



Edexcel Biology Checklist

Triple Award

VIDEO

EXAM
Q&A



Topic 1. Key Concepts in biology

Video: **Eukaryotic and prokaryotic cells**

- Compare the structure of animal and plant cells
- Label typical and atypical prokaryotic cells
- Compare prokaryotic and eukaryotic cells



Video: **Orders of magnitude and standard form**

- Practice converting units
- Practice writing numbers in standard form
- Calculate differences in orders of magnitude
- Multiply and divide numbers in standard form



Video: **Microscopes and magnification**

- Compare light and electron microscopes
- Describe how to use a microscope to view prepared animal and plant cells
- Maths Skill: To calculate magnification and the actual size of cells.



Video: **Microscope drawing and measuring cell size**

- Estimate cell size based on the diameter of the field of view
- Draw low and high plan drawings from microscopes



Video: **Specialised cells**

- Describe how some specialised cells are adapted for their function
- Describe the adaptations of the gametes
- Compare cilia and microvilli.



Video: **Enzymes**

- Describe enzyme structure and how they work
- Describe and explain the factors that affect enzyme reactions with reference to typical rates of reaction graphs



Video: **Core Practical: investigating enzymes and calculating the rate of reaction**

- Describe how to conduct a rates of reaction investigation on the effect of pH on amylase
- Calculate and plot the rate of reaction



Video: **Core Practical: food tests**

- Describe how to use a chemical reagent to test the presence of a food group in a food sample
- Describe how to calculate the energy content of foods using bomb calorimetry





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Video: **Enzymes in digestion**

- Describe the role of enzymes in digestion
- Describe the substrates and products for each class of digestive enzyme
- State where each of the class' of digestive enzyme can be found in the digestive system



Video: **Diffusion and active transport**

- Define diffusion and active transport
- Describe the role of carrier proteins in active transport
- Compare active and passive transport



Video: **Core Practical: osmosis in potatoes**

- Define osmosis
- Explain what could happen to animal and plant cells, due to osmosis, if the water concentration is not regulated
- Investigate how the concentration of a solution could affect the change in mass



Topic 2. Cells and control

Video: **Cell division**

- Describe what happens in the different stages of mitosis
- Describe the process of cell differentiation in mammals and cell elongation in plants
- Describe how percentile charts are used to monitor development
- Explain what is meant by cancer



Video: **Stem cells**

- Define a stem cell
- Describe the difference between embryonic and adult stem cells
- State that stem cells in plants are found in their meristems



Video: **The nervous system**

- Describe the structure of the nervous system
- Explain how the components of the nervous system can produce a coordinated response
- Explain how the structure of a reflex arc is related to its function
- Describe the role of synapses



Video: **The brain**

- Describe the structure and function of the parts of the brain
- Compare the use of CT and PET scans in studying the brain [Higher Tier]
- Discuss the difficulties in treating brain and spinal cord problems [Higher Tier]





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Video: **The eye**

- Relate eye structures to their function
- Describe some common defects of the eye and explain how some of these problems are overcome



Topic 3. Genetics

Video: **Asexual and sexual reproduction and meiosis**

- Compare and evaluate sexual and asexual reproduction
- Compare and evaluate mitosis and meiosis
- Describe the stages in meiosis



Video: **DNA and the human genome project**

- Describe DNA as a polymer made up of 2 strands coiled to form a double helix
- Describe how DNA can be extracted from fruit
- Describe the genome as the entire DNA of an organism and a gene as a section of DNA
- Discuss the outcomes of the Human Genome and its potential applications in medicine



Video: **Protein synthesis**

- Describe the structure of a nucleotide
- Explain how the order of bases in a gene decides the order of amino acids in the protein and that these fold to produce specifically shaped proteins such as enzymes
- Describe the process of protein synthesis including transcription and translation
- Compare the effects of mutations on protein structure when the mutations occur in coding and non-coding sections of DNA.



Video: **Genetic diagrams**

- Distinguish between the terms dominant, recessive, homozygous and heterozygous
- Explain the inheritance of characteristics using Punnett squares
- Explain why there is a 50% chance of the inheritance of a particular gender.



