Course report 2025

Advanced Higher Biology

This report provides information on candidates' performance. Teachers, lecturers and assessors may find it useful when preparing candidates for future assessment. The report is intended to be constructive and informative, and to promote better understanding. You should read the report with the published assessment documents and marking instructions.

We compiled the statistics in this report before we completed the 2025 appeals process.

Grade boundary and statistical information

Statistical information: update on courses

Number of resulted entries in 2024: 2,999

Number of resulted entries in 2025: 3,125

Statistical information: performance of candidates

Distribution of course awards including minimum mark to achieve each grade

Course award	Number of candidates	Percentage	Cumulative percentage	Minimum mark required
A	536	17.2	17.2	100
B	702	22.5	39.6	84
C	776	24.8	64.4	69
D	658	21.1	85.5	53
No award	453	14.5	100%	Not applicable

We have not applied rounding to these statistics.

You can read the general commentary on grade boundaries in the appendix.

In this report:

- ‘most’ means greater than or equal to 70%
- ‘many’ means 50% to 69%
- ‘some’ means 25% to 49%
- ‘a few’ means less than 25%

You can find statistical reports on the statistics and information page of our website.

Section 1: comments on the assessment

Question paper

The question paper had the appropriate balance of questions to test knowledge, understanding, and skills. It contained questions that most or many candidates answered correctly, as well as an appropriate proportion of questions that were more challenging. Feedback from the marking and examining teams indicated that the question paper was fair, balanced, and accessible.

Question 12 contained a choice of extended writing. Option A (meiosis) was more popular than option B (plasmodium), though the mean mark for both options was similar.

Section 1 of the question paper performed as expected and section 2 was more challenging than expected. We took this into account when setting grade boundaries.

Project

The project performed as expected.

Candidates investigated a wide variety of topics that allowed them to carry out novel and interesting work.

Markers and examiners noted an increase in the number of centres where multiple candidates carried out very similar projects, often with the same aim. As the assessment conditions state, centres must avoid this.

Section 2: comments on candidate performance

Question paper

Candidates achieved a wide range of marks for the question paper. Most candidates demonstrated a broad knowledge of the course content and attempted all, or most, of the questions. This year, fewer candidates had a high level of no responses; however, some candidates gave no response to several or, in some cases, most questions.

Candidates performed best in questions that required them to demonstrate knowledge by giving terms or making relatively simple statements based on the mandatory knowledge. Candidates generally performed well in questions that had an element of choice. Many candidates performed strongly in extended-writing questions, which effectively differentiated candidates.

Many candidates demonstrated competence in a wide range of skills, including processing, planning and suggesting improvements to experimental design, and selecting data.

Candidates generally did not perform as strongly in questions that asked them to demonstrate a greater degree of reasoning or understanding by applying their knowledge to new or unfamiliar contexts. Candidates generally did not perform as well in questions relating to the key areas of investigative biology or questions that asked them to draw conclusions from tables and graphs.

Markers noted that some candidates demonstrated limited knowledge of the course content by giving few correct responses, which suggests that they had not prepared adequately for the assessment.

Markers and examiners noted that the literacy skills of some candidates had an impact on their ability to express themselves clearly and concisely, which caused them to miss out on marks.

Section 1: multiple choice

Question 3	Some candidates applied their knowledge of isoelectric points and density to determine protein locations within the sample.
Question 5	Most candidates identified the correct sequence of molecules in the amplification pathway in the vertebrate eye.
Question 6	Many candidates correctly calculated the area of the synapse.
Question 10	Few candidates correctly identified that the type of data for red wing area is qualitative data. The score assigned is based on observation rather than numerical data and so could not be ranked.
Question 11	Most candidates did not use the phylogenetic tree to interpret the statements provided.
Question 15	Some candidates selected pairs of graphs that represented the information given in the question.
Question 18	Many candidates selected the correct conclusion from the data provided.
Question 19	Most candidates correctly applied their knowledge of r-selection and K-selection to this species, recognising that it had traits of both groups.

Section 2: structured response

Question 1(a)(ii)	Some candidates explained how sexual dimorphism arises due to male-male rivalry. Many candidates missed the significance of success in rivalry leading to increased access to females from their response. Some candidates used key biological terms such as ‘genes’ and ‘alleles’ incorrectly.

