

# Grade Descriptions for Cambridge IGCSE Biology 0610

## 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 IGCSEs, they describe performance at three levels – grades ‘F’, ‘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 illustrate 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 inside the grade’ is likely to demonstrate.

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.

## Grade descriptions

Area of knowledge, understanding and skills	Typical performance at grade F	Typical performance at grade C	Typical performance at grade A
<b>Cellular and molecular biology</b>	<p>Students recognise descriptions of the characteristics of living organisms. They apply the principles of scientific naming of organisms. They describe some features found in arthropod groups.</p> <p>They distinguish between animal and plant cells and give the function of some cellular structures such as the flagellum.</p> <p>They describe the structure of biological molecules such as proteins and lipids.</p>	<p>Students identify and describe the Kingdom that organisms belong to and describe the features of different arthropod groups.</p> <p>They describe similarities between animal and plant cells and give the function of most cellular structures such as the nucleus.</p> <p>They use their understanding of complementary base pairing in DNA.</p> <p>They use the magnification formula to calculate actual image size.</p> <p>They describe the effect of temperature on enzyme action.</p>	<p>Students fully explain the use of DNA sequences to understand the evolutionary history of species and interpret relevant diagrams.</p> <p>They describe some aspects of prokaryotic structure.</p> <p>They use their understanding of enzyme action to explain the effect of temperature and pH.</p> <p>They explain how some types of cells are adapted for their function.</p>
<b>Biological processes</b>	<p>Students identify photosynthesis and respiration from descriptions.</p> <p>They identify diffusion from diagrams and descriptions.</p> <p>They complete simple descriptions of anaerobic respiration.</p>	<p>Students describe photosynthesis and respiration. They use the appropriate word equations and identify balanced chemical equations. Students use their understanding to make predictions a described experiment.</p> <p>They describe aerobic and anaerobic respiration in humans.</p> <p>They describe active transport and osmosis.</p>	<p>Students identify and describe the effects of limiting factors of photosynthesis from data in tables or graphs.</p> <p>They describe the mechanism of active transport.</p> <p>They use their knowledge of osmosis to discuss given experimental results.</p>

Area of knowledge, understanding and skills	Typical performance at grade F	Typical performance at grade C	Typical performance at grade A
<b>Human physiology</b>	<p>Students identify some organs and structures and their function, for example the organs of the digestive systems and some simple internal structures in the heart.</p> <p>They discuss the requirements for some nutrients in the diet.</p> <p>They identify some structures in the jaw such as the gum and enamel and some types of human teeth.</p> <p>They name some hormones.</p> <p>They complete descriptions about how the eye responds to light and name other stimuli that sense organs can respond to.</p>	<p>Students identify the functions of a wide variety of organs.</p> <p>They describe both physical and chemical digestion.</p> <p>They describe circulatory systems including identifying features of different types of blood vessels. They discuss the functions of some blood cells and platelets.</p> <p>They name and locate on a diagram the different regions of the kidney.</p> <p>They describe the mechanism of ventilation in the lungs.</p> <p>They label different parts of a reflex arc and use their understanding to describe the pupil reflex.</p>	<p>Students explain the requirements for different conditions in different parts of the digestive system and how these are achieved.</p> <p>They demonstrate a detailed understanding of synaptic transmission.</p> <p>They explain the effect of exercise on heart rate and the control of internal body temperature.</p> <p>They explain the mechanisms underlying the effects of cholera in the small intestine.</p> <p>They provide a detailed description of accommodation.</p> <p>They demonstrate a simple understanding of the production of urine in the kidney.</p>
<b>Plant biology</b>	<p>Students recognise and identify most structures in roots and leaves. They describe some of the functions of the xylem and phloem.</p> <p>They demonstrate their understanding of transpiration by naming some of the factors that affect the rate of transpiration.</p>	<p>Students identify both the structures in leaves and roots and their functions such as palisade mesophyll cells and photosynthesis.</p> <p>They describe the different forms of pollination and identify them in diagrams.</p> <p>They identify different trophic responses from diagrams.</p>	<p>Students give detailed explanations of how the structures in a leaf are adapted for photosynthesis.</p> <p>They use their understanding of transpiration to predict the effect of different factors on transpiration.</p> <p>They describe the differential distribution of auxin that leads to tropic responses in shoots.</p> <p>They outline the process of translocation and demonstrate their understanding of sources to sinks for different situations.</p>