Video: **Mendel**

- Describe the work of Mendel in discovering the basis of genetics
- Recognise the difficulties of understanding inheritance before the mechanism was discovered



Video: **Fractions, ratio, proportion and probability**

- Apply the concept of probability in the context of inherited diseases
- Analyse genetic cross using ratios, fractions and percentages [Maths Skills]





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Video: **Sex linkage and multiple alleles**

- Describe how multiple alleles, like the ABO blood groups are inherited
- Explain what is meant by codominance
- Explain why more men than women suffer from sex-linked genetic disorders [Higher Tier]



Video: **Variation and mutation**

- State that the genetic variation in a population is due to mutations
- Appreciate that some mutations do, while other mutations do not affect the organism's phenotype
- Compare variation caused by genes and the environment



Topic 4. Natural Selection and genetic modification

Video: **Natural selection**

- Describe the process of natural selection as a driving force for evolution



Video: **Human evolution**

- Describe the evidence for human evolution based on fossils
- Describe the evidence for human evolution based on stone tools



Video: **Theories of evolution: Darwin and Wallace**

- Describe the work of Darwin and Wallace in the development of the theory of evolution by natural selection
- Describe how the anatomy of the pentadactyl limb provides scientists with evidence of evolution



Video: **Classification and evolutionary trees**

- Describe how organisms are classified into 5 kingdoms
- Explain why genetic analysis has altered the classification of life to include the 3 domains



Video: **Selective breeding**

- Define selective breeding
- Explain the impact of selective breeding on food plants and domesticated animals
- Evaluate the process of selective breeding.



Video: **Tissue culture**

- Describe the process of tissue culture in plants and animals
- Evaluate the use of tissue culture in medicine and plant breeding programmes



Video: **Genetic engineering**

- Evaluate genetic engineering
- Describe how bacteria can be genetically engineered to produce insulin [Higher Tier]





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Video: **GMO's and feeding the world**

- Describe how plants can be genetically modified to produce their own insecticide
- Evaluate the use of Bt plants
- Evaluate the use of fertilisers and biological control as agricultural solutions to the demands of a growing human population



Topic 5. Health, disease and the development of medicines

Video: **Health and disease**

- Define health
- Compare communicable and non-communicable disease
- Explain why the presence of one disease can lead to an increased susceptibility to other diseases
- Describe the symptoms of some common infections and how they are spread and prevented
- Define and give examples of pathogens



Video: **Immunity and vaccination**

- Recap the body's first line of defence (non-specific immunity)
- Describe the role of phagocytes in non-specific immunity
- Describe the role of lymphocytes in the body's second line of defence (specific immunity)
- Describe how vaccines generate antibodies to provide immunity to communicable diseases



Video: **Monoclonal antibodies**

- Define what is meant by monoclonal antibodies
- Describe how monoclonal antibodies are created
- Describe how monoclonal antibodies are used as a diagnostic tool and to treat illness.



Video: **Culturing microorganisms**

- Define what is meant by aseptic techniques
- Describe how to use aseptic techniques to culture a species of bacteria
- Describe how to investigate the effect of an antimicrobial agent on the growth of bacteria
- Calculate the area of the inhibition zones (Maths Skill) to evaluate the effectiveness of different antimicrobial agents on bacteria growth.



Video: **Antibiotics and drug trials**

- Define what an antibiotic is and describe how they were discovered
- Explain why antibiotics are ineffective against viral infections
- Describe the process of discovery, development and trialling of new medicines
- Explain how bias is reduced in drug trialling





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Video: **The lifecycle of a virus**

- Describe the lifecycle of a virus, including the lytic and lysogenic phase
- Compare the effects of each phase on the host cell



Video: **Plant defences and diagnosis**

- Describe some physical, mechanical and chemical plant defence methods
- Describe different ways plant diseases can be detected and identified, in the lab and in the field



Video: **Non-communicable disease**

- Describe the risk factors associated with cardiovascular disease including the effect of smoking
- Describe the effect of obesity on cardiovascular disease, as well as diabetes
- Describe how BMI and waist-to-hip-ratio measurements can diagnose obesity
- Describe some mineral deficiency illnesses are caused by malnutrition
- Describe how alcohol can influence the liver



Video: **Cardiovascular disease**

- Describe a range of different forms of cardiovascular disease
- Describe and evaluate the treatments available for each type of issue associated with the circulatory system



Topic 6. Plant Structures and their functions

Video: **Photosynthesis**

- Describe how glucose is used in a plant
- Describe the process of photosynthesis and explain why it is an endothermic reaction



Video: **Investigating photosynthesis**

- Describe how light intensity affects the rate of photosynthesis
- Apply the principle of the inverse square law (Higher Tier only and a Maths skill)
- Calculate the rate of reaction (Maths skills)



Video: **Limiting factors**

- Explain the effects of temperature, light intensity and carbon dioxide concentration as limiting factors of photosynthesis
- Explain how the interactions of these limiting factors can be helpful in maximising plant yield



Video: **Plant tissues**

- Describe the adaptations of the tissues in a leaf
- Explain how water and mineral ions are taken up by plant roots, relating the structure of root hair cells to this function
- Explain how the structure of the xylem and phloem are adapted to their function in the plant





