GCE Examiners' Report

Biology

AS/ A Level

Summer 2025

Introduction

Our Principal Examiners' report provides valuable feedback on the recent assessment series. It has been written by our Principal Examiners and Principal Moderators after the completion of marking and moderation, and details how candidates have performed in each unit.

This report opens with a summary of candidates' performance, including the assessment objectives/skills/topics/themes being tested, and highlights the characteristics of successful performance and where performance could be improved. It then looks in detail at each unit, pinpointing aspects that proved challenging to some candidates and suggesting some reasons as to why that might be.[1]

The information found in this report provides valuable insight for practitioners to support their teaching and learning activity. We would also encourage practitioners to share this document – in its entirety or in part – with their learners to help with exam preparation, to understand how to avoid pitfalls and to add to their revision toolbox.

Further support

Document	Description	Link
Professional Learning / CPD	WJEC offers an extensive programme of online and face-to-face Professional Learning events. Access interactive feedback, review example candidate responses, gain practical ideas for the classroom and put questions to our dedicated team by registering for one of our events here.	https://www.wjec.co.uk/home/professional-learning/
Past papers	Access the bank of past papers for this qualification, including the most recent assessments. Please note that we do not make past papers available on the public website until 12 months after the examination.	Portal by WJEC or on the WJEC subject page
Grade boundary information	Grade boundaries are the minimum number of marks needed to achieve each grade. For unitised specifications grade boundaries are expressed on a Uniform Mark Scale (UMS). UMS grade boundaries remain the same every year as the range of UMS mark percentages allocated to a particular grade does not change. UMS grade boundaries are published at overall subject and unit level. For linear specifications, a single grade is awarded for the subject, rather than for each unit that contributes towards the overall grade. Grade boundaries are published on results day.	For unitised specifications click here: Results, Grade Boundaries and PRS (wjec.co.uk)

[1] ***Please note that where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report.***

Exam Results Analysis	WJEC provides information to examination centres via the WJEC Portal. This is restricted to centre staff only. Access is granted to centre staff by the Examinations Officer at the centre.	Portal by WJEC
Classroom Resources	Access our extensive range of FREE classroom resources, including blended learning materials, exam walk-throughs and knowledge organisers to support teaching and learning.	https://resources.wjec.co.uk/
Bank of Professional Learning materials	Access our bank of Professional Learning materials from previous events from our secure website and additional pre-recorded materials available in the public domain.	Portal by WJEC or on the WJEC subject page.
Become an examiner with WJEC.	We are always looking to recruit new examiners or moderators. These opportunities can provide you with valuable insight into the assessment process, enhance your skill set, increase your understanding of your subject and inform your teaching.	Become an Examiner | WJEC

Contents **Page**

Executive Summary

In 2025, it was pleasing that all units showed a similar mean to 2024, showing the maintenance of standards. More able candidates in all units demonstrated a sound ability to process, analyse and interpret data and information and were able to express themselves well using appropriate scientific terminology.

There was an improvement across the units in candidates' ability to recall straightforward knowledge (AO1). However, as last year, a number of candidates were not able to use the correct biological terminology required, this often impacted their ability to gain credit for their answers.

Better scoring candidates in all units were able to use all the information given to them in the form of text, images and tables in order to describe trends and explain biological ideas / processes (AO2) and also to reach conclusions (AO3). However, this was not true for a significant number of candidates across all units. Candidates should be reminded to try and interact with all the information given to them. It is there to help them and they should try and use it in their answers.

Again this year, mathematical skills were seen to be good across all units. Where there were errors, these could have been avoided if more care had been taken, e.g. rounding errors or not expressing the answer as requested in the question. There were issues however with calculating a percentage error in unit 1 and this year candidates found the formulation of a null hypothesis in unit 3 more difficult than previous. This may be because it was presented to them in a different context. In unit 4 it was noted that there was little understanding of the term modal.

Although most candidates performed well in unit 5, many struggled to access the practical skill marks in the theory papers. This was especially the case when these were assessing evaluation skills. These were poorly attempted in the enzyme question in unit 1 and the fieldwork question in unit 3. Although many candidates perform well when asked to carry out the calculations related to microscopy work, they are less adept at the labelling of tissues and organelles. Candidates should be exposed to range of photo electron micrographs and be able to interpret what they show.

Quality of written communication continues to be an issue. Although there is a Quality of Extended Response (QER) question which explicitly assesses quality of written communication, candidates also need to address this in other questions. A candidate's response must make sense. Clarity is also important; candidates must not rely on examiners knowing what is meant by a vague response. Candidates should be encouraged to re-read each response to make sure it makes sense and is clear and answers the question being asked. They should also take care to make their handwriting as clear as possible. If additional space is required for an answer candidates should write it on the additional page provided and ensure it is correctly labelled.

