Grade Descriptions for Cambridge International A Level Biology 9700

What are grade descriptions?

Grade descriptions describe the level of performance typically demonstrated by candidates achieving the different grades awarded for a qualification. For Cambridge International A Levels, they describe performance at three levels – grades ‘E’, ‘C’ and ‘A’.

Grade descriptions sit alongside other key documents that illustrate examination standards, including:

- the syllabus, which presents what students should be taught over a course of study and explains how this is assessed
- the specimen assessment materials, which exemplify the structure of the assessment and the kinds of tasks that candidates complete
- grade thresholds, which show the total mark required to achieve a grade.

Grade descriptions are produced with a wide range of audiences in mind. For teachers, they support lesson planning and curriculum development, while students may gain useful insights into what is required to achieve a high grade and what candidate performance at lower grades typically looks like. For university admissions staff and employers, and those less familiar with Cambridge, they paint a picture of typical performance at different grades.

Cambridge publishes grade descriptions for a qualification once examinations have taken place for the first time, and we review them when a qualification is substantially revised. They are developed by highly experienced examiners who understand performance standards in the subject area and have studied samples of candidate work.

How do I use this resource?

Grade descriptions are presented as a grid, with content areas at the start of each row and the different grades at the top of each column.

The content areas group together various aspects of the syllabus – they reflect topics, assessment objectives, key concepts, syllabus aims and components. The way they are organised is specific to each subject.

For each content area, there is a descriptor for each grade. Reading across the row from left to right, the descriptors represent increasing levels of performance, with each grade descriptor building on, and including, the last.

Each column represents overall performance at a particular grade. Reading down the column from top to bottom, the descriptors capture the range of knowledge, understanding and skills that a candidate comfortably achieving the grade is likely to demonstrate.

Where content areas for the first and second halves of the A Level are distinct, they are also assessed a different standards. Performance for content areas assessed at AS Level is therefore described separately in this document.

Cambridge produces grade descriptions to support teaching and learning and the interpretation of candidate scores and grades. We do not use them to set grade thresholds. As such, they cannot be used to challenge the grade awarded to any individual candidate.

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Grade descriptions

Area of knowledge, understanding and skills	Typical performance at grade E	Typical performance at grade C	Typical performance at grade A
DNA, heredity and natural selection	Students recall some events in meiosis and identify correctly some stages of meiosis. They explain some of the required genetics terms and interpret or construct monohybrid crosses, but they have more difficulty with dihybrid crosses. They show limited understanding of the *lac* operon and gene control. They use structured layouts to calculate values in the chi-squared test and *t*-tests. They outline some features of phenotypic variation and list the main ideas and principles behind natural and artificial selection and evolution, and usually apply these main ideas to new situations. They state the main principles of traditional genetic engineering. They show limited knowledge about techniques such as gene editing, polymerase chain reaction (PCR), electrophoresis and microarrays. They know that databases provide information about nucleotide and amino acid sequences.	Students sequentially describe the main events in meiosis and identify most stages. They define most genetic terms and interpret or construct monohybrid and dihybrid crosses, but they may make errors with crosses involving linkage or epistasis. They explain the *lac* operon in outline and in greater depth if using a diagram. They perform chi-squared and *t*-tests and determine critical values. They distinguish between continuous and discontinuous variation and state features of genetic drift and the founder effect. They apply knowledge of selection and evolution to unfamiliar examples. They carry out basic Hardy–Weinberg calculations. They understand the principles of genetic technology and the main techniques involved: they may not always know how to apply microarray analysis to new examples. They know that DNA sequence data can be used to show evolutionary relationships.	Students understand the role of meiosis, identify the stages and describe some details. They define genetic terms and usually cope with examples of autosomal linkage or epistasis in genetic crosses. They explain the relationship between genes and phenotype and understand gene control and the *lac* operon. They state null hypotheses for statistical tests and understand the analysis involved. They identify discontinuous and continuous variation in unfamiliar examples. They are confident applying concepts and principles of selection to more complex situations and have a good understanding of genetic drift and the founder effect. They know the features of the HW principle and usually carry out calculations correctly. They describe and explain genetic techniques and apply knowledge to examples. They have a good understanding of the role of bioinformatics.
Biochemical processes	Students understand that different respiratory substrates have different energy values and that ATP is a product of respiration.	Students know the relative energy values of respiratory substrates and state the ratio for RQ and make calculations.	Students analyse data to compare respiratory substrates and calculate RQ using data extracted from respiration reactions.

