin
 - the effectiveness of each kind of insulin in controlling the patients' symptoms

- the potential adverse reactions possible with each kind of insulin
- exploring health and safety considerations related to each of the types of insulin. For example, the risk of an adverse immune response when injecting animal derived insulins, particularly bovine, or the need to be able to highly purify the insulin preparation for use in the patient
- an explanation of how the patients' blood glucose levels can be measured and how this would be used to monitor a patient's response to treatment with either of the types of insulin
- an explanation of the rationale for choosing each of the sources referenced. For example, an explanation that they have chosen academic articles as they have been peer-reviewed to ensure their content is reliable, or that information has been derived from reputable organisations/charities such as the NHS
- presenting data from the research, which should be analysed to a basic level, to enable conclusions to be drawn. For example, a comparison of the time taken and the length of action for the various types of insulin, referenced in <https://www.diabetes.co.uk/insulin/animal-insulin.html> and genetically modified insulins referenced in <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4203937/>, or a comparison of the production scale for each type of insulin and how this relates to expected demand.

Task 2: plan a project

AO1: Plan their approach to meeting the project brief

Band	Mark	Descriptor
		The student has:
4	10–12	<p>Produced a plan with clear aims that are entirely relevant to the project brief and used a wide range of sources selected in the literature review to determine the style and nature of the investigation.</p> <p>Set out the plan in logical, sequential steps which:</p> <ul style="list-style-type: none"> • are complete and sufficient to investigate the most economic use of methods and processes • are achievable in the timeframe • address resource issues and monitoring • are entirely relevant to its stated aims
3	7–9	<p>Produced a plan with aims that are relevant to the brief and based on a range of sources selected in the literature review.</p> <p>Set out a plan that can be followed to investigate the most economic use of methods and processes, with details of timeframes, resources, and requirements for each step.</p>
2	4–6	<p>Produced a plan with aims, using information from the literature review.</p> <p>Described several steps that are appropriate for the investigation.</p> <p>Described timescales and resources.</p>
1	1–3	<p>Produced a plan with some general aims unsupported by the literature review.</p> <p>Identifies some steps that are appropriate for the investigation.</p> <p>Listed timescales and/or resources without giving relevant detail.</p>
0	0	No creditworthy material as described in bands 4 to 1.

AO2: Apply core knowledge and skills to the development of a scientific project

Band	Mark	Descriptor
		The student has:
3	9–12	Completed a risk assessment, sufficient to cover and prioritise all risks which can reasonably be anticipated and describes their effective mitigation or management. Clearly explained risks involving others and does so correctly within the risk hierarchy (prioritisation).
2	5–8	Completed a risk assessment sufficient to cover most risks, including some detail on their mitigation or management. Described key risk involving others with some understanding of risk hierarchy (prioritisation).
1	1–4	Completed a risk assessment sufficient to cover some risks, including some detail on their mitigation or management. Described key risk involving others with some understanding of risk hierarchy (prioritisation).
0	0	No creditworthy material as described in bands 3 to 1.

AO4: Use English, mathematics, and digital skills as appropriate

Band	Mark	Descriptor The student has:
4	4	Communicated all aspects of the risk assessment with excellent use of level 2 English spelling, punctuation, and grammar, conveying meaning clearly and effectively throughout, in a logical structure using appropriate professional tone as expected for a risk assessment. Use of scientific/technical terminology and language is excellent with no errors.
3	3	Communicated most aspects of the risk assessment effectively with a well-developed use of level 2 English spelling, punctuation, and grammar, conveying meaning clearly throughout, with a clear attempt at using a logical structure, using appropriate professional tone as expected for a risk assessment. There is a good use of scientific/technical terminology and language with minimal errors.
2	2	Communicated most aspects of the risk assessment with inconsistent use of level 2 English spelling, punctuation, and grammar throughout, conveying the required meanings overall, although lacking some clarity and conciseness. Use of scientific/technical terminology and language is sound but contains some errors.
1	1	Communicated most aspects of the risk assessment with simplistic use of English at level 2 throughout. There may be some errors which do not affect meaning or coherence. The use of scientific/technical terminology and language is minimal and includes some errors.
0	0	No creditworthy material. Spelling, punctuation, and grammar, or structure, makes most or all the risk assessment difficult to understand for the reader.