Candidates should be aware that within the two A2 theory units we are required to assess content both from AS and the other A2 unit. These questions should bring together candidates understanding of different areas of Biology.

BIOLOGY

GCE

Summer 2025

Unit 1 Basic Biochemistry and Cell Organisation

Overview of the Unit

The demand of the questions was comparable to those tested in previous papers and the paper was a suitable and fair test for the candidates at AS level. The level of difficulty within the questions increased as the paper progressed. The paper proved accessible to all candidates, with over 95% of candidates attempting most of the questions. The paper also discriminated well, with a range of marks being awarded, allowing all candidates to demonstrate their knowledge and understanding of the unit.

The following aspects of the assessment were well answered

- In general, the AO1 questions were answered well, especially when the wording in the stem was very straightforward (Q1b, Q2ci, Q3bv, Q5a, Q6a, Q7 – description of transcription)
- In general, there appears to be an overall improvement of maths skills when compared to previous papers. Including, the use of an equation to calculate the surface area of a red blood cell (Q3bii, Q3biii, Q6bii).

The following aspects of the assessment were less well answered

- The legibility of candidates handwriting appears to be getting worse. If examiners are unable to read a candidate's response, they are unable to award them marks.
- In general, questions relating to practical biology and had the lowest facility factors.
- Understanding the rationale of practical design (Q3bi)
- Identifying components from electron micrographs (2a)
- Descriptions of trends of data presented from a table and a graph (3biv, 4ci)
- Use of precise biological terminology (Q1ai, Q2aii, Q2ci, Q4ci, Q4ciii)

Comments on individual questions/sections

Question 1.

This aimed to assess knowledge of the cell cycle. In part a)(i), many students lost marks due to imprecise terminology, such as using "duplication" instead of "replication" for DNA, and incorrectly suggesting all organelles are replicated, rather than synthesised (except mitochondria and chloroplasts). In part a)(ii), most correctly identified prophase and anaphase, but many misidentified telophase, thinking it was image C rather than D. However, most successfully sequenced the stages.
Part b) was generally well answered, though some students ignored the question's focus on processes and instead discussed locations and functions of mitosis and meiosis. Many failed to move beyond GCSE-level thinking, incorrectly stating that mitosis always produces diploid cells and meiosis always produces gametes.
The fern lifecycle in part c) was poorly answered; most incorrectly stated that meiosis produces gametes, despite information indicating otherwise. However, many did correctly determine chromosome numbers in different lifecycle stages.

Question 2.

This question involved interpreting an electron micrograph of a pancreatic cell and images of pro-insulin being converted to insulin. In a)(i), only stronger candidates identified all three labelled structures, indicating a general lack of familiarity with EM images. In a)(ii), candidates often used vague terms like "*vertical*" and "*horizontal*" instead of correct terminology such as "*longitudinal*" and "*transverse*". Part b) was well answered, with most gaining two marks. Part c) had a relatively low facility factor showing that many candidates struggled to apply their knowledge of the role of cell organelles. Many failed to use the image when referring to the Golgi apparatus. References to exocytosis were often vague or incorrect—some suggested vesicles themselves are secreted. Part c)(ii) was a good discriminator: most knew ATP is made in mitochondria and is required for exocytosis, but only higher-level responses linked ATP to peptide bond formation or tRNA activation in protein synthesis.

Question 3.

This question revealed weaknesses in the application of practical biology, with most parts having relatively low facility factors. Most explained why glucose and glucose-1- phosphate aren't isomers. In b) (i), about half explained the need to equalise temperatures; others gave vague references to "*controlling temperature*". A minority did not attempt parts b) (ii) (7%) or b) (iii) (18%), possibly due to weak maths skills or poor understanding of error calculations. Some confused accuracy with resolution or misused the ± symbol. In b) (iii), most who attempted it gained two marks but some lost one mark for incorrect decimal places. Part b)(iv) had a low facility factor with very few describing the trend well; most missed that the rate became constant. Responses were often vague or lacked clarity in language. Part b)(v) had the lowest facility factor on the paper; only a few candidates identified uncontrolled pH or the variation of volume when removing drops of solution. Vague answers about "*mixing*" or "*equipment resolution*" were common. Most correctly described the Benedict's test for reducing sugars.

Question 4.

