

GCSE Biology

Outline of Exams and RAG Checklists

This GCSE consists of 2 written exam papers, 100 marks each and lasting 1 hour 45 mins. The question styles include multiple choice, structured, closed short answer and open extended response. In addition to the checklists below, there will be questions relating to the required practical activities studied through the course and there will be calculations, so a calculator is required.

The paper 1 exam on 13th May 2025 (PM) includes Modules B1 to B4 Cell biology; Organisation; Infection and response; and Bioenergetics and is 50% of the grade.

The paper 2 exam on 9th June 2025 (AM) includes Modules B5 to B7 Homeostasis and response; Inheritance, variation and evolution; and Ecology and is 50% of the grade.

Below are the 7 Learning Journey Checklists for this GCSE. Bold statements are assessed on the higher tier paper only.



KS4 TRIPLE BIOLOGY

B1 LEARNING JOURNEY

B1	REF	SKILL	RAG
1.1 CELL STRUCTURE	B.1.1.1.a	I can use the terms 'eukaryotic' and 'prokaryotic' to describe types of cells	
	B.1.1.1.b	I can describe the features of bacterial (prokaryotic) cells	
	B.1.1.2.a	I can state the structures found in animal and plant (eukaryotic) cells	
	B.1.1.2.b	I can describe the functions of the structures in animal and plant (eukaryotic)	
	B.1.1.4.a	I can describe what differentiation is, including differences between animals and	
	B.1.1.4.b	I can describe what a specialised cell is, including examples	
	B.1.1.5.a	I can define the terms magnification and resolution	
	B.1.1.5.b	I can compare electron and light microscopes in terms of their magnification and resolution, including the consequences of these differences for studying	
	B.1.1.6.a	I can describe how bacteria reproduce and the conditions required	
	B.1.1.6.b	I can describe how to prepare an uncontaminated culture	
1.1 CELL DIVISION	B.1.2.1.a	I can describe how genetic information is stored in the nucleus of a cell	
	B.1.2.2.a	I can describe the processes that happen during the cell cycle, including an understanding of mitosis	
	B.1.2.3.a	I can describe stem cells, including sources of stem cells in plants and animals and their role in an organism	
	B.1.2.3.b	I can describe the use of stem cells in the production of plant clones and therapeutic cloning	
	B.1.2.3.c	I can discuss the potential risks, benefits and issues associated with using stem cells in medical research and treatments	
1.3 TRANSPORT IN CELLS	B.1.3.1.a	I can describe the process of diffusion, including examples	
	B.1.3.1.b	I can explain how diffusion is affected by different factors	
	B.1.3.1.c	I can explain the term "surface area to volume ratio", and how this relates to single-celled and multicellular organisms	
	B.1.3.1.d	I can explain how the effectiveness of an exchange surface can be increased, including examples of exchange surface adaptations	
	B.1.3.2.a	I can describe the process of osmosis	
	B.1.3.3.a	I can describe the process of active transport, including examples	
	B.1.3.3.b	I can explain the differences between diffusion, osmosis and active transport	



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B2 LEARNING JOURNEY

B2	REF	SKILL	RAG
	B.2.1.1.a	I can describe the levels of organisation within living organisms	
2.2 ANIMAL TISSUES, ORGANS AND ORGAN SYSTEMS	B.2.2.1.a	I can describe basic features of enzymes	
	B.2.2.1.b	I can describe the lock and key theory as a model of enzyme action	
	B.2.2.1.c	I can explain the effect of temperature and pH on enzymes	
	B.2.2.1.d	I can describe the digestive enzymes, their names, sites of production and actions	
	B.2.2.1.e	I can describe how the products of digestion are used	
	B.2.2.1.f	I can describe the features and functions of bile	
	B.2.2.2.a	I can describe the structure of the human heart and lungs	
	B.2.2.2.b	I can explain how the heart moves blood around the body	
	B.2.2.2.c	I can explain how the natural resting heart rate is controlled, and how irregularities can be corrected	
	B.2.2.2.d	I can describe the structure and function of arteries, veins and capillaries	
	B.2.2.3.a	I can describe blood and identify its different components, including identifying blood cells from photographs and diagrams	
	B.2.2.3.b	I can describe the functions of blood components, including adaptations to function	
	B.2.2.4.a	I can describe what happens in coronary heart disease	
	B.2.2.4.b	I can describe treatments for coronary heart disease and heart failure	
	B.2.2.4.c	I know that heart valves can become faulty and I can describe the consequences of this	
	B.2.2.5.a	I can describe health and the causes of ill-health	
	B.2.2.5.b	I can describe how different types of diseases may interact	
	B.2.2.6.a	I can describe what risk factors are and I can give examples	
	B.2.2.7.a	I can describe benign and malignant tumours	
	B.2.2.7.b	I can describe the known risk factors for cancer, including genetic and lifestyle risk factors	
2.3 PLANT TISSUES, ORGANS AND ORGAN SYSTEMS	B.2.3.1.a	I can name some plant tissues and describe their functions	
	B.2.3.1.b	I can explain how the structure of plant tissues are related to their function within the leaf, which is a plant organ	
	B.2.3.2.a	I know that the roots, stem and leaves form a plant organ system that transports substances around the plant	
	B.2.3.2.b	I can explain how root hair cells, xylem and phloem are adapted to their functions	
	B.2.3.2.c	I can describe what transpiration is	
	B.2.3.2.d	I can explain how the rate of transpiration can be affected by different factors	
	B.2.3.2.e	I can describe the role of stomata and guard cells in the control of gas exchange and water loss	



