Course report 2025

Higher Human 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: 7,451

Number of resulted entries in 2025: 7,318

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	1,916	26.2	26.2	104
B	1,567	21.4	47.6	87
C	1,527	20.9	68.5	71
D	1,317	18.0	86.5	54
No award	991	13.5	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 1: multiple choice

Question paper 1 performed as expected.

In general, numeracy questions performed better than expected. Some straightforward demonstrating knowledge questions and experimental design questions performed less well than expected.

Question paper 2

The marking team, teachers, and lecturers indicated that question paper 2 was fair and well-balanced. However, some questions were more demanding than intended. We considered this when setting grade boundaries.

Assignment

The assignment performed as expected.

Section 2: comments on candidate performance

There was a notable improvement in candidate attainment in the question papers. Candidate performance in the assignment also continued to improve.

Question paper 1: multiple choice

Areas that candidates performed well in

Most candidates performed well in the following questions:

Question 1 structure of DNA molecules

Question 2 the role of DNA polymerase

Question 7 pharmacogenetics

Question 8 metabolic pathway to identify the condition that would result in an increased production of isoleucine

Question 18 the pathway that results in fine motor control in fingers

Question 19 applying various problem-solving skills to analyse the data in a table

Question 20 applying problem-solving skills to predict the concentration of the drug remaining in the blood at five hours
(This was an intended grade-A question.)

Question 21 the role of mast cells

Question 22 applying problem-solving skills to analyse data on an individual's white blood cell count from a text and identifying the graph that represents these changes

Question 23 applying problem-solving skills to analyse data in the concentration of T lymphocytes and HIV in the blood of the individual three years after they were infected with HIV

Question 25 influenza as a public health problem every winter

Many candidates performed well in the following questions:

Question 3 applying problem-solving skills to analyse the data in a bar graph. (This was an intended grade-A question.)

Question 5 nucleic acids involved in the transcription stage of gene expression

Question 9 the conversion of pyruvate during vigorous exercise

Question 10 applying problem-solving skills to calculate how many more times a fast-twitch muscle fibre can contract in one minute compared to a slow-twitch muscle fibre
(This was an intended grade-A question.)

Question 11 muscle fibres from an Olympic sprinter compared to an elite long-distance runner

Question 14 routine ultrasound scan and the stage in pregnancy when it is normally carried out

Question 16 explaining the difference in blood pressure in an artery and a vein

Question 17 the stage that may not occur in an individual with type 2 diabetes

Question 24 applying problem-solving skills to calculate the number of phagocytes and lymphocytes from a ratio

Areas that candidates found demanding

Some candidates:

Question 4 identified the types of RNA that can be found in the cytoplasm

Question 6 calculated the number of minutes taken to produce 128 copies of one DNA section
(This was an intended grade-A question.)

Question 12 applied problem-solving skills to analyse the data on a line graph
(This was an intended grade-A question.)

Question 13 identified the validity and reliability of an experimental procedure

Question 15 identified the type of inheritance from a diagram showing the inheritance of sickle cell in three generations of a family

Question paper 2

Areas that candidates performed well in

Most candidates performed well in the following questions:

Question 1(a)	the type of cell division shown in the diagram and the location where gametes are produced
Question 2(a) and (c)	naming the DNA base and the temperature used to allow primers to bind in PCR
Question 4(b)	the location of NADH production
Question 5(a)	naming the type of metabolic reaction catalysed by catalase
Question 6(a)	identifying the physical and body mass category that resulted in the greatest chance of fertility problems

Question 9(a)(ii)	naming the organ that HDL transports excess cholesterol to for elimination
Question 10(a)	identifying parts of the nervous system
Question 11(a)(ii)	naming two methods that enable the transfer of information from short-term to long-term memory
Question 11(b)	identifying the location where memories are stored
Question 14(b)(ii) and (b)(iii)	calculating the number of individuals that must be vaccinated and suggesting a possible reason why herd immunity may not be established

Many candidates performed well in the following questions:

Question 1(d)	describing a use of stem cells in research
Question 3(a)(i)	naming the type of inheritance for haemophilia A
Question 3(a)(ii)	calculating how many females have haemophilia A (This was an intended grade-A question.)
Question 3(b)(i)	naming the type of chromosome mutation that causes haemophilia A
Question 3(b)(ii)	stating the function of an exon
Question 4(a)	describing how the inner membrane is adapted to maximise ATP production
Question 5(b)(i)	stating two variables, not already mentioned, that should be controlled to make the investigation valid
Question 5(c)	completing the line graph to show the results of the investigation using catalase and copper nitrate

Question 6(b)(i)	calculating the BMI of a female using data provided (This was an intended grade-A question.)
Question 6(b)(ii)	using data from the table to state the chance that this female will have fertility problems
Question 6(b)(iii)	naming and describing a suitable treatment when the partner has a low sperm count
Question 7(a)(i)	naming blood vessel X from the diagram
Question 7(a)(ii)	describing evidence shown in the diagram that suggests the heart is in atrial systole (This was an intended grade-A question.)
Question 8(c)(i)	using data from the graph to calculate the risk of an individual dying from coronary heart disease in Scotland (This was an intended grade-A question.)
Question 10(b)	naming the type of neuron shown in the diagram
Question 10(c)	describing myelination and its importance in child development (1 mark in this question was an intended grade-A mark.)
Question 11(a)(i)	identifying that process X was encoding
Question 12(a)	stating one effect of activating the reward pathway
Question 12(c)(i)	stating the effect of prolonged use of an agonist
Question 12(c)(ii)	naming one other protocol that could be used during this clinical trial and explaining its importance to the results (This was an intended grade-A question.)

Question 13(a)(i)	naming structure Q from a diagram of a lymphocyte
Question 13(a)(ii)	giving evidence from the diagram that shows lymphocyte R is a B lymphocyte
Question 13(b)	describing the role of phagocytes following the inactivation of the pathogen
Question 14(a)(i)	identifying the vaccination coverage from a graph
Question 14(a)(ii)	calculating the percentage decrease in polio cases in the 30-year period
Question 14(a)(iii)	selecting data from a graph to describe the changes in vaccination coverage
Question 14(b)(i)	using data in a table and graph to calculate a simple whole number ratio (This was an intended grade-A question.)
Question 15A	writing notes on the follicular and luteal phases of the menstrual cycle

Areas that candidates found demanding

Some candidates:

Question 1(b)	described how these stem cells could differentiate into specialised cells such as corneal cells (A common error was candidates giving general answers that did not refer to genes or proteins.)

Question 1(c)(i)	used data from the table to describe the changes that occur in the number of stem cell donors (A common error was candidates giving general trends that did not use data from the table.)
Question 1(c)(ii)	used information in the table to suggest a benefit of using the patient's own stem cells for this treatment (A common error was candidates not using data from the table and giving general answers involving rejection. This was an intended grade-A question.)
Question 3(c)	described how alternative RNA splicing leads to different proteins being expressed from one gene
Question 4(d)	named enzyme X from the diagram
Question 5(b)(ii)	stated the purpose of the control in this investigation (This was an intended grade-A question.)
Question 5(e)	predicted the average time for the disc to float in 6% hydrogen peroxide (This was an intended grade-A question.)
Question 7(b)	described how impulses from the SAN caused ventricular systole (1 mark in this question was an intended grade-A mark.)
Question 7(c)	calculated the increase in heart rate from the ECG traces (This was an intended grade-A question.)

Question 7(d)	described how the medulla lowers the heart rate following a period of exercise (1 mark in this question was an intended grade-A mark.)
Question 8(a)(i)	described the formation of an atheroma within an artery (1 mark in this question was an intended grade-A mark.)
Question 8(a)(ii)	suggested how the insertion of a stent leads to increased blood flow in an artery
Question 8(c)(ii)	explained why deaths from coronary heart disease are expressed as per 100 000 of the population (A common error was candidates suggesting this made large numbers easier to plot.)
Question 9(a)(i)	stated a use of cholesterol in the body
Question 9(b)(i)	described the mode of action of competitive inhibitors
Question 11(c)(i)	explained why more students recalled the words at the start and the end of the list compared to those in the middle (A common error was candidates giving generic statements about the serial position effect and not explaining why students recalled more words from the start and the end. 1 mark in this question was an intended grade-A mark.)
Question 11(c)(ii)	stated how the investigation could be made reliable

Question 12(b)	stated a method to remove dopamine from a synapse
Question 12(c)(iii)	stated a design factor that would allow the results of the clinical trial to have statistical significance
Question 15B	wrote notes on the biology of controlling fertility and the methods of contraception (A common mistake was candidates using everyday language and not giving the detail of contraception as outlined in the course specification.)