Despite being a straightforward question, many candidates struggled due to the use of poor terminology. Some believed the phospholipid bilayer is the entire plasma membrane. Few explained "*selectively permeable*" accurately—many simply said the membrane "*chooses*" molecules. In b), stronger candidates gained all marks, but others incorrectly stated that facilitated diffusion uses ATP or that channel proteins are used in active transport. Descriptions lacked references to molecules or ions, and answers were often generic (e.g., "*moves down a concentration gradient*"). In c)(i), most correctly identified diffusion for molecule A and facilitated diffusion for B but failed to support answers with correct graph interpretation - few recognised the relationship as being directly proportional or explained why the curve for B plateaus. Some incorrectly claimed that the rate for B "*stops*". For molecule C, better answers identified the molecules size as preventing its movement; weaker ones referenced kinetic energy. Part c)(iii) was well answered by stronger students, but many weaker candidates simply stated that higher temperature increases kinetic energy of molecule C or misattributed it to enzyme activity.

Question 5.

This question, especially part c) was a good discriminator. Although most candidates understood the biology involved, the weaker candidates' explanations were of a standard not much beyond GCSE level. Part (a) proved to be very accessible, with most candidates picking up all three marks. In part b) many candidates gave vague explanations of the lock and key theory, but they fail to understand that enzymes, in this case tyrosinase, has a tertiary structure providing a '*specific shaped active site*'. It's substrate, in this case tyrosine, has a '*complementary shape'* which allows them to fit together. In part c) the better candidates gave very good answers making links between all the information provided. Weaker candidates didn't understand that the main part of the cat's body would have a temperature above 35°C but that the extremities would have a temperature below 35°C.

Question 6.

This was generally well answered by many candidates. Most candidates gained 2 marks for stating a similarity and a difference between the structure of a phospholipid and a triglyceride. However, some candidates dropped marks for referring to the properties of the molecules or by not making comparative statements. In part b) (i) most candidates correctly described the phospholipid heads as being hydrophilic and the phospholipid tails being hydrophobic, but they described rather than explain their arrangement. In b) (ii) many candidates correctly used the formula to gain all three marks. However, some candidates didn't recognise that the column heading for the number of red blood cells needed was '$x10^9$'. In b) (iii) most candidates calculated the correct ratio and although the majority recognised that the general ratio was 2:1, only the most able candidates made the correct conclusion that the phospholipids must be arranged in a bilayer. 19% of candidates did not attempt an answer.

Question 7.

This question covered DNA/RNA distribution and transcription. The mean mark achieved was 3.4/ 9, showing that most candidates found the question challenging. Better candidates structured answers clearly into three parts, while weaker ones merged them. For the distribution of DNA, only the better candidates stated that DNA would be found in mitochondria. Candidates tended to be better at explaining the distribution of RNA. Transcription was the best-answered section, with several strong descriptions. However, many candidates incorrectly stated that RNA polymerase is involved in complementary base pairing, when its role is to catalyse phosphodiester bond formation. Some confused transcription with translation, saying RNA polymerase attaches at a start codon and detaches at a stop codon. Quality of written communication was again an issue for some candidates, affecting clarity and accuracy.

BIOLOGY

GCE

Summer 2025

Unit 2 Biodiversity and Physiology of Body Systems

Overview of the Unit

The demand of the questions was similar to previous years and the paper covered all assessment objectives, and topics within unit 2. The mathematical skills and how science works were appropriate and balanced. The majority of candidates coped well with the mathematical content in the paper. The paper became more challenging from questions 1 to 6 and the QER question tested knowledge and understanding as well as requiring a comparison with an unfamiliar example. There were questions which required use of given information combined with subject knowledge and these questions were less well answered than those asking for familiar knowledge and understanding.
The level of performance overall is similar to previous years.

Comments on individual questions/sections

Biodiversity and Classification

- Many candidates were able to distinguish between homologous and analogous features in context.
- The majority of candidates were able to distinguish numerical differences in amino acid sequences in proteins, however, fewer candidates were able to use the data and the diagrams to evaluate the three domains over the five kingdoms system for showing evolutionary relationships.
- In the biodiversity question (Qu. 5), a minority of candidates could evaluate a method. In future they should be encouraged to consider every part of the given information.
- Whilst the majority could calculate Simpson's Biodiversity index, few candidates could explain the difference relating to deciduous and coniferous woodland. The information required to do this was in the stem of the question.

Exchange and Transport in Animals

- The majority of candidates could state that gas exchange in Amoeba is by diffusion, but fewer were able to identify that gases are exchanged across the cell membrane.
- Candidates could identify the features of organisms that enabled gas exchange but many failed to be specific about exactly how that adaptation was beneficial to that organism. There were many general comments that gained no credit. This was seen in questions 2 and 3.
- When asked about haemoglobin and myoglobin, answers were too general and did not use the information given in the question regarding partial pressures of oxygen. Too few candidates could describe myoglobin as acting as a "store" of oxygen in muscle.

Plant transport

- Many candidates were able to identify the tissues in plants involved with transport and there were many answers that gained full credit for describing water movement across the root into the xylem. Some candidates, however, did not know the name of the sieve tube element or companion cell and some could not identify phloem.
- Few candidates could identify the organic molecules being translocated in phloem.
- Whilst many candidates could identify sources and sinks in daffodils at different times of the year, very few could explain the need for transport in both directions in phloem.