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B3 LEARNING JOURNEY

B3	REF	SKILL	RAG
3.1 COMMUNICABLE DISEASE	B.3.1.1.a	I can describe what a pathogen is and how pathogens are spread	
	B.3.1.1.b	I can explain how pathogenic bacteria and viruses cause damage in the body	
	B.3.1.1.c	I can explain how the spread of diseases can be reduced or prevented	
	B.3.1.2.a	I can describe measles, HIV and tobacco mosaic virus as examples of viral pathogens (to include pathology, treatment and disease control where appropriate)	
	B.3.1.3.a	I can describe salmonella food poisoning and gonorrhoea as examples of bacterial pathogens (to include pathology, treatment and disease control where appropriate)	
	B.3.1.4.a	I can describe the signs, transmission and treatment of rose black spot infection in plants	
	B.3.1.5.a	I can describe the symptoms, transmission and control of malaria, including knowledge of the mosquito vector	
	B.3.1.6.a	I can describe defences that stop pathogens entering the human body	
	B.3.1.6.b	I can state the role of the immune system	
	B.3.1.6.c	I can describe how white blood cells attack pathogens	
	B.3.1.7.a	I can describe how vaccination works, including at the population level	
	B.3.1.8.a	I can explain how antibiotics and painkillers are used to treat diseases, including their limitations	
	B.3.1.9.a	I can describe how sources for drugs have changed over time, and give some examples	
	B.3.1.9.b	I can describe how new drugs are tested, including pre-clinical testing and clinical trials	
3.2 MONOCLONAL ANTIBODIES	B.3.2.1.a	I can describe what monoclonal antibodies are and why they are useful	
	B.3.2.1.b	I can describe how monoclonal antibodies are produced	
	B.3.2.2.a	I can explain how monoclonal antibodies are used for diagnosis, research, chemical testing and disease treatments	
	B.3.2.2.b	I can evaluate the advantages and disadvantages of monoclonal antibodies	
3.3 PLANT DISEASES	B.3.3.1.a	I can describe some observable signs of plant disease, and how plant diseases can be identified	
	B.3.3.1.b	I can give examples of plant pathogens	
	B.3.3.1.c	I can give examples of plant ion deficiencies and their effects	
	B.3.3.2.a	I can describe physical, chemical and mechanical defence responses of plants	



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B4 LEARNING JOURNEY

B4	REF	SKILL	RAG
4.1 PHOTOSYNTHESIS	B.4.1.1.a	I can describe what happens in photosynthesis, including using a word equation	
	B.4.1.1.b	I can describe photosynthesis using a chemical equation	
	B.4.1.2.a	I can state the limiting factors of photosynthesis	
	B.4.1.2.b	I can explain how limiting factors affect the rate of photosynthesis, including graphical interpretation (limited to one factor)	
	B.4.1.2.c	I can explain how the limiting factors of photosynthesis interact, including graphical interpretation involving two or three factors	
	B.4.1.2.d	I can explain how limiting factors are important to the economics of greenhouses, including data interpretation	
	B.4.1.2.e	I can explain and use inverse proportion in the context of photosynthesis	
	B.4.1.3.a	I can describe how the glucose produced in photosynthesis is used by plants	
4.2 RESPIRATION	B.4.2.1.a	I can describe basic features of respiration	
	B.4.2.1.b	I can describe aerobic and anaerobic respiration using word equations	
	B.4.2.1.c	I can describe aerobic and anaerobic respiration (in plants and yeast cells only) using chemical equations	
	B.4.2.1.d	I can compare aerobic and anaerobic respiration	
	B.4.2.2.a	I can describe what happens to heart rate, breathing rate and breath volume during exercise and why these changes occur	
	B.4.2.2.b	I can explain what happens when muscles do not have enough oxygen	
	B.4.2.2.c	I can explain what happens to lactic acid	
	B.4.2.3.a	I can explain what metabolism is, including examples	