AO5: Realise a project outcome and review how well the outcome meets the brief

Band	Mark	Descriptor
		The student has:
3	6–8	<p>Described in detail the types of data to be collected and the mechanisms of collection. The description clearly addressed how the data and its collection mechanism will meet the needs of the targeted practical investigation, the constraints of the setting, and the timeframes. Data is sufficient in breadth, quantity, and relevance to realise the stated project aims.</p> <p>Guidance</p> <ul style="list-style-type: none"> types of data: qualitative/quantitative, numerical/verbal, primary/secondary
2	3–5	<p>Described the types of data to be collected and the mechanisms of collection, which meet the needs of the targeted practical investigation. Data is adequate in breadth, quantity, and relevance to realise the stated project aims.</p> <p>Guidance</p> <ul style="list-style-type: none"> types of data: qualitative/quantitative, numerical/verbal, primary/secondary
1	1–2	<p>Identified some of the data to be collected and its mechanism of collection, with some but limited consideration of practicability for the setting, or realistic timeframes. Data is adequate for some elements (breadth, quantity, and relevance to realise the stated project aims). There is little differentiation of types of data.</p> <p>Guidance</p> <ul style="list-style-type: none"> types of data: qualitative/quantitative, numerical/verbal, primary/secondary
0	0	No creditworthy material as described in bands 3 to 1.

Indicative Content

The student should consider:

- outlining the objective/aim of the experiment; to investigate the onset of action and the length of action of porcine insulin compared to synthetic human insulin in patients with type 1 diabetes
- producing a plan with a clearly defined strategy to meet the stated aims, including:
 - an experimental method for testing the effects of both types of insulin, including administration of the insulin and monitoring of the effects of the insulin over a defined time period
 - a strategy for monitoring the effects of the insulin, including, how to test the response, types of sample to be collected, how the samples will be analysed, the timepoints required to test the effectiveness of the response

- clear use of control variables, such as:
 - treating the same patient(s) with the two types of insulin/using sufficient numbers of patients in each group
 - controlling food intake prior to and during the experiment
 - measuring the response at set timepoints in all experiments
 - measuring blood glucose levels prior to the onset of treatment
- reference to the literature review, where appropriate, to justify their decisions when planning the experiment
- outlining how the data will be collected, analysed and interpreted, in relation to the stated aims, to allow for a valid conclusion to be drawn from the experiment which is reported to the supervisor
- producing a risk assessment that identifies any relevant hazards to both the patient and anyone else involved in the experiment. Students should also score any risks and suggest sensible controls for the risks to reduce the scores
- example of what the plan could include:
 - recruit a wide cohort of patients and randomly assign each to one of the two types of insulin, monitoring their blood glucose levels over time via self-reporting
 - recruiting a limited number of patients and designing a controlled study in which the patients' blood glucose levels were regularly monitored and the effects of food intake were assessed at various time points to determine how well each type of insulin controlled blood glucose at different times post injection.

Task 3: analysis of data

AO2: Apply core knowledge and skills to the development of a scientific project

Band	Mark	Descriptor
		The student has:
4	13–16	<p>Within the report the student has demonstrated accurately all relevant and required data, demonstrating an excellent balance of data and information selected for presentation, and including the outputs of their statistical analysis, with valid and relevant use of tables, charts, and graphs.</p> <p>Chosen visualisation techniques that are appropriate and realistic for the data and the project aims, and which add value to the analysis, enhancing readability and understanding.</p>
3	9–12	<p>Within the report the student has demonstrated accurately most of the relevant and required data, selecting sufficient data and information for presentation, and including the outputs of their statistical analysis, with valid use of tables, charts, and graphs.</p> <p>Chosen visualisation techniques that are realistic for the data and the project aims, some add value to the analysis, enhancing readability and/or understanding.</p>
2	5–8	<p>Within the report the student has demonstrated most of the relevant and required data, including the outputs of their statistical analysis, with some valid use of tables, charts and/or graphs.</p> <p>Chosen visualisation techniques that support the project aims and add some value to the analysis, and that are readable.</p>
1	1–4	<p>Within the report the student has demonstrated some of the required data with limited use of tables, charts, or graphs, and where tables, charts and graphs are used, the choice of visualisation techniques only tentatively support the project aims or add limited value to the analysis.</p>
0	0	No creditworthy material as described in bands 4 to 1.