Nutrition

- The majority of candidates could identify sites of protein digestion in mammals, and many could calculate the magnification of the image of the ileum. Fewer candidates could label the tissue layers in the micrograph.
- Very few candidates could combine their knowledge of protein digestion with their knowledge of ruminant digestion and its advantage over other herbivorous mammals. Answers to this question were too general and although some gave an account of ruminant digestion, they failed to answer the question.
- Most candidates could identify peristalsis, but fewer could describe it and even fewer could explain why control of peristalsis was necessary.

QER – Animal Transport

- The majority of candidates attempted to answer all three sections of the QER question.
- There were some excellent answers scoring in the top marking band. The best answers used specific vocabulary describing and comparing delivery of oxygenated blood to respiring tissues. They described open circulation and closed circulation well and could compare single and double circulations. Many candidates observed that oxygenated and deoxygenated blood mix in the amphibian, but very few took the comparison any further.
- The poorer answers used terms such as “effective” and “efficient” in relation of the circulatory systems instead of referring to delivery of blood to tissues at higher speed or pressure.
- Candidates should be advised that when writing comparisons, they write full comparisons. When describing double circulation, many candidates failed to complete the description and comparison with single circulation.

BIOLOGY

GCE

Summer 2025

Unit 3 Energy, Homeostasis and the Environment

Overview of the Unit

- The paper assessed the required breadth of topics including synoptic material from units 1,2 and 4 with the required balance between assessment objectives, AO1, AO2 and AO3.
- Attempt rates were slightly higher than in 2024 with no particular trends in unanswered questions in terms of assessment objectives. However, attempt rates were generally high only falling below 90% in part 2 (a)(ii) which was adding ATP production to the z scheme diagram.
- Accessibility was more variable than in 2024, some questions had very high facility factors (FF), suggesting that they were not challenging enough, and some very low, suggesting they were inaccessible even though some were straight recall e.g., the definition of a transect. As in 2024 one such item was a synoptic element, part 4(d).
- Performance on the items requiring mathematical skills was very good, the errors seen were around use of standard form and rounding errors. Understanding of the concept of a null hypothesis was not as good as in 2024 - see part 4(f)(ii).
- Poor written communication was an issue, in particular giving short one- or two-word answers when a sentence is clearly required. Random use of the pronoun ‘it’ is another issue. Candidates should be encouraged to read what they have written and make sure that any sentences they write make sense on their own by replacing ‘it’ with the word to which they are referring. ‘Brain dumping’ was evident – see part 5(c). Candidates should be discouraged from writing everything they know about a topic they recognise in a question and allowing the examiner to do the work of picking out an answer to the question.

Comments on individual questions/sections

Question 1.
Part (b) A straightforward recall question, proved to be more difficult than expected. A range of responses was seen including NAD –6, FAD - 2 ATP – 2 presumably by calculating the number from one molecule of glucose. Candidates should be reminded to read questions carefully. Part (c)(i) Candidates were expected to apply knowledge and understanding of the process of aerobic respiration to an unfamiliar diagram. Most candidates were able to give some kind of description of what the arrows in image1. In part I, the best responses gave concise descriptions of the active transport of protons from the matrix to the intermembrane space. Less successful responses referred to electrons, described movement down electrochemical gradients or made vague reference to chemiosmosis.

Question 2.

In part (a)(ii) relatively few candidates used the curved arrow convention to illustrate ATP production, even though it had been demonstrated in image 1. Consequently, many responses gained either the mark for 'where' or the mark for 'how' but few responses gained both. Parts (iv) I and II were recall questions that proved challenging. More candidates were able to describe the fate of the protons from photolysis than were able to say what happens to the oxygen atoms. Part (b) was an AO3 question in which candidates were expected to make judgements and come to a conclusion from the evidence provided. The best responses gave concise accounts linking the switching off of the gene to the lack of the enzyme to reduce NADP and gave details of subsequent effects on the Calvin cycle. Less successful responses referred to the death of the host plants and there were also issues with the quality of written communication.

Question 3

Part (c)(i) was a mathematics question. It was very well answered apart from some inaccurate rounding or failing to give the answer in standard form. In part (c)(ii) candidates were expected to understand difficulties with making measurements and estimates of variable material. The best responses gave concise comparisons of the tubes in dialysis filters and kidney tubules. Less successful responses made no comparisons and were vague comments such as 'the tubes are man-made'. There were also issues with the quality of written communication. In part (c)(iii) candidates were expected to apply knowledge of the effect of a large surface area on exchange mechanisms to filtration in the kidney. The best responses made a clear link between a large surface area and a fast rate of filtration; these were not seen very often. More often responses were vague or showed poor quality of written communication. Application of knowledge and understanding was tested in parts (d). The best responses in part (d)(i) made links between a slower filtration rate and the greater distance for molecules to travel; and in part (d)(ii) gave a simple definition of X linkage and a clear explanation of why males are more likely to inherit Alport syndrome. Less successful responses failed to refer to genes or alleles when explaining X linkage or made vague reference only to inheriting the Illness from the mother.