Area of knowledge, understanding and skills	Typical performance at grade E	Typical performance at grade C	Typical performance at grade A
	They describe the structure of mitochondria and chloroplasts and relate some of these to function. They know that chlorophyll absorbs light and outline the role of other pigments, but they may confuse absorption and action spectra. They outline chromatography of chloroplast pigments and calculate R_f values when provided with the formula. They know some detail of the main stages of respiration, identify the main differences between respiration in aerobic and anaerobic conditions and give an outline description of investigations. They may lack confidence drawing conclusions from results. They describe one or two of the main adaptations of rice but do not usually follow this up with explanations. They recall the main events occurring in the light-dependent and light-independent stages of photosynthesis; they describe the stages in more detail if provided with diagrams or other stimulus material, although they may make errors when naming compounds or describing the sequence of events that occurs. They list the main limiting factors of photosynthesis and understand experiments to investigate limiting factors; they show varying ability to interpret graphs of results.	They relate mitochondrial and chloroplast structures to the stages of respiration and photosynthesis. They describe graphs of action and absorption spectra and relate these to the main chloroplast pigments. They describe most details of chromatography of pigments and usually understand how to use the results to calculate R_f values. They describe in sequence the steps involved in the stages of aerobic respiration and describe respiration in anaerobic conditions in mammalian cells and in yeast. They are familiar with investigations into respiration and make conclusions based on the results, supported by some theoretical knowledge. They describe the listed adaptations of rice and explain the advantages of these in terms of the conditions in which rice plants grow. They recall details to produce good accounts of the light-dependent and light-independent stages of photosynthesis; they are less confident applying knowledge of the stages to unfamiliar material and may not recall all the details of photophosphorylation and of the Calvin cycle. They understand the concept of limiting factors and are able to describe and interpret results of experiments into limiting factors.	They understand that mitochondrial and chloroplast structures are related to function. They explain why different pigments are required for photosynthesis and explain the conceptual difference between absorption and action spectra. They describe details of chromatography of chloroplast pigments and interpret results based on unfamiliar contexts. They describe sequential detail within each of the stages of respiration and deduce the effect of changes to the process when presented with unfamiliar material. They describe and explain similarities and differences between respiration in aerobic and anaerobic conditions and interpret results based on unfamiliar and more complex investigations into respiration. They usually suggest adaptations of rice plants that are additional to those listed and give clear explanations. They give a detailed account of the light-dependent and light-independent stages of photosynthesis and are confident applying knowledge and understanding to a range of situations. They explain the concept of limiting factors and suggest explanations for more complex observations and results of investigations.