AO3: Select relevant techniques and resources to meet the brief

Band	Mark	Descriptor
		The student has:
3	5-6	Selected an appropriate statistical technique and used it correctly to produce valid outcomes that inform clearly expressed conclusions relevant to the project aims.
2	3-4	Selected a relevant statistical technique and used it to produce results that aided the student's conclusions.
1	1-2	Selected and used a statistical technique to produce results with a basic description of the analytical outcome that does not contribute to the student's conclusions.
0	0	No creditworthy material as described in bands 3 to 1.

AO4: Use English, mathematics, and digital skills as appropriate

Band	Mark	Descriptor The student has:
3	5–6	Communicated all aspects of the report clearly and effectively throughout, in a logical structure and with excellent use of level 2 English spelling, punctuation and grammar, which also supports the use of accurate technical and scientific language.
2	3–4	Communicated most aspects of the report effectively, with some attempt at a logical structure. Use of English spelling, punctuation and grammar and use of technical /scientific language supports understanding for the reader although is likely to have several minor errors (which do not impact on reader understanding).
1	1–2	Communicated some aspects of the report with little evidence of a structure. Use of level 1 English spelling, punctuation and grammar and use of technical/scientific language supports understanding of some parts of the report for the reader.
0	0	No creditworthy material. Spelling, punctuation and grammar, or structure, makes most or all of the report difficult to understand for the reader.

AO5: Realise a project outcome and review how well the outcome meets the brief

Band	Mark	Descriptor
		The student has:
3	5–6	<p>Provided balanced and well-justified conclusions that explicitly link to:</p> <ul style="list-style-type: none"> the trends and patterns shown in the data the implications of any outliers and/or potential anomalies the project aims <p>Given a well-thought through explanation of the limitations of the data or the strategy with reference to the conclusions, addressing all elements (bulleted above) in a balanced way, such as with relevant and sufficient weight.</p>
2	3–4	<p>Provided conclusions relevant to the trends and patterns shown in the data. Referred to the project aims with descriptions of limitations in data or strategy.</p>
1	1–2	<p>Provided a conclusion with some reference to the trends and patterns shown in the data, and with limited reference to the project aims.</p>
0	0	<p>No creditworthy material as described in bands 3 to 1.</p>

Indicative Content

The student's analysis could:

- plot the data in a manner that allows for clear visualisation of the effects of the two types of insulin on the patients' blood glucose levels. For example, a line graph showing the blood glucose levels against time, either with mean values and error bars or all of the individual experiments plotted and a clear visual difference between the types of insulin plotted
- identify the time required for each experiment for the patients' blood glucose levels to be brought down to within the normal range of 4-9 mmol/L for type 1 diabetics, recording the time required for each experiment following injection
- identify that over the first 4 hours, the synthetic human insulin is able to reduce the blood glucose level significantly faster than the porcine insulin. After 4 hours there is a reduction in the significance of the difference between the two types of insulin at controlling blood glucose levels
- performed a statistical analysis, for example, students t-test on the time required for each type of insulin to reduce blood glucose levels to within the normal range of 4-9 mmol/L for type 1 diabetics
- identify the levels of blood glucose in each patient at 4 hours, immediately after the administration of the controlled dose of chocolate, recording the levels of the blood glucose at this time point in each experiment

- recording the level at 255 minutes would also be valid as the student may state this time is needed for an effect to be seen
- performed a statistical analysis, for example, students t test on the blood glucose levels following the controlled dose of chocolate, identifying that there is no significant difference in the ability of each type of insulin to control the blood glucose levels 4 hours after administration
- stated their conclusions, based on their statistical analysis of the data. For example, in the first 4 hours, the human insulin is faster acting and better able to control blood glucose levels than the pig insulin. However, 4 hours after the administration of the insulin, there is no significant difference between the two types of insulin and their ability to control blood glucose levels.