Question 4

Part (a) was not well answered with very few candidates making any reference to an environmental gradient, and those that did just referred to a changing environment. Candidates should be encouraged to learn a simple definition of a transect that includes reference to an environmental gradient. Parts (c)(i)I and II tested AO3, candidates were expected to interpret information provided in image 4.2 to explain the design of the survey. The best responses described the tide being at its lowest value and gave a concise explanation of the advantage of that in part I and pointed out that it would be dark and explained why that would be a disadvantage in part II. Less successful responses noted the conditions but gave no reasons why these would be an advantage or disadvantage. Poor quality of written communication was again an issue. There was a synoptic element to part (d) with reference to xerophytic adaptations and as usual candidates did not do well on the synoptic element. Calculating magnification in part (e)(i) did present a challenge for candidates but calculating a simple percentage in part (e)(ii) was less challenging. Responses to part (f)(i) were disappointing. With effectively a choice between t-test and chi squared test only about half of candidates chose correctly. Candidates should be encouraged to understand that the chi squared test applies to situations where it is possible to calculate expected results. Part (f)(ii) appears to have bucked a trend reported for other papers that candidates were getting better at writing null hypotheses. Many very sloppy responses were seen, the best responses referred to no significant difference between mean values for percentage of callus made up of core. Outcomes for part (f)(iii) were also poorer than expected despite some obvious clues in the bullet points provided for the experimental plan. The best responses gave clear descriptions of increasing the number of quadrats used at each of the positions on the shore and increasing the number thalli sampled in each quadrat. Less successful responses gave vague statements such as ‘repeat the experiment several times’.

Question 5

Performance on part 5(a)(i) was disappointing, all permutations of the structures labelled on the diagram in image 5.1, including hammer as effector or as part of CNS. Poor quality of written communication was also evident in part (a)(iii) examples included not writing in sentences or lack of clarity e.g., 'it doesn't go to the brain.' Candidates should have been able to see that as a 2-mark question they would get a mark for why the reflex is rapid and one for why it is automatic. Many responses addressed only one of the adjectives. Part 5(c) was an opportunity for 'brain dumping' and some responses gave well written, detailed accounts of synaptic transmission, sometimes followed by "this can't happen if calcium channels are blocked". Candidates need to understand that this is a strategic error, it is clearly not an answer to the question. To access the marking points on the marking scheme they must explicitly make those points in their response.

Question 6

Part (b)(ii)II assessed AO3, evaluating experimental design in a practical context and the issues were like those reported on other papers. The best responses gave a clear description of uncertainty around the end point or imprecision of serial dilution. Less successful responses gave typical vague suggestions such as "only 3 repeats". Performance on part (c)(iii) was disappointing, very few responses referenced genes or the gene pool, many responses made vague references to ecosystems. No other areas to highlight in question 6.

Question 7

The indicative content was divided into three areas, measures to reduce overfishing, applying knowledge of population density and evaluating the effectiveness of the policy. The first area assessed AO1 and was generally well answered with the best responses giving concise articulate accounts with no significant omissions or irrelevant inclusions. Less successful responses in this area gave bullet point lists or just mentioned one or two measures. The other areas assessed AO2 and AO3 and performance on these areas was weaker. Too often responses repeated information provided in the question with no further comment. The best responses linked information provided with knowledge of population density and explained the effects of missing targets on fish populations as well as making judgements on the quality of the data and a general conclusion.

BIOLOGY

GCE

Summer 2025

Unit 4 Variation, Inheritance and Options

Overview of the Unit

This paper assessed the breadth of the specification for Unit 4 plus some synoptic elements of Units 1, 2 and 3. The balance of AO1, AO2, and AO3 (assessment objectives) met the requirements for this A2 unit. Attempt rates were generally high, above 95% for the majority of questions with only 3 dipping below 90%, the minimum being 85.5%.
Demand and performance was comparable to previous years.

Accessibility was good across all topics with a balance between questions that candidates found straightforward and questions that were challenging. Some AO3 question expectations were higher, notably for evaluating or forming conclusions (3ciiII, 4bi and 5bi I). Several AO1 responses required greater precision of knowledge (3bii I and II).

Written communication; too many answers displayed poor syntax that made them difficult to decipher and examiners struggled to read the handwriting in several scripts. Considerable efforts were made to locate some responses written in inappropriate or poorly labelled places outside the designated area.