Few candidates:

Question 2(b)	explained why the two primers had different base sequences (A common mistake was candidates describing DNA replication. 1 mark in this question was an intended grade-A mark.)
Question 3(b)(iii)	explained why the protein was non-functional (1 mark in this question was an intended grade-A mark.)
Question 4(c)	described the role of electrons in the electron transport chain
Question 5(d)	stated the conclusion from the results (A common mistake was candidates restating the results and not referring to the aim in their answer. The aim is outlined in the first sentence of the question. This was an intended grade-A question.)

Question 8(b)	described how thrombosis can cause myocardial infarction (1 mark in this question was an intended grade-A mark.)
Question 9(b)(ii)	described the pattern of inheritance in a family history that indicated FH was an autosomal dominant trait (A common error was candidates not using patterns of inheritance but focusing on individuals. 1 mark in this question was an intended grade-A mark.)
Question 13(c)	described the role of memory cells in protecting this individual from developing chicken pox (1 mark in this question was an intended grade-A mark.)
Question 13(d)	explained how T lymphocytes destroy infected cells (This was an intended grade-A question.)

Assignment

Areas that candidates performed well in

Most candidates:

Section 1	provided an appropriate aim. The aim detailed the independent and dependent variables that clearly described the purpose of the investigation.
Section 3(b)	had sufficient raw data, including a replicate. The number and range of the data was appropriate for the aim.

Section 4(a)	selected an appropriate format for their graphical representation.
Section 4(b)	used suitable scales on the axes of their graphs.
Section 4(c)	used appropriate labels and units for the axes of their graphs.
Section 4(d)	accurately plotted their data points.
Section 8	provided a clear and concise report with an informative title.

Many candidates:

Section 2	provided an account of the underlying biology at Higher level that was relevant to the aim.
Section 3(c)	presented data in a correctly produced table with clear headings and mean/average values calculated correctly.
Section 3(d)	provided a second source of data that was relevant to the aim.

Areas that candidates found demanding

Some candidates:

Section 3(a)	summarised their experimental procedure.
Section 3(e)	provided a citation in the body of the report and the full reference later in the report.
Section 5	provided a valid comparison or appropriate calculation linked to the aim of the investigation.
Section 6	provided a valid conclusion that related to the aim and was supported by all the data in the report.
Section 7	provided valid evaluative statements supported by appropriate justifications.

Section 3: preparing candidates for future assessment

Question papers

Teachers and lecturers should make sure candidates are aware that the question papers can assess all the information in the Higher Human Biology Course Specification. This includes the key areas and depth of knowledge sections and the apparatus and techniques section. Candidates should pay particular attention to the terms listed under 'Apparatus and techniques' on pages 87 and 88 of the Higher Human Biology Course Specification.

Candidates tend to perform well in skills-based questions. However, they can struggle with questions relating to experimental investigations. Teachers and lecturers should give candidates opportunities to carry out practical investigations, where possible.

Candidates can find it challenging to draw a conclusion from investigation results. Many candidates restate results when they write a conclusion. Teachers and lecturers should emphasise to candidates that they must base their conclusion on the aim of the investigation and not on an indirect measurement of the dependent variable.

Teachers and lecturers should encourage candidates to use past papers for revision and compare their responses to the marking instructions. The Understanding Standards website has example candidate responses along with commentary about the marks awarded. This can help candidates understand the standard required to successfully answer questions. Candidates should pay attention to questions worth 2 or more marks and ensure their answers are complete to gain all marks.

Candidates should not use pencils in their responses as this can make the responses more difficult for markers to read. This includes any graphs.

Assignment

The Higher Human Biology Assignment Assessment Task outlines the assessment conditions for the assignment. The assessment requirements have not changed since 2019. We exemplified these requirements in the Understanding Standards events in 2023. The resources from the events are published on the Understanding Standards website. Teachers and lecturers should read these resources before their candidates start work on the assignment.