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Video: **Transpiration**

- Explain the effect of a variety of environmental factors on the rate of water uptake by a plant
- Describe how a simple potometer can be used to investigate a factor that affects the rate of water uptake in plants



Video: **Plant adaptations**

- Describe how plants are adapted to survive in extreme environments including the effect of leaf size and shape, the cuticle and stomata



Video: **Plant hormones**

- Explain the role of auxin in phototropism and gravitropism
- Describe how plant growth can be controlled by auxin, gibberellins, ethene



Topic 7. Animal coordination, control and homeostasis

Video: **The endocrine system**

- Describe the principles of hormonal control in the endocrine system
- Name some of the endocrine glands
- Compare hormonal and nervous control



Video: **Adrenalin and Thyroxine**

- Explain the role of thyroxine and adrenalin in the body
- Explain why thyroxine is an example of negative feedback



Video: **Thermoregulation**

- Explain that thermoregulation takes place with reference to the role of the dermis, epidermis and the hypothalamus
- Explain the role of shivering in thermoregulation
- Explain the role of vasodilation and vasoconstriction in thermoregulation [Higher Tier]



Video: **The menstrual cycle foundation**

- Describe the stages in the menstrual cycle, including the roles of the hormones oestrogen and progesterone, in the control of the menstrual cycle
- Explain how hormonal contraception works
- Evaluate hormonal and barrier methods of contraception



Video: **The menstrual cycle higher**

- Explain the interactions of oestrogen, progesterone, FSH, LH in the control of the menstrual cycle, including the repair and maintenance of the uterus wall, ovulation and menstruation
- Explain the use of hormones in ART including IVF and clomifene therapy





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Video: **Controlling blood glucose levels**

- Explain how insulin controls blood sugar levels in the body
- Explain how glucagon interacts with insulin to control blood sugar levels in the body [Higher Tier]
- Compare type 1 and type 2 diabetes and explain how they should be treated
- Evaluate the correlation between BMI and type 2 diabetes



Video: **Controlling water: the excretory system**

- Explain the importance of controlling water in the body
- Describe the structure of the kidney
- Describe the role of the nephron
- Describe how ADH is part of a negative feedback loop
- Evaluate the use of a kidney transplant over dialysis in treating kidney failure



Topic 8. Exchange and transport in animals

Video: **Respiration**

- Describe respiration as an exothermic reaction that releases energy
- Compare aerobic and anaerobic respiration
- Describe how to use a simple respirometer to investigate the effect of temperature on the rate of respiration [Core Practical]
- Calculate the rate of respiration [Math skill]



Video: **The circulatory system**

- Explain how red blood cells and plasma are adapted for transport
- Describe the structure of the double circulatory system
- Explain how the structure of the heart and blood vessels are adapted to their function
- Calculate heart rate, stroke volume, and cardiac output



Video: **Diffusion**

- Explain the need for exchange surfaces and a transport system in multicellular organisms including the calculation of surface area:volume ratio
- Explain how alveoli and microvilli are adapted for gas exchange by accommodating Fick's law of diffusion





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Topic 9. Ecosystems and material cycles

Video: **Interdependence**

- Describe how ecosystems are organised
- Explain how biotic and abiotic factors affect communities
- Describe how species interact in a community by referring to competition and predator-prey cycles.



Video: **Core Practical: sampling in ecosystems**

- Describe how quadrats can be used to estimate the population of an organism in a habitat
- Describe how to use transects with quadrats to investigate the effect of an abiotic factor on the distribution of a plant species
- Describe how to minimise bias in an ecological study.



Video: **Pyramids of biomass and biomass transfer**

- Describe and interpret pyramids of biomass
- Describe how biomass is lost at each stage in a food chain
- Calculate the efficiency of biomass transfer



Video: **Cycling in ecosystems**

- Describe how carbon, nitrogen and water are cycled in ecosystems
- Describe the role of decomposers in the cycling of nutrients in ecosystems
- Describe the process of producing potable water in areas of drought including desalination



Video: **Decay**

- Describe the factors that speed up and slow down decay
- Calculate the rate of decay of biological material [Maths Skills]



Video: **Biodiversity**

- Describe the positive and negative impacts of fish farming on biodiversity
- Describe the process of eutrophication and its impact on biodiversity
- Describe the effects of introducing a non-indigenous species to an ecosystem
- Explain the importance of conservation in maintaining biodiversity, including the role of reforestation and captive breeding programmes



Video: **Monitoring pollution and biodiversity**

- Describe how biological indicators can be used to evaluate the impact of environmental change on water and air quality





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Video: **Food security**

- Describe how an increased human population is affecting our food security
- Describe the impact of new pests and pathogens on food security
- Describe the effect of farming practices on food security
- Explain the human effect on the environment
- Discuss how biofuels can help to increase the sustainability of our foods.