Information provided in questions was not always read carefully, a factor noted in several questions despite repeated instructions to use the information given. This has been an issue in previous years and continues to have an adverse affect on the performance of numerous candidates.

There were many good examples of evaluating the method and outcome of practical investigations. However, this skill proved challenging for some. Features that controlled variables were often poorly described.

Many candidates performed well in questions requiring mathematical skills, particularly when carrying out calculations using a formula. Most used correct standard form. Few were able to refer to the modal class on a histogram correctly.

The following aspects of the assessment were answered well:

- AO1 and AO2 features of plant reproduction and pollination (Q.1).
- AO1 and AO2 relating to use of Hardy Weinberg equation (Q 2 a ii).
- AO2 relating to speciation (3 a).
- AO2 Calculation of the number of copies of DNA using PCR (3 c iv).
- AO3 use of evidence from a timeline to support a conclusion (3 c ii l).
- AO2 use of a genetic diagram(4 a ii).
- AO1, AO2 and AO3 relating to type of mutation and features of RBCs (5 a and 5 b i l).
- AO2 advantages of gene therapy (5cii).

The following aspects of the assessment were answered less well:

- AO3 Advantage of seed dispersal (1 c ii).
- AO1 structure and function of primers (3b ii).
- AO2 Identification of phenotype from genotype (4a i l).
- AO1, AO2, AO3 Epigenetic control of gene expression (4 b)

Comments on individual questions/sections

Question 1

A straightforward opening question that required candidates to use their knowledge of pollination and refer to the photographs given. Explanations relating to cross pollination in this species proved challenging for some, but many gave a sensible response.
In part (b), structural features related to double fertilisation were identified correctly in many answers. However, candidates often omitted to state that endosperm was a food 'store'.
Most answers showed good understanding of seed dispersal but a few failed to distinguish seed dispersal from pollen dispersal. The significance of reducing competition between individual plants (c)(ii) was often lost.

Question 2

It was disappointing to find so many candidates were unable to define 'autosomal'. Correct definitions of 'recessive' were more frequent. Answers stated within the context of the genotype were accepted if they were precise, referring to 'alleles', not 'genes', that are 'expressed', not 'found', in the phenotype.
There were many correctly calculated answers using the Hardy Weinberg equation. Those who failed to recognise the value of q^2 from the question or identified 0.16 as 'q' were unable to obtain any marks. It was pleasing to see so many answers stating the correct frequency as a decimal although a percentage was also accepted.
Many candidates provided sensible suggestions to explain genetic links with breeding outcomes later in the season for guillemots living further north. Vague references to warmer weather without comments about hatching success or chick survival were not accepted. It was pleasing to find that many could identify the differences between genetic control of the two physical features described in the question (b)(i).
Descriptions of change in wingspan distribution often lacked clarity. Few referred to the modal group although alternative descriptions were acceptable. Vague references to larger wingspan were not accepted as the range didn't change. References to the 'mean' were not given credit as mean values are not displayed in the graphs.
Some excellent answers to 2 (b)(iii) applied good understanding of natural selection, although there was considerable variability of responses. References to genes rather than alleles were not accepted.

Question 3

Candidates who had learned the basic principles of speciation were able to describe the process clearly. There was confusion between the terms ‘isolation’, ‘speciation’ and ‘barriers’ in some responses.

Many candidates made admirable attempts to use their knowledge of PCR but showed a lack of precision considering these are AO1 responses. It was not always clear that DNA separated into ‘single’ strands (b)(i), or where hydrogen bonds were broken. Few described a primer accurately (b)(ii)I and explanations of function were often vague (b)(ii)II. There were better descriptions of thermostability of Taq polymerase but quoting a temperature of 70 ^{o}C, overlooked the need to withstand 95 ^{o}C used in PCR.

The calculation (b)(iv) posed few problems but there were errors of rounding or incorrect standard form. Varied responses accounted for the production of fewer DNA molecules than expected with most correct answers stating that nucleotides had ‘run out’.
Candidates were able to use evidence from the timeline to support the conclusion given in 3(c)(ii). Most recognised the link between temperature/time and use of clothing before divergence of Pediculus. Part II proved more challenging as fewer candidates recognised the considerable time interval between loss of body hair and use of clothing.

Question 4

This was the shortest and least well completed question. However, in 4(a)(ii), a simple genetics diagram was carried out well by most candidates.
Few candidates realised that the presence of the X and Y chromosomes in the genotype meant that the gender of the cat should have been included in the phenotype description. Most answers stated coat colour only.