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B5 LEARNING JOURNEY

B5	REF	KNOWLEDGE	RAG
5.1 HOMEOSTASIS	B.5.1.1.a	I can describe what homeostasis is and why it is important, and I can give examples of conditions controlled by homeostasis	
	B.5.1.1.b	I can describe the common features of all control systems	
5.2 NERVOUS SYSTEM	B.5.2.1.a	I can state the function of the nervous system and name its important components	
	B.5.2.1.b	I can describe how information passes through the nervous system	
	B.5.2.1.c	I can describe what happens in a reflex action and why reflex actions are important	
	B.5.2.1.d	I can explain how features of the nervous system are adapted to their function, including a reflex arc	
	B.5.2.2.a	I can state the function of the brain and how it is structured, including naming specific regions and identifying these on a diagram	
	B.5.2.2.b	I can describe the functions of different regions of the brain	
	B.5.2.2.c	I can explain how neuroscientists have been able to map regions of the brain to particular functions	
	B.5.2.3.a	I can state the function of the eye and how it is structured, including names of specific parts	
	B.5.2.3.b	I can describe the functions of different parts of the eye, including relating structure to function	
	B.5.2.3.c	I can describe what accommodation is, and how it is carried out	
	B.5.2.3.d	I can explain what myopia and hyperopia are and how they are treated, including interpreting ray diagrams	
	B.5.2.4.a	I can describe how body temperature is monitored and controlled, including responses when body temperature becomes too high or too low	
	B.5.2.4.b	I can explain how the body's responses act to raise or lower temperature in a given context	

B5	REF	KNOWLEDGE	RAG
5.3 HORMONAL CONTROL	B.5.3.1.a	I can describe the endocrine system, including the location of parts and the role of hormones	
	B.5.3.2.a	I can state that blood glucose concentration is monitored and controlled by the pancreas, and describe the body's response when blood glucose is too high	
	B.5.3.2.b	I can explain what type 1 and type 2 diabetes are and how they are treated	
	B.5.3.2.c	I can describe the body's response when blood glucose concentration is too low	
	B.5.3.2.d	I can explain how glucagon interacts with insulin to control blood glucose levels in the body	
	B.5.3.3.a	I can describe how water, ions and urea are lost from the body, and the consequences of losing or gaining too much water for body cells	
	B.5.3.3.b	I know that protein digestion leads to excess amino acids inside the body, and I can describe what happens to these	
	B.5.3.3.c	I can describe how the kidneys produce urine	
	B.5.3.3.d	I can explain how the water level in the body is controlled by ADH	
	B.5.3.3.e	I can describe how kidney failure can be treated	
	B.5.3.4.a	I can describe what happens at puberty in males and females, including knowledge of male and female reproductive hormones	
	B.5.3.4.b	I can name and describe the roles of the hormones involved in the menstrual cycle	
	B.5.3.4.c	I can explain how different hormones interact to control the menstrual cycle and ovulation	
	B.5.3.5.a	I can describe how fertility can be controlled by hormonal and non-hormonal methods of contraception	
	B.5.3.6.a	I can explain how hormones are used to treat infertility, including the steps involved in In Vitro Fertilisation (IVF) treatment	
	B.5.3.6.b	I can evaluate the risks and benefits of fertility treatments	
	B.5.3.7.a	I can describe the functions of adrenaline and thyroxine in the body, and I know where they are produced	
	B.5.3.7.b	I can explain the roles of thyroxine and adrenaline in the body as negative feedback systems	
5.4 PLANT HORMONES	B.5.4.1.a	I can describe hormone-linked plant responses, to include phototropism and gravitropism, and the role of auxin in controlling these	
	B.5.4.1.b	I can describe the functions of gibberellins and ethene in plants, and the uses of plant hormones in agriculture, horticulture and the food industry	