Task 4: presentation of outcomes and conclusions

AO2: Apply core knowledge and skills to the development of a scientific project

Band	Mark	Descriptor
		The student has:
4	10–12	<p>Included on the A2 poster a concise explanation of:</p> <ul style="list-style-type: none"> the investigation aims the investigation plan the results and their analysis the conclusions of the investigation <p>All the important trends and patterns in the data are highlighted with tables, charts and graphs which are accurate, accessible, relevant, and drawn from the student's analysis.</p> <ul style="list-style-type: none"> tables, charts, and graphs will include only a concise explanation of key trends and data and are not just be copied over from their analysis report, unless these are effective summaries for the purpose of this presentation task existing or new tables, graphs and charts may be printed and physically pasted onto their poster, or software may be used to create part or all the poster
3	7–9	<p>Included on the A2 poster an explanation of:</p> <ul style="list-style-type: none"> the investigation aims the investigation plan the results and their analysis the conclusions of the investigation <p>All the important trends and patterns in the data are highlighted with tables, charts and graphs which are accurate, accessible, relevant, and drawn from the student's analysis.</p> <ul style="list-style-type: none"> tables, charts and graphs on the poster will include accurate and relevant information, but may not always be in the form of a concise explanation, for example, there may be some cluttered and/or long-winded elements existing or new tables, graphs and charts may be printed and physically pasted onto their poster, or software may be used to create part or all the poster
2	4-6	<p>Included on the A2 poster a description of:</p> <ul style="list-style-type: none"> the investigation aims

Band	Mark	Descriptor
		<p>The student has:</p> <ul style="list-style-type: none"> • the investigation plan • the results and their analysis • the conclusions of the investigation <p>Some of the important trends and patterns in the data are highlighted with tables, charts and graphs which are reasonably accurate, accessible, and drawn from the student's analysis.</p> <ul style="list-style-type: none"> • tables, charts, and graphs on the poster will include mostly accurate and accessible information, but may not always be in relevant, for example, it may have areas where it is unclear what conclusions are supported, or what points are being made • existing or new tables, graphs and charts may be printed and physically pasted onto their poster, or software may be used to create part or all the poster
1	1–3	<p>Listed on the A2 poster some detail in the following areas:</p> <ul style="list-style-type: none"> • the investigation aims • the investigation plan • the results and their analysis • the conclusions of the investigation <p>The detail is limited with key points missing, and where detail is provided, this may repeat or contradict already made points, descriptions, or conclusions.</p> <p>Tables and graphs, if used, may lack clarity, important material may be missing and superfluous material may be included which does not contribute to the key points of the investigation or analysis. The student may fail to highlight key trends and patterns in the data.</p>
0	0	No creditworthy material as described in bands 4 to 1.

AO3: Select relevant techniques and resources to meet the brief

Band	Mark	Descriptor The student has:
3	5–6	Designed the A2 poster to enable all content to be easily accessible to an audience (with scientific literacy), making maximum use of the available space and arranging the content logically. All artwork and colouring aids the accessibility and understanding of the information presented (is not merely decorative) and key points (relating to the investigation aim, the results analysis or conclusions, or the investigation conclusions) are prominent and easily recognised.
2	3–4	Designed the A2 poster to enable most of the content to be easily accessible to an audience, arranging the content in a logical way to make reasonable use of the available space. Overall, the artwork and colouring aids improve the accessibility and understanding of the information presented (is not merely decorative), although one or two key points (relating to the investigation aim, the results analysis, or conclusions) may lack relevance, or only add decorative value.
1	1–2	Designed the A2 poster to display a limited amount of the content well, although organisation of content is cluttered and could make better use of the space available. Artwork and colouring are mainly decorative although may be appropriate to highlight 2 key points (relating to the investigation aim, the results analysis, or conclusions) for the audience.
0	0	No creditworthy material as described in bands 3 to 1.

AO4: Use English, mathematics, and digital skills as appropriate

Band	Mark	Descriptor
		The student has:
4	4	<p>Utilised IT software and/or applications or used mathematical processes or a combination of both digital and mathematical skills, in order to:</p> <ul style="list-style-type: none"> organise and assign importance to all the data required conduct their analyses (including statistical analysis) produce accurate tables, charts and/or graphs which are presented clearly and are accessible to the intended audience
3	3	<p>Utilised IT software and/or applications or used mathematical processes or a combination of both digital and mathematical skills, in order to:</p> <ul style="list-style-type: none"> organise and assign importance to most of the required data conduct their analyses (including statistical analysis) produce relevant tables, charts and/or graphs
2	2	<p>Utilised IT software and/or applications or used mathematical processes or a combination of both digital and mathematical skills, in order to:</p> <ul style="list-style-type: none"> organise and assign importance to some of the required data conduct some analyses produce some relevant tables, charts and/or graphs <p>It is clear to the audience that the use of digital and/or mathematical skills could be strengthened to enhance accuracy.</p>
1	1	<p>Utilised IT software and/or applications or used mathematical processes or a combination of both digital and mathematical skills, in order to:</p> <ul style="list-style-type: none"> organise and assign importance to some of the required data conduct some analyses produce some but limited tables, charts and/or graphs <p>It is clear to the audience that the use of digital and/or mathematical skills could be strengthened to enhance accuracy, accessibility, and presentation.</p>
0	0	No creditworthy material. Spelling, punctuation and grammar or structure makes most or all the literature review difficult to understand for the reader.