Explanations in 4(a)(iii) rarely offered any reference to there being only one allele for coat colour in males or explanation that the allele was on the X chromosome.
Part (b) was more challenging, particularly the AO3 assessment of (b)(i). Some candidates failed to relate inactivation of one X chromosome to different cells. Many referred to inactivation of the X chromosome in different cats. There were some creditworthy descriptions of the allele being expressed in different hair follicle cells. Few alluded to different areas of the skin but some described different quantities of orange or brown fur.

Candidates who had learned about epigenetics produced clear explanations of how gene expression is prevented. There were some excellent answers showing good understanding of the mechanism of protein synthesis.

Fewer answers to (b)(iii) made it clear that the DNA base sequence is unaltered in epigenetic examples of gene expression.

Question 5

There was ample evidence that candidates were familiar with features of red blood cells and the mutation that results in sickle haemoglobin.
Those who read the details of practical procedures involved in trials were able to respond well to parts (b) and (c). Most used information effectively to explain the four month time interval between treatments but fewer candidates could deduce that donated red blood cells would be of various ages. Explanations of why the same individuals were used in each trial were generally poor. Answers offered little to suggest that the origin of RBCs should be the only variable. However, the ethical considerations of using embryonic stem cells were appreciated by most candidates.

In part (c), only a minority of candidates understood what an overlap between SD bars indicates in terms of significance. Many referred to range bars despite being told in the description of the graph that these were SD bars.
Answers to (c)(ii) showed good understanding of the merits of gene therapy over transfusion for treating sickle cell disease. Phrases suggesting 'less rejection' were accepted, those suggesting 'no rejection' were not. However, potential disadvantages of this gene therapy were less well understood, with the possibility of activating oncogenes being the most common response.

Question 6 QER

The majority of responses achieved marks within the mid range. Not many could be classified as very good or excellent, predominantly because few candidates used the information given in the stem of the question to good effect. This made it difficult to satisfy many of the marking points in the first and third sections. On the whole, answers were well organised into appropriate sections with clear sentences and most candidates had a reasonable grasp of the main features of the placenta.

Features that produced a short diffusion pathway were visible and/or labelled on the photomicrograph but the majority of answers failed to include them. A significant number of responses lapsed into non-structural features that were irrelevant.

Most candidates understood that higher maternal blood pressure or the mother's immune system would have an adverse effect on the foetus but many responses did not extend beyond these reasons why maternal and foetal blood have no direct contact or offered little explanation of potential consequences.

There were acceptable descriptions of the functions of at least two out of the three hormones in the graph in most responses. Candidates were not as confident about the role of oestrogen or progesterone within the context of pregnancy. There were references to other endocrine glands despite being told in the stem of the question that all three hormones were produced by the placenta. Poor answers offered little more than a description of when hormone concentrations increased or decreased.

Question 7

Part (a)(i) was answered well with lots of candidates correctly answering 'vector', the most common incorrect answer was 'carrier'. Part (ii) was answered less successfully, most candidates would have benefitted from using the image given to help construct their answer.]In part (b), many candidates lost marks for not being clear enough in their expression. Answers were often confused and not directly answering the question.
In part (c), although candidates were able to gain credit for the antibiotic killing the bacteria, most missed the mark for the antibiotic diffusing through the agar. Candidates were able to determine the minimum inhibitory concentration and complete the calculation successfully where it was answered.

Question 8

Many candidates struggled to identify the structures in the Haversian system in part (a)(i).
In part (b)(i) candidates were able to state that calcium is found in dairy, and vitamin D in oily fish, but didn't state why this helped with the treatment of Osteomalacia. Candidates were relatively successful in completing the calculation in part (iv).
In part (c), most candidates could identify the type of fracture and describe how it was treated, but needed to be more specific that a metal rod was inserted during treatment. Candidates were mainly able to state one reason why it was important to treat hip fractures, but not many stated two reasons.
Part (d) was answered well with most candidates able to state two conclusions and were able evaluate the study using the data provided.

Question 9

Part (a)(i) was poorly answered as many arrows going to specific areas of the brain were not clear enough. Parts (ii) and (iii) were much more successfully answered with most candidates able to deduce the two areas of the brain affected and explain which side of the brain was affected. Part (iv) was very well answered, candidates were able to state the advantages of the MRI scans, but also suggest why a CT scan might be preferred. For parts (iv) I and II it was clear that knowledge of neuroplasticity was lacking in some candidates.
In part (b) candidates were able to define operant conditioning and learned behaviour. Candidates were most successful in part (ii) in drawing a conclusion and improving confidence in their conclusion showing that practical skills were a strength in this question.