Teachers and lecturers must ensure that candidates understand which resources are not permitted in the report stage. The resources candidates can use are detailed in the Higher Human Biology Assignment Assessment Task. This document states that candidates can have 'raw experimental data, which may be tabulated'. A candidate can take in tabulated results; however, they cannot take in a complete table with all headings and units. Candidates must complete their table headings and calculate their averages under exam conditions during the report stage. Evidence of candidates using resources that they are not allowed will result in a centre malpractice referral.

Teachers and lecturers should ensure that the experiments candidates choose are at Higher level. The assignment must link to the key areas of human biology contained in the course specification. However, certain experiments that link to the course specification are not recommended, for example memory-based assignments scored fewer marks than laboratory-based assignments. These non-practical assignments do not align well with the requirements of the coursework assessment task. Centres that have used them in previous years should consider changing to laboratory-based assignments in future.

The following advice relates to the specific sections of the assignment.

Aim

When writing the aim, candidates should refer to the independent and dependent variables, specifying what they are changing and what they are measuring. If they

indicate a specific substance or enzyme in the aim, then they need to refer to it in subsequent sections, including the internet/literature source.

Underlying biology

The knowledge candidates include must be at Higher level or above and must cover topics in the aim. The underlying biology must include expanded descriptions written in the candidate's own words, not reorganised sentences from texts.

Data collection and handling summary

The summary must allow the reader to visualise the experiment. Candidates should avoid too much detail, but they should name the independent variable and any key chemicals they used. They should not include volumes, concentrations, or temperatures in the summary, unless they refer to the independent variable. Candidates must describe how they measured the dependent variable, for example a stopwatch to measure the time for a disc to rise or a measuring cylinder to measure volume.

Data presentation

The table candidates produce must contain clear headings, units, and correctly calculated averages. If candidates use a chemical for the independent variable, they must name it in the table. Candidates must not construct a pre-populated table in the research stage. They must calculate the averages and write the headings in the report stage.

Internet/literature source

The source candidates select must link to both aspects of the aim of the investigation. Teachers and lecturers should encourage candidates to insert statements indicating how their selected data source links to their aim.

Citation and reference

Candidates must cite their data source. They should enter the citation alongside their chosen source, for example, a (1). They should not write the full reference under the source. They should give the full reference, linked to the citation, at the end of the report.

Analysis

Teachers and lecturers should make sure candidates have a clear understanding of the experiments they are going to carry out, especially complicated enzyme experiments. Candidates can lack understanding when they make an indirect measurement for the dependent variable, for example time for a disc to rise as a measurement of enzyme activity. This can affect their ability to analyse and conclude from their data.

Candidates must give the x-axis values (with units) used in the analysis for a comparison or a calculation. Candidates must link the analysis to their aim. When candidates make an indirect measurement of the dependent variable, they must link this measurement to their aim. For example, in enzyme experiments where enzyme activity is measured indirectly by time for a disc to rise, candidates must link the indirect measurement (time to rise) to the dependent variable (enzyme activity).

When making a comparison, candidates must link any measurements they are comparing to the aim. Similarly, when candidates are making a calculation, they must link the results they obtain to their investigation aim.

When a candidate has chosen a discrete variable for their independent variable, for example, types of sugar, if their internet or literature data contains additional sugars to the ones they have used, they only need to compare the common sugars from the internet or literature data.

Conclusion

Teachers and lecturers should remind candidates that their conclusion must relate to their aim and be supported **by all** the data in their report. This means that candidates must refer to both their experimental data and source data if it is relevant.

If a candidate chooses an indirect measurement in their experiment, their conclusion cannot simply describe the results. Instead, the conclusion must refer to the dependent variable given in the aim.

For discrete data with only three categories, candidates should state which category has the highest and lowest dependent variable result. For data with more than three categories, candidates must rank them in order.

Evaluation

Candidates can evaluate experimental controls, variables, errors, and potential improvements. In all cases, they must include an appropriate justification to support any evaluative comment. Candidates do not need to use the terms ‘valid’, ‘reliable’ and ‘accurate’. However, if they use these terms, they must use them correctly.

Candidates can only gain 1 mark for an appropriate evaluation of the data or information from the internet or literature source.

Structure

The title must provide information about both aspects of the aim.

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.