AO5: Realise a project outcome and review how well the outcome meets the brief

Band	Mark	Descriptor
		The student has:
3	5–6	Verbally presented the contents on the A2 poster clearly and without the need for tutor questions, using the detail as a stimulus for the presentation, expanding on each section to clearly articulate all the following: <ul style="list-style-type: none"> the aims of the project the results of the analysis their conclusions.
2	3–4	Verbally presented the contents on the A2 poster, broadly using the detail as a stimulus for the presentation, expanding on some of the sections to articulate most of the following: <ul style="list-style-type: none"> the aims of the project the results of the analysis their conclusions.
1	1–2	Verbally presented the contents of the A2 poster, almost entirely reading from each section of the poster, rather than expanding on the detail. If the student attempts to use the poster as a stimulus, their presentation covers a minority of key points, lacking in clarity, with some significant omissions of key points, or mention of points that are not relevant to the project aims.
0	0	No creditworthy material as described in bands 3 to 1.

Indicative Content

The student could provide evidence of the following:

- a poster with clearly defined sections, to include:
 - a brief introduction to the research problem and the aims of the experiment
 - a brief summation of the methods used to acquire the data
 - a summation of the data to allow for viewers to see the results of the experiment and the data used to draw any conclusion
 - a brief conclusion stating the results of the experiment
- any appropriate graphical representation of the data, for example, line graphs for the response, box or bar charts for the times taken to reduce blood glucose levels/blood glucose levels after 4 hours and clearly

labelled, allowing the viewer to very quickly and clearly identify what the data is showing, including a concise explanation of key trends within the data

- a poster that is legible and appropriate for its size, making use of all of the space available without overcrowding
- clear and concise verbal communication of the contents of their poster when presenting it.

Task 5: group discussion

AO2: Apply core skills and knowledge to the development of a scientific project

AO3: Select relevant techniques and resources to meet the brief

AO5: Realise a project outcome and review how well the outcome meets the brief

Band	Mark	Descriptor
		The student has:
3	7–9	<p>Demonstrated consistent engagement throughout, and a comprehensive breadth and depth of knowledge relevant to the discussion, both when asking questions and in answering those of others, raising well-informed points and arguments, articulating these in clear language for all students to understand, and may even check that others have understood accurately.</p> <p>Listened to other ideas and opinions respectfully, reflecting or building on these in their own responses, demonstrating collaboration with others to reach an appropriate and relevant solution.</p> <p>Written an email that responds clearly and fully to the initial concerns raised by the parent with valid solutions.</p>
2	4–6	<p>Demonstrated some engagement throughout, and a reasonable breadth of knowledge relevant to the discussion, both when asking questions and in answering those of others, raising some valid points and expressing these in clear language.</p> <p>Listened to other ideas and opinions without interruption, demonstrating an understanding of other opinions and consideration of these to reach an appropriate and relevant solution.</p> <p>Written an email that responds clearly to the initial concerns raised by the parent, including valid solutions, but may only partially address the concerns.</p>

Band	Mark	Descriptor
1	1–3	<p>The student has:</p> <p>Demonstrated limited engagement with the discussion, and a basic knowledge relevant to the discussion, both when asking questions and in answering those of others, raising points and arguments that are tentative and largely unsupported by suitable evidence, articulating these in language that is sometimes understandable to the other students but is not always clear.</p> <p>Listened to other ideas and opinion but was not always respectful of the opinions of others or may be dismissive of their contribution. Did not consider other opinions to reach a solution, or they reached a solution that was not appropriate or suitable.</p> <p>Written an email that responds only tentatively to the initial concerns raised by the parent.</p>
0	0	No creditworthy material as described in bands 3 to 1.