BIOLOGY

GCE

Summer 2025

Unit 5 Practical Examination

Overview of the Unit

- General performance was good across the cohort in the Experimental task with very few non attempted questions.
- Improvement seen in table and graph skills from previous year.
- The Practical analysis task assesses practical and mathematical skills, including the ability to apply and interpret a statistical test and deduce and evaluate information from text and tables. It also tests knowledge of the use of the microscope and associated calculations.
- The general performance in data analysis section was higher than in previous years, as shown by a higher mean and smaller standard deviation, whereas attainment in the microscopy section was similar to that of the past.

Comments on individual questions/sections

Experimental Task

- Candidates are generally good at tabulating and graphing data, this has steadily improved in recent years.
- Tables generally scored highly with many candidates gaining full marks. Where marks were deducted, it was most often for the following: Use of decimal places in the results section despite being directed to measure clear zone to the nearest mm in instructions. For incorrect rounding of mean calculation and in some cases, for not including the mean in the label for the dependent variable.
- Graphs showed an improvement from the previous year. This was the first time candidates have been asked to draw a straight line of best fit. The majority of candidates managed this and avoided dot to dot plots, however marks were lost, in some cases, for not continuing the line to consider the final point. The majority of candidates labelled the y-axis as “mean…” which is an improvement on the previous year. In some cases, marks were deducted for uneven scales on the x-axis, candidates should be encouraged to draw even scales when the intervals between the values is not even.
- Interpolating the graph to read off values was a different skill tested to previous years and the responses were mixed. A significant number of candidates did not draw lines on their graph to read off the values for concentration of amylase. The marks were not awarded if this could not be checked.
- In the questions section, candidates demonstrated the most variation. The best answers gained most of the marks available and the poorer responses only gained one or two marks. The best answers used the term diffusion to explain why clear zones appeared. They correctly stated how and why temperature could affect the diameter of clear zone and they linked the fact that the clear zones weren’t perfect circles to an overestimate of amylase concentration. When answering the questions section, candidates should be encouraged to go back to the introduction and to ensure they have answered the question fully.

Practical analysis task

Question 1

Many candidates completed the table suitably in part (a), but a common omission was the 'when' clause in describing a risk associated with a given hazard. Most candidates could perform the calculations in (b) and use the information to generate a logical conclusion. Some forgot that the square of a negative number is positive. Candidates are reminded that they should choose the number of decimal places for their answer based on the number used in the given information. In part (d), most understood the concept of placing quadrats at regular intervals along a line to constitute a belt transect. Some candidates mistakenly suggested using percentage cover to assess population density. In describing abiotic factors, credit was not given for general terms such as 'weather' or 'climate'.
Many candidates interpreted the table suitably in (e), but the language used in some answers was not specific enough: Aliicho has the highest (not higher) altitude and rainfall, but cooler (not coolest) temperature.

The question asks where coffee is most likely to be grown, so credit was not given if an answer described where it would not be grown. Candidates are reminded to answer questions in the terms in which they are asked.

Question 2

Most candidates could recognise and label structures in a photomicrograph in (a), but they should take care that label lines end within the structure identified, not touching its edge or ending nearby. Most could also perform the necessary calculations in (b) and (c). Where marks were not given, it was generally because candidates either did not round their answer correctly or they had not sense-checked it.
Most candidates' realised that a 17mm long structure needs to be viewed under a low power objective in (c), and credit was given for citing either x4 or x10. Those that guessed x40 or x100 showed lack of experience using a microscope, despite the requirements of the specification.

Improving a low power plan required specific instructions e.g. 'complete the uterus' rather than 'complete the diagram'. Some candidates suggested including parts of the male reproductive system, forgetting the role of the vas deferens.

The large number of tapeworm eggs relates to their transfer to the secondary host. Candidates are reminded to take care with their use of terminology: tapeworms do not lay eggs, do not give birth, do not hatch and are not born.

Supporting you

Useful contacts and links

Our friendly subject team is on hand to support you between 8.30am and 5.00pm, Monday to Friday.
Tel: **029 2240 4252**
Email: science@wjec.co.uk
Qualification webpage: AS/A Level Biology

See other useful contacts here: Useful Contacts | WJEC

CPD Training / Professional Learning

Access our popular, free online CPD/PL courses to receive exam feedback and put questions to our subject team, and attend one of our face-to-face events, focused on enhancing teaching and learning, providing practical classroom ideas and developing understanding of marking and assessment.

Please find details for all our courses here: https://www.wjec.co.uk/home/professional-learning/

WJEC Qualifications

As Wales' largest awarding body, WJEC supports its education community by providing trusted bilingual qualifications, specialist support, and reliable assessment to schools and colleges across the country. This allows our learners to reach their full potential.

With more than 70 years' experience, we are also amongst the leading providers in both England and Northern Ireland.

WJEC
245 Western Avenue
Cardiff CF5 2YX
Tel No 029 2026 5000
Fax 029 2057 5994
E-mail: exams@wjec.co.uk
website: www.wjec.co.uk