Area of knowledge, understanding and skills	Typical performance at grade F	Typical performance at grade C	Typical performance at grade A
<b>Inheritance/genetics</b>	<p>Students recognise simple descriptions for terms such as mutation and asexual reproduction.</p> <p>They apply the principles of selective breeding to contexts such as livestock farming.</p>	<p>Students calculate probabilities and phenotypic ratios for the simple inheritance of characteristics.</p> <p>They recognise descriptions of more complex terms such as gene.</p> <p>They provide a simple description of the correct order of some of the stages involved in protein synthesis.</p> <p>They use their understanding of natural selection in different contexts such as the development of antibiotic resistance. They describe different types of variation.</p>	<p>Students calculate probabilities and phenotypic ratios for more complex inheritance of characteristics such as codominance and sex-linked.</p> <p>They describe protein synthesis and explain the link between DNA base sequence, amino acid sequence and protein shape.</p> <p>They describe the process of adaptation and identify adaptation appropriate for different contexts.</p> <p>They describe the roles of mitosis and meiosis and the cells produced by each type of cell division.</p>
<b>Organisms, the environment and human influence on the ecosystem</b>	<p>Students create both food chains and webs. They make simple interpretations from basic food chains. They demonstrate their understanding by identifying some trophic levels. They use some key terms such as carnivore and herbivore.</p> <p>They show a basic understanding of the effect of pollution on ecosystems and state some of the reasons for species extinctions.</p> <p>They describe and interpret diagrams of the carbon cycle.</p>	<p>Students use food webs. They recognise a wide variety of different trophic levels in a food web. They describe the energy transfers happening in a food web. They identify and discuss the different types of pyramids used to represent food chains.</p> <p>They describe the phases of a population growth curve in terms of birth rates and death rates.</p> <p>They demonstrate their understanding of the effects of habitat destruction through the examples of deforestation and eutrophication.</p> <p>They explain the importance of conservation programmes and describe some different strategies.</p>	<p>Students use complex food webs. They show their understanding by identifying all the different trophic levels. They apply their understanding to extended interpretation of different human impacts on a food web. They understand aspects of the efficiency of the energy transfer from one trophic level to the next.</p> <p>They fully explain the different phases of the population growth curve.</p> <p>They give a detailed description of the process of eutrophication.</p> <p>They describe and interpret diagrams of the nitrogen cycle.</p>

Area of knowledge, understanding and skills	Typical performance at grade F	Typical performance at grade C	Typical performance at grade A
<b>Biotechnology</b>	Students identify different uses of biotechnology. They recognise the role of anaerobic respiration in yeast in both biofuel production and bread-making.	Students describe simple genetic modification. They give a basic description of genetic modification.  They apply this understanding to examples such as insulin production by bacterial cells.	Students fully describe the process of genetic modification. They name and give the function of enzymes involved in the process.  They discuss the advantages and disadvantages of genetic modification of crops.  They understand the use of fermenters in biotechnology and explain the importance of maintaining conditions such as pH in a fermenter.
<b>Experimental skills and investigations</b>	Students draw a table. They refer to experimental data to draw simple conclusions. Students draw graphs with correctly labelled axes. They draw diagrams of an appropriate size. They identify the need for multiple repeats of the experiment and constant variables in their experimental plans. They identify safety precautions needed in experiments. They complete basic calculations and measurements. They describe the procedures for tests for biological molecules such as the iodine solution test for starch.	Students correctly complete a table with experimental data. They are able to plot data accurately on a graph and include sufficient detail in their biological diagrams. They describe how to change the independent variable and the need for safety precautions in their experimental plans. They complete more complex calculations. They identify independent, dependent and constant variables in described experiments. They identify some errors in described experimental details. They describe data in graphs and tables.	Students use correct headers and units in a table. They are able to draw complex conclusions from experimental data. They use sensible scales and draw appropriate lines on a graph. They use clear continuous lines when making a biological drawing. They write a thorough experimental plan including details of the method and how to measure changes in the dependent variable. They complete complex calculations with appropriate rounding. They identify errors in described experimental details and suggest improvements to the experiment.

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