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B6 LEARNING JOURNEY

B6	REF	SKILL	RAG
6.1 REPRODUCTION	B.6.1.1.a	I can describe features of sexual and asexual reproduction	
	B.6.1.2.a	I can describe what happens during meiosis	
	B.6.1.2.b	I can describe what happens at fertilisation	
	B.6.1.3.a	I can explain advantages of sexual and asexual reproduction	
	B.6.1.3.b	I can describe examples of organisms that reproduce both sexually and asexually	
	B.6.1.4.a	I can describe the structure of DNA and its role in storing genetic information inside the cell	
	B.6.1.4.b	I can explain the term 'genome' and the importance of the human genome	
	B.6.1.5.a	I can describe the structure of DNA, including knowledge of nucleotide units	
	B.6.1.5.b	I can explain complementary base pairing in DNA	
	B.6.1.5.c	I can explain the relationship between DNA bases, amino acids and proteins	
	B.6.1.5.d	I can describe how proteins are synthesised on ribosomes, including protein folding and its importance for protein function	
	B.6.1.5.e	I can explain what mutations are, and the possible effects of mutations	
	B.6.1.5.f	I can explain what non-coding parts of DNA are, and why they are important	
	B.6.1.6.a	I can describe how characteristics are controlled by one or more genes, including examples	
	B.6.1.6.b	I can explain important genetic terms: allele, genotype, phenotype, dominant, recessive, homozygous and heterozygous	
	B.6.1.6.c	I can understand and use Punnet square diagrams, genetic crosses and family trees	
	B.6.1.6.d	I can construct a Punnet square diagram to predict the outcome of a monohybrid cross	
	B.6.1.7.a	I can describe cystic fibrosis and polydactyly as examples of inherited disorders	
	B.6.1.7.b	I can evaluate social, economic and ethical issues concerning embryo screening when given appropriate information	
	B.6.1.8.a	I can describe how the chromosomes are arranged as 23 pairs in body cells, including the function of the sex chromosomes	
	B.6.1.8.b	I can explain how sex is determined and carry out a genetic cross to show sex inheritance	

B6	REF	SKILL	RAG
6.2 VARIATION AND EVOLUTION	B.6.2.1.a	I can describe what variation is and how it can be caused	
	B.6.2.1.b	I can describe mutations and explain their influence on phenotype and changes in a species	
	B.6.2.2.a	I can explain the theory of evolution by natural selection	
	B.6.2.2.b	I can describe how new species can be formed	
	B.6.2.3.a	I can describe what selective breeding is	
	B.6.2.3.b	I can explain the process of selective breeding, including examples of desired characteristics and risks associated with selective breeding	
	B.6.2.4.a	I can describe what genetic engineering is, including examples, and how it is carried out	
	B.6.2.4.b	I can explain some benefits, risks and concerns related to genetic engineering	
	B.6.2.4.c	I can explain the process of genetic engineering, to include knowledge of enzymes and vectors	
	B.6.2.5.a	I can describe different cloning techniques, to include: tissue culture, cuttings, embryo transplants and adult cell cloning	
6.3 THE DEVELOPMENT AND UNDERSTANDING OF THE GENETICS OF EVOLUTION	B.6.3.1.a	I can describe the ideas proposed by Darwin in his theory of natural selection and explain why this theory was only gradually accepted	
	B.6.3.1.b	I can describe other inheritance-based theories that existed (apart from the theory of natural selection), and the problems with these theories	
	B.6.3.2.a	I can describe the work of Alfred Russel Wallace	
	B.6.3.2.b	I can explain how new species can be formed	
	B.6.3.3.a	I can describe how our understanding of genetics has developed over time, to include knowledge of Mendel	
	B.6.3.4.a	I can describe some sources of evidence for evolution	
	B.6.3.5.a	I can describe what fossils are, how they are formed and what we can learn from them	
	B.6.3.5.b	I can explain why there are few traces of the early life forms, and the consequences of this in terms of our understanding of how life began	
	B.6.3.6.a	I can describe some of the causes of extinction	
	B.6.3.7.a	I can describe how antibiotic-resistant strains of bacteria can arise and spread	
	B.6.3.7.b	I can describe how the emergence of antibiotic-resistant bacteria can be reduced and controlled, to include the limitations of antibiotic development	
6.4 CLASSIFICATION	B.6.4.1.a	I can describe how organisms are named and classified in the Linnaean system	
	B.6.4.1.b	I can explain how scientific advances have led to the proposal of new models of classification, including knowledge of the three-domain system	
	B.6.4.1.c	I can describe and interpret evolutionary trees	