Question 1(b) Few candidates used the information in the supplementary sheet correctly to interpret the differences in the ratio between regenerated and original claws, and how this would affect claw morphology. Candidates who did not gain the mark, often referred only to the x-axis of the line graph (Figure 1B) without referring to the diagram of the claw (Figure 1A).

Question 1(c)(i) Many candidates drew a conclusion related only to claw size. Where candidates did not gain the mark, they referred to the strength of regenerated and original claws only, without referring to claw size.

Question 1(c)(ii) Some candidates drew a comparison between the strength of the correlation between original and regenerated claws. Although not incorrect, this information alone was not a sufficient response as the stem of the question already stated the trends of both lines. Candidates that gained the mark here identified that the gradient of the trend line was steeper in the original claws compared to the regenerated claws.

Question 1(d)(i) Few candidates selected information from Figure 3A, showing that per gram of muscle tissue the oxygen consumption was very similar in both types of claws.

Question 2(b) Many candidates correctly described the purpose of using a blank in colorimetry. Some candidates incorrectly referred to the blank as a negative control and missed out on the mark as a result.

Question 2(c) Many candidates demonstrated understanding of precision through their analysis of the data in the table.

Question 2(d)	Many candidates described the importance of constructing a calibration curve. Where candidates did not gain full marks, they often did not mention the significance of calculating means of the known values in the table to determine the values to be plotted.
Question 3(a)	Few candidates gained 2 marks for this question. Some candidates correctly stated that increasing temperature would disrupt the interactions between the r-groups (tertiary structure), however many candidates repeated the question stem or gave answers not appropriate for Advanced Higher level. Where candidates gained 2 marks, they linked the disruption of the tertiary structure to the protein unfolding.
Question 3(b)	Most candidates demonstrated some knowledge of the role of hydrophilic signalling molecules. This question differentiated candidates well.
Question 3(c)	Some candidates did not correctly convert between SI units, resulting in their response being incorrect by orders of magnitude.
Question 4(b)(i)	Few candidates applied their knowledge of lymphocyte clonal selection to the requirement for increased DNA synthesis and, therefore, the requirement for more CTP to allow this to happen.
Question 4(c)(i)	Some candidates did not identify the turning point in the trend, describing only what happened between 0mM and 1mM CTP production. This meant that they did not sufficiently address all of the data in the figure.
Question 4(c)(ii)	Some candidates did not select appropriate data from the graph to support their response. To gain full marks, candidates had to use data.

Question 7(a)(i)	Most candidates demonstrated very good knowledge of the sodium-potassium pump. A few candidates recited the whole story of the pump. Although these candidates did gain marks, they did not engage fully with the question, which required a specific focus on conformation change and affinity change.
Question 7(b)(ii)	Many candidates gave partial answers to this question rather than giving a full prediction based on the information provided.
Question 8(a)	Some candidates demonstrated a good knowledge of the term ‘anthropomorphism’. The candidates who missed out on the mark did not explain why anthropomorphism must be avoided.
Question 8(c)(i)	Most candidates provided a justification for whether the action of the dogs’ owners was a positive or negative aspect of experimental design.
Question 8(d)(i)	Few candidates determined that the sample size was large enough due to the small size of the error bars.
Question 9(a)(ii)	Many candidates suggested an appropriate control measure when carrying out fieldwork. Some candidates answered in the context of experimental design, incorrectly using the terms ‘positive control’ or ‘negative control’ in their responses.
Question 10(a)	Few candidates fully applied their knowledge of the concept of natural selection to the newly introduced concept of selective sweep.
Question 10(c)	Many candidates demonstrated good knowledge of the Hardy-Weinberg principle.
Question 12	Many candidates performed well in the extended-response questions. Question 12 differentiated candidates well.

Project

As in previous years, most candidates performed well in the procedures and results section. Many candidates did not perform as well in the discussion section of the report.

Many candidates carried out practical work of suitable challenge and complexity to access marks throughout the project report. Markers and examiners highlighted that some candidates undertook practical work that was too simplistic at this level, which prevented them from accessing marks in the procedures and discussion section.

Teachers and lecturers have a responsibility to ensure that candidates can access all marks available for the project report during the planning stage.