Area of knowledge, understanding and skills	Typical performance at grade E	Typical performance at grade C	Typical performance at grade A
Biological systems	Students state some of the principles involved in homeostasis in mammals, label diagrams of the kidney and nephron and outline ultrafiltration, selective reabsorption and the role of ADH in osmoregulation. They describe the roles of insulin and glucagon in the control of blood glucose concentration, give an outline of cell signalling and know that test strips and biosensors are used to measure the concentration of glucose in blood and urine. They understand that, in plant homeostasis, stomata have daily rhythms of opening and closing and that stomatal movement is related to events involving water movement. They recall AS knowledge of osmosis and active transport to describe and explain examples of homeostasis but may confuse active transport and facilitated diffusion and incorrectly use the term water concentration. They state the main differences between the nervous and endocrine systems and label diagrams of neurones, but they may not be aware of intermediate neurones. They describe the main points relating to the structure and function of cholinergic synapses. They understand that impulse conduction involves the movement of ions through membrane proteins but lack confidence when producing a sequential account. They show gaps in knowledge of sensory reception and muscular contraction.	Students describe the principles of homeostasis and outline nephron structure to function in ultrafiltration and selective reabsorption. They give some sequential detail involving ADH and osmoregulation. They understand the regulation of blood glucose concentration by insulin and glucagon and interpret graphical or tabular data. They recall some steps of cell signalling by glucagon and interpret in outline the results of test strips and biosensors. They describe structure of guard cells and outline the homeostatic mechanisms that result in the opening and closing of stomata. They know that ABA has a role in stomatal closure in times of water shortage and are usually clear when explaining movement of ions and water across membranes. They know a number of similarities and differences between the nervous and endocrine systems and describe the structure and role of sensory and motor neurones. They know the role of intermediate neurones and describe the structure and functioning of cholinergic synapses in detail. They produce sequential descriptions of the main events in action potentials and impulse conduction. They give a sequential account of sensory reception and muscular contraction but may miss some relevant points.	Students have a good command of the principles involved in homeostasis and the processes occurring in the kidney. They describe kidney and nephron structure in detail and understand the relationship between insulin and glucagon. They give a full account of cell signalling by glucagon. They explain the principles involved in the use of glucose test strips and biosensors. They apply understanding of biological systems to unfamiliar contexts. They relate the structure of guard cells to their homeostatic role in stomatal movement. They give a sequential account, accompanied by explanations, of the mechanisms involved in stomatal opening and closure. They show an understanding of the role of ABA in stomatal closure and suggest mechanisms of action. They describe and explain the similarities and differences between the nervous and endocrine systems. They apply knowledge and understanding to situations describing malfunctioning of neurones or to explain the effect of toxins and drugs on the functioning of cholinergic synapses. They show an understanding of the sequence of events occurring in action potentials and impulse conduction and of the functioning of sensory receptors. They give detailed accounts of muscular contraction.

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	They need prompting to give points about the three syllabus examples of control and coordination in plants.	They recall some knowledge of the three syllabus examples of control and coordination in plants but may not provide all relevant details.	They explain how the response of the Venus flytrap to a stimulus and the action of auxin and gibberellin are examples of control and coordination.
Organisms in their environment	Students give features related to the biological species concept and state the taxa in the kingdom system of classification. They recall AS knowledge to give differences between eukaryotes and prokaryotes. They provide basic descriptions of ecosystem and niche and outline what is meant by ecosystem and species diversity. They outline methods for assessing biodiversity. They complete calculations of biodiversity in well-structured questions. They list reasons why populations and species become extinct and give some features of methods used in conservation.	Students state the features of the three different species concepts and name the three domains. They state features of viruses. They define a niche but may not give a full definition of an ecosystem. They explain what is meant by ecosystem biodiversity and species diversity. They know how to carry out transects, describe methods for assessing biodiversity and carry out calculations. They are knowledgeable of the main principles and ideas concerning conservation and are confident applying these to new situations.	Students discuss limitations and merits of the three different species concepts and state differences between the three domains. They provide clear definitions of ecosystem and niche and explain the differences between ecosystem biodiversity, species diversity and genetic variation within species. They usually choose and describe a suitable method for assessing biodiversity. They distinguish between belt and line transects and state the relevant calculation to carry out. They discuss current issues relating to conservation and methods used to conserve species.
Organising, presenting and using information	Students deal with straightforward concepts to organise information. They are less able to bring together information from different main syllabus topics, and extended responses may require more ideas or repeat information given in the question text. They use some scientific terms but may resort to less scientific terminology. They translate information from one form to another, sometimes with misinterpretations or	Students bring together the main principles and facts from a number of different syllabus topic sections. They incorporate stimulus material in a response and include many of the scientific terms stated in the syllabus. They produce extended responses that contain relevant information but not always sufficient for a complete response. They translate information from one form to another, with responses tending to contain a	Students present knowledge, principles and concepts from across the syllabus in a coherent and relatively complete response. They use the correct scientific terms and their responses usually contain minimal superfluous content. They recognise and extract data to input into formulae and generally decide on the most appropriate calculations to make.

