AQA Biology Checklist

Triple Award

VIDEO | EXAM Q&A

Topic 1. Cell biology

Video: **Eukaryotic and prokaryotic cells**

- Distinguish between eukaryotic and prokaryotic cells.
- Compare animal and plant cells.
- Relate cell structures to their functions.

Video: **Specialised Cells**

- Describe how a specialised cell is adapted by having a different shape or a different number of organelles.
- Explain how the adaptations make the cell suited to its function.
- Describe how specialised cells form tissues, how tissues form organs and how organs form organ systems in a multicellular organism.

Video: **Orders of Magnitude and Standard Form**

- Convert mm into micrometers. [Maths skills]
- Use standard form to represent small numbers. [Maths skills]
- Perform orders of magnitude calculations. [Maths skills]

Video: **Microscope and Magnification**

- Explain how electron microscopes have increased our understanding of sub-cellular structures.
- Calculate the magnification, actual size or image size of a cell or cell organelle, representing this in standard form where necessary. [Maths skills]
- Appreciate how to use a scale bar in cellular drawings. [Maths skills]
- How to