1 Abstract

Most candidates provided an abstract with a suitable aim, together with the main findings of their investigation. It is essential that the findings stated in the abstract are consistent with the findings of the overall project.

2 Introduction

Most candidates gave an acceptable aim and hypothesis. Most candidates stated both the independent and dependent variables in their aim. A few candidates gave hypotheses that did not match the stated aim, or, in cases where the independent variable was discrete, did not indicate which measure of the independent variable would have the greatest effect on the dependent variable.

Many candidates made a good attempt to describe the biology underlying their project. As in previous years, only a few candidates gained full marks for this section.

Candidates must include information in their underlying biology that is relevant to the biological system that they are investigating. Some candidates did not address biology fundamental to the topic they studied and presented large amounts of information that was irrelevant to their aim(s). For example, if candidates are

investigating an enzyme, any discussion related to protein structure should be in the context of their specific enzyme rather than a general account of protein structure.

Most candidates attempted to justify the project that they were carrying out, though some of these justifications were only tenuously linked to the investigation.

3 Procedures

Most candidates presented a robust account of the procedures that they used in their investigation, gaining many of the marks available for this section.

Most candidates used procedures that were appropriate to the aims of the investigation. If candidates missed out on this mark, it was because the procedures they used would not allow them to achieve the aim(s). Candidates must consider whether the procedure they intend to use would allow them to obtain a valid measurement of the dependent variable.

Most candidates described the independent and dependent variables used in their procedure and how they changed or measured them. Most candidates gave a full account of the procedure they used in sufficient detail for it to be repeated from the description. Candidates who missed out on marks did not provide all of the essential details of the procedures, gave descriptions that lacked clarity or contained contradictory information, or wrote the procedures in the imperative voice (usually as a list of instructions).

Many candidates included a description of a negative control, where appropriate, or explained why they did not need a negative control. Some candidates also included appropriate baseline measurements or positive controls which, although not necessary to gain the mark for section 3(c), potentially provided useful data for analysis and evaluation in the discussion section of the report.

While most candidates controlled or monitored confounding variables, few candidates described how they achieved this satisfactorily. Candidates should consider the major confounding variables affecting their study and account for these in this section of the project report, providing detail on how they controlled them.

Most candidates described an appropriate pilot study and justified how it informed their final procedures. Most candidates who did not gain the mark for a pilot study still carried out a pilot study, but they did not adequately justify its importance to the final experimental procedure.

Many candidates carried out work that had suitable complexity, creativity, or accuracy. Candidates who did not gain this mark produced work that was not suitably complex for this level or used well-known published protocols with little or no modification or originality.

4 Results

Many candidates performed well in this section of the project report.

Most candidates included raw data in the report. (When the raw data is extensive, candidates can include it in an appendix to help the flow of the report.) Candidates must ensure that they include their raw data. Some candidates presented partially processed data, which prevented them from meeting the criteria for this mark.

As in previous years, the construction and quality of tables was an issue. Candidates must ensure that mean calculations do not claim a greater degree of accuracy than the raw data. Table headings should be appropriate for columns and contain appropriate units.

Candidates should submit their original hand-drawn graphs rather than including digital scans or photographs of graphs, which were difficult for markers to judge.

5 Discussion

Many candidates gave a conclusion that was relevant to the aim and supported by the data in the report. A few candidates gave a conclusion that was relevant but not supported by the data presented, for example, indicating trends that did not exist in the data. Only a few candidates gave a valid conclusion. The validity of some conclusions was compromised by methodological flaws, such as inadequate control of confounding variables or a sample size that was too small.

The evaluation marks in this section are intended to challenge candidates.

Most candidates attempted to evaluate their procedures, but only some candidates gained marks. Some candidates missed out on marks because they largely repeated descriptions of how they had carried out their procedures and did not include suitable justification of why their experimental design was appropriate. Some candidates did not go beyond very simple justification, such as stating repeats were carried out to make the results more reliable. This is not sufficient at this level, and candidates who gained marks showed understanding by justifying why the sample size they used was appropriate in terms of, for example, the degree of variation observed.

Only some candidates gained marks for evaluating their results. Most candidates attempted to provide some evaluation of their results, but not all candidates addressed the three areas outlined in the marking instructions.