Indicative Content

The evidence should demonstrate:

- clear communication and engagement with their peers about the query in the concerned parent email, for example, confidently communicating their opinions on how best to respond to the email, actively listening to their peers and taking onboard their opinions, allowing the information to either help shape their own opinions or using their opinions to rebut that of their peers in a professional, well explained manner
- the ability to rationalise the advice given in the response to the email, for example, using data from their literature reviews to provide information in response to the email
- clearly and rationally implement the points from the group discussion into the email reply
- may discuss other factors that may need to be considered, for example, the patients' vegan lifestyle may make them hesitant to use porcine insulin regardless of any benefits porcine may offer and this would have to be considered and managed.

Task 6: reflective evaluation

AO2: Apply core knowledge and skills to the development of a scientific project

AO3: Select relevant techniques and resources to meet the brief

AO5: Realise a project outcome and review how well the outcome meets the brief

Band	Mark	Descriptor
		The student has:
4	11–14	<p>Provided an evaluation of all the following tasks, including a comprehensive and balanced explanation of what worked well and what worked less well:</p> <ul style="list-style-type: none"> • their literature review • their project plan • their analysis of given data, including their choice of statistical analysis technique • their A2 poster and its presentation <p>Provided balanced and well-justified reasons for all the changes (or not) they would make if repeating each task, with direct reference to the aims of the project and resource constraints or general constraints of the setting and demonstrating a clear understanding of how changes in different tasks interact and impact on the quality of the other tasks.</p>
3	7–10	<p>Provided an evaluation of all the following tasks, including credible explanations of what worked well, what worked less well:</p> <ul style="list-style-type: none"> • their literature review • their project plan • their analysis of given data, including their choice of statistical analysis technique • their A2 poster and its presentation <p>Provided well-justified reasons for all the changes (or not) they would make if repeating each task, with direct reference to the aims of the project and resource constraints/constraints of the setting.</p>

Band	Mark	Descriptor
2	4–6	<p>The student has:</p> <p>Provided an account of most of the following tasks, including some explanation of what worked well and what worked less well:</p> <ul style="list-style-type: none"> • their literature review • their project plan • their analysis of given data, including their choice of statistical analysis technique • their A2 poster and its presentation <p>Outlined some reasons for the changes they would make if repeating each task, with some reference to the aims of their project or any resource constraints/constraints of the setting.</p>
1	1–3	<p>Listed examples of what worked well, and what worked less well for some of the following tasks:</p> <ul style="list-style-type: none"> • their literature review • their project plan • their analysis of given data, including their choice of statistical analysis technique • their A2 poster and its presentation <p>Outlined basic changes they would make if repeating the tasks making little or no reference to the reasons why or how it relates to the aims of their project.</p>
0	0	No creditworthy material as described in bands 4 to 1.

AO4: Use English, mathematics, and digital skills as appropriate

Band	Mark	Descriptor
		The student has:
4	4	Communicated all aspects of the reflective evaluation with excellent use of level 2 English spelling, punctuation, and grammar, conveying meaning clearly and effectively throughout, in a logical structure. Use of scientific/technical terminology and language is excellent with no errors.
3	3	Communicated most aspects of the reflective evaluation effectively with a well-developed use of level 2 English spelling, punctuation, and grammar, conveying meaning clearly throughout, with a clear attempt at using a logical structure. There is a good use of scientific/technical terminology and language with minimal errors.
2	2	Communicated most aspects of the reflective evaluation with inconsistent use of level 2 English spelling, punctuation, and grammar throughout, conveying the required meanings overall, although lacking some clarity and conciseness. Use of scientific/technical terminology and language is sound but contains some errors.
1	1	Communicated most aspects of the reflective evaluation with simplistic use of English at level 2 throughout. There may be some errors which do not affect meaning or coherence. The use of scientific/technical terminology and language is minimal and includes some errors.
0	0	No creditworthy material. Spelling, punctuation, and grammar, or structure, makes most or all the reflective evaluation difficult for the reader to access or understand.

Indicative Content

The student's reflective evaluation could:

- include an account of the effectiveness of their own communication skills (written and verbal) and quality of their own contribution within the tutor discussion, as well as the quality of their written work and analysis
- review how effective they have been in completing all the tasks, commenting on the quality of their plan and the extent to which it allows investigation of the problem
- identify any areas of weakness and describe desired improvements to their own knowledge, planning skills and collaborative working for future practice.

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