KS4 TRIPLE BIOLOGY

B7 LEARNING JOURNEY

B7	REF	SKILL	RAG
7.1 ADAPTATIONS, INTERDEPENDENCE AND COMPETITION	B.7.1.1.a	I can state what an ecosystem is	
	B.7.1.1.b	I can describe which resources animals and plants compete for, and why they do this	
	B.7.1.1.c	I can explain the terms 'interdependence' and 'stable community'	
	B.7.1.2.a	I can name some abiotic and biotic factors that affect communities	
	B.7.1.2.b	I can explain how a change in an abiotic or biotic factor might affect a community given appropriate data or context	
	B.7.1.4.a	I can describe structural, behavioural and functional adaptations of organisms	
	B.7.1.4.b	I can describe what an extremophile is	
7.2 ORGANISATION OF AN ECOSYSTEM	B.7.2.1.a	I can represent the feeding relationships within a community using a food chain, including the use of scientific terms to describe these relationships	
	B.7.2.1.b	I can explain how and why ecologists use quadrats and transects	
	B.7.2.1.c	I can understand and interpret predator-prey cycles	
	B.7.2.2.a	I can describe the processes involved in the carbon cycle	
	B.7.2.2.b	I can describe the processes involved in the water cycle	
	B.7.2.3.a	I can explain how the conditions for decay are optimised by farmers and gardeners, and the reasons for this	
	B.7.2.3.b	I can describe how methane gas can be produced for use as a fuel	
	B.7.2.4.a	I can explain how environmental changes can affect the distribution of species in an ecosystem	
7.3 BIODIVERSITY AND THE EFFECT OF HUMAN INTERACTION ON ECOSYSTEMS	B.7.3.1.a	I can describe what biodiversity is and, why it is important, and how human activities affect it	
	B.7.3.2.a	I can describe the impact of human population growth and increased living standards on resource use and waste production	
	B.7.3.2.b	I can explain how pollution can occur, and the impacts of pollution	
	B.7.3.3.a	I can describe how humans reduce the amount of land available for other animals and plants	
	B.7.3.3.b	I can explain the consequences of peat bog destruction	
	B.7.3.4.a	I can describe deforestation and why it has occurred in tropical areas	
	B.7.3.4.b	I can explain the consequences of deforestation	
	B.7.3.5.a	I can describe how the composition of the atmosphere is changing, and the impact of this on global warming	
	B.7.3.5.b	I can describe some biological consequences of global warming	
	B.7.3.6.a	I can describe programmes that aim to reduce the negative effects on ecosystems and biodiversity	

B7	REF	SKILL	RAG
7.3 BIODIVERSITY AND THE EFFECT OF HUMAN INTERACTION ON ECOSYSTEMS	B.7.3.1.a	I can describe what biodiversity is, why it is important, and how human activities affect it	
	B.7.3.2.a	I can describe the impact of human population growth and increased living standards on resource use and waste production	
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	B.7.3.5.b	I can describe some biological consequences of global warming	
	B.7.3.6.a	I can describe programmes that aim to reduce the negative effects on ecosystems and biodiversity	
7.4 TROPHIC LEVELS IN THE ECOSYSTEM	B.7.4.1.a	I can describe the different trophic levels and use numbers to represent them	
	B.7.4.1.b	I can describe what decomposers are and what they do	
	B.7.4.2.a	I can construct a pyramid of biomass and explain what it represents	
	B.7.4.3.a	I can state how much energy producers absorb from the Sun and how much biomass is transferred from one level to the next	
	B.7.4.3.b	I can explain how biomass is lost between trophic levels, including the consequences of this	
7.5 FOOD PRODUCTION	B.7.5.1.a	I can explain the term 'food security' and factors that affect it	
	B.7.5.2.a	I can explain how the efficiency of food production can be improved	
	B.7.5.2.b	I can explain the term 'factory farming', including examples, and ethical objections	
	B.7.5.3.a	I can explain the importance of maintaining fish stocks at a level where breeding continues	
	B.7.5.3.b	I can explain some methods that can help to conserve fish stocks	
	B.7.5.4.a	I can describe how modern biotechnology is used in food production, including the fungus <i>Fusarium</i> as an example	
	B.7.5.4.b	I can describe the uses of genetically modified organisms in insulin and food production	