Many candidates did not demonstrate the required critical discussion or level of understanding in their evaluation of results. Candidates who carried out overly simple projects were limited in the discussion they could offer in this section.

Some candidates tried to outline variation between repeats and replicates but gave inaccurate descriptions of the variation or didn’t offer any explanation of the differences they observed. Some candidates tried to use statistical analysis to help with the analysis of results but used or interpreted tests incorrectly. When trying to interpret their results, many candidates did not consider the appropriateness of the procedures, the accuracy of the measurements, or the reliability of the data. Few candidates carried out additional processing or presentation of their data, beyond the presentation of mean values, to help discuss the meaning of trends. A few candidates made good use of relevant and robust sources to inform a good discussion of the findings in relation to the underlying biology discussed earlier in the report.

6 Presentation

Most candidates provided a report with an appropriate structure, including an informative title and a contents page with page numbers.

As in previous years, some candidates did not cite references correctly, as outlined in the instructions for candidates.

Section 3: preparing candidates for future assessment

Question paper

Candidates preparing for future assessments should work towards having a sound knowledge and understanding of the mandatory knowledge detailed in the course support notes (Appendix 1 of the Advanced Higher Biology Course Specification). As well as being able to demonstrate knowledge of the mandatory course content, candidates must be able to show understanding and reasoning by being able to apply that knowledge in unfamiliar contexts.

To help candidates understand and process novel information in questions, teachers and lecturers should encourage them to read questions carefully and focus their responses on the question asked. Candidates should be careful not to base their responses solely on mandatory knowledge when they also need to use the information in the stem of a question. Candidates should focus on understanding the course content rather than memorising it.

Teachers and lecturers should give candidates opportunities to develop and practise the range of skills described in the course specification. Candidates should be familiar with data-handling questions and know how to use the information in a supplementary sheet. Candidates must be careful to use the given data, and other information, when required. When drawing conclusions, candidates should avoid simply restating results or giving responses using only some of the data the question asks them to consider.

The question paper can assess the mandatory knowledge in all key areas of investigative biology at any point, and candidates should have a good grasp of this course content to achieve marks in the experimental design questions.

Teachers and lecturers should give candidates opportunities to practise a variety of questions across all key areas so that they become familiar with the standard

required at Advanced Higher level. Past papers, and their associated marking instructions, are available on our website.

Project

Candidates should choose a topic to investigate, but teachers and lecturers must agree the topic to ensure it is appropriate. As stated in the Advanced Higher Biology Project Assessment Task, candidates from the same centre should investigate different topics. In large centres, more than one candidate can investigate similar topics, but each candidate must carry out all stages of the investigation independently of each other. Several candidates from a centre should not carry out similar projects. Candidates from the same centre must have different aims.

Resources, including online resources, are available to help candidates formulate ideas and develop their protocols, but candidates must use these resources in a way that avoids plagiarism.

Teachers and lecturers must comply with all relevant safety and ethical regulations and codes of practice, including those relating to the use of microbiological techniques. The instructions for candidates indicate that candidates should be involved in preparing a risk assessment for their procedures, but teachers or lecturers must check this, as they are responsible for ensuring appropriate risk assessments are completed and all work is being carried out safely. Teachers and lecturers must also ensure any ethical concerns around the use of human subjects or animals have been appropriately considered. Candidates should not work with prescription medications as part of their project.

Candidates should ensure that the underlying biology is relevant to the biological system that they are studying. This ensures that the content of this section is relevant to the aim of the investigation. Where they use model organisms or systems, candidates should explain the importance of the system they are using in answering any wider question they are studying. Teachers and lecturers should encourage candidates to ensure that any biological models they use are appropriate to their investigation (for example, it is unlikely that eggshells will be an appropriate model for human teeth).

Teachers and lecturers should encourage candidates to avoid copying large chunks of text verbatim in their account. The underlying biology should be at an appropriate depth to support section 5 (discussion (conclusion(s) and evaluation)) as candidates must link their findings back to this section. Candidates do not need to limit themselves to theory covered in the Advanced Higher Biology course.