Area of knowledge, understanding and skills	Typical performance at grade E	Typical performance at grade C	Typical performance at grade A
	errors. They identify main patterns and trends in information and draw basic conclusions. They know how to carry out calculations practised at AS and carry out calculations required for A Level when the numerical data is straightforward and clearly presented. They sometimes manipulate data to support a written description of graphical and tabular results.	mix of relevant and less appropriate data. They identify trends and patterns in data provided and support a valid conclusion with an explanation. They carry out calculations listed in the A Level syllabus and have most success when some of the layout required is included. They manipulate numerical data to include in descriptions of graphs and tables.	They extract and manipulate graphical and tabular data to support descriptions and explanations, often producing a comprehensive response. They clearly communicate conclusions and supporting evidence made from identifying trends, relationships or patterns.
Explaining phenomena and applying information	Students show inconsistency in their understanding of the different A Level topic sections. They use the more straightforward concepts when explaining phenomena, patterns and relationships and sometimes select appropriate points learned at AS Level. They apply principles and concepts to unfamiliar material when there is a clear link to familiar syllabus material, otherwise answers may be more descriptive than explanatory.	Students have a good understanding of most of the syllabus but may show a weaker grasp of some topics, particularly when dealing with unfamiliar contexts. They include a range of concepts and principles from relevant syllabus sections when giving explanations and include appropriate ideas from AS Level. They use scientific terminology in their explanations.	Students generally have a good understanding of most syllabus topics and introduce ideas from their own experience to provide explanations. They recognise the links to different syllabus topics when dealing with unfamiliar material and responses are usually of a good depth. They use scientific terminology accurately and extensively to produce explanations of familiar and unfamiliar contexts.
Problem solving and evaluating information	Students solve problems based on less demanding subject material; they sometimes provide partial solutions to more complex, or unfamiliar, problems. They make simple predictions that are qualified with some supporting argument. They demonstrate the ability to evaluate information that is focused on less complex material that presents fewer ambiguities.	Students solve problems based on familiar material, including those that require links to be made across the syllabus content, but they are less confident dealing with new situations. They make predictions based on correct ideas and suggest supporting arguments for hypotheses that are proposed. They show an understanding of principles and concepts when evaluating information.	Students draw on understanding and fairly extensive recall from across the syllabus to suggest and explain solutions to biological problems related to familiar or new situations. They construct hypotheses that are supported by solid arguments. They frequently go through two or more steps in their thought process and use a range of viewpoints to evaluate data.

Area of knowledge, understanding and skills	Typical performance at grade E	Typical performance at grade C	Typical performance at grade A
	They select information from texts and diagrams when constructing a response but may extract some ideas that are not relevant.	They work through text and diagrammatic material to collect ideas and produce coherent responses.	They make logical judgements about the strength of evidence that exists to support biological theories.
Experimental and investigation skills	Students usually produce an outline design of an experimental method. They may not always choose appropriate apparatus or may need to provide more detail of techniques to be used. They make a prediction when the problem is familiar. They assess the level of risk associated with a method and list the main variables to be standardised. They may confuse dependent and independent variables. They usually suggest the most appropriate way to display results, although they may not always follow the correct convention for the display of graphs and tables. They suggest calculations to deal with data but are not confident suggesting the appropriate statistical tests to carry out. They summarise results and identify obvious anomalous results. They may not be able to distinguish between conclusions, descriptions, and explanations. They assess investigations that are based on familiar syllabus content and identify areas of improvement (e.g. lack of sufficient replicates).	Students can, when given a problem, design an experimental method and describe in sequence most of the main steps involved. They know the difference between dependent and independent variables, list the main variables that need to be standardised and usually recognise the need for a control. They make a relevant prediction, expressing this as a written hypothesis or as a graph of the expected results. They select and construct the most suitable type of graph or table for the display of results but these may incorporate errors. They understand that the quality of results can be assessed by looking for anomalies and suggest reasons for anomalies. They make decisions about calculations that allow data to be processed and analysed and sometimes suggest an appropriate statistical test to carry out. They summarise main conclusions from results and give some explanations to support. They suggest improvements for investigations that will increase confidence in results.	Students can design a detailed sequential experimental method that allows the method to be easily followed. They describe and explain a relevant control experiment. They identify situations where there is more than one independent or dependent variable in an experiment and judge the other variables that should be standardised. They select the most suitable method to display results and make no or few errors. They assess the quality and validity of results by considering the occurrence of anomalies and spread of results. They usually make correct decisions about the calculations and statistical tests to use and carry out calculations accurately. They make conclusions based on the available evidence and the original prediction, and they support these with scientific explanations. They suggest possible explanations for inconsistencies or anomalous results. They review an investigation and assess the confidence that can be put into conclusions.