Candidates must follow the instruction to use past tense and imperative voice when writing the description of procedures in their report. They must avoid giving a set of instructions. The description of procedures must have sufficient detail to allow the investigation to be repeated. Candidates should consider the questions about writing procedures in the instructions for candidates to ensure they cover the necessary information, including the controls that they used; how they controlled confounding variables; the sample size they used; how they achieved independent replication; and how the pilot study or studies informed the final procedure.

Candidates must include their raw, unprocessed, data in the report. Teachers and lecturers should encourage candidates to use interesting and informative graphical presentations to display and discuss their data. Candidates must combine data from replicates to present summarised data in a graph supported by an appropriate table, but they are not limited by this. Processing and presenting data in additional ways might provide scope for candidates to further analyse and evaluate their results.

Candidates who create computer-generated graphs must ensure the scales, labels, and plots are appropriate for the presentation and analysis of scientific data. They should ensure that all graphs are of a suitable size to allow markers to easily observe data and trends.

When evaluating procedures, candidates must explain why they have designed their experiment in the way they have, rather than just describing what they did. They should provide rationale and justification for choices they have made throughout the process. Candidates should use the questions in the instructions for candidates to address all the points in the marking instructions and make sure they have supported their discussion with appropriate justification.

When evaluating their results, candidates should use the instructions for candidates to address all the required aspects. Investigations that are too simplistic may not

offer much scope for discussion in this section. Candidates should use an analysis of the variation between repeats and replicates to support discussion about whether variability is due to error in laboratory practice, intrinsic variation in the biological samples studied, or the treatments that they have planned. Candidates should describe the trends in their data and explain why the results support the conclusions that they have drawn.

Statistical analysis is not mandatory, but it may support candidates when analysing their results. Candidates using statistics must have a good understanding of the statistic that they are using to prevent them making errors in interpretation. Candidates should only make claims of statistical significance when the statistical test they use supports this.

To achieve marks for interpreting their results, candidates need to go beyond stating trends and address how their procedures impact on the meaning of trends and findings. Candidates can find it difficult to interpret results that do not match their hypothesis and/or previous findings. In these cases, candidates should try to distinguish between the effects of methodological weaknesses and treatments that have no effect. Candidates will be in a good position to give meaningful discussion of findings in relation to the underlying biology and related research if they have selected the most relevant and useful information to include in the introduction section of their report.

Teachers and lecturers should encourage candidates to structure their reports using the sections given in the instructions for candidates. Candidates should check that the headings and page numbers in the contents page of the final version of their report are accurate. Candidates should follow the instructions for candidates exactly when citing and listing references and provide full references for online journal articles.

Teachers and lecturers should advise candidates not to exceed the maximum word count for the report.

Appendix: general commentary on grade boundaries

Our main aim when setting grade boundaries is to be fair to candidates across all subjects and levels and to maintain comparable standards across the years, even as arrangements evolve and change.

For most National Courses, we aim to set examinations and other external assessments and create marking instructions that allow:

- a competent candidate to score a minimum of 50% of the available marks (the notional grade C boundary)
- a well-prepared, very competent candidate to score at least 70% of the available marks (the notional grade A boundary)

It is very challenging to get the standard on target every year, in every subject, at every level. Therefore, we hold a grade boundary meeting for each course to bring together all the information available (statistical and qualitative) and to make final decisions on grade boundaries based on this information. Members of our Executive Management Team normally chair these meetings.

Principal assessors utilise their subject expertise to evaluate the performance of the assessment and propose suitable grade boundaries based on the full range of evidence. We can adjust the grade boundaries as a result of the discussion at these meetings. This allows the pass rate to be unaffected in circumstances where there is evidence that the question paper or other assessment has been more, or less, difficult than usual.

- The grade boundaries can be adjusted downwards if there is evidence that the question paper or other assessment has been more difficult than usual.
- The grade boundaries can be adjusted upwards if there is evidence that the question paper or other assessment has been less difficult than usual.
- Where levels of difficulty are comparable to previous years, similar grade boundaries are maintained.

Every year, we evaluate the performance of our assessments in a fair way, while ensuring standards are maintained so that our qualifications remain credible. To do this, we measure evidence of candidates' knowledge and skills against the national standard.

For full details of the approach, please refer to the Awarding and Grading for National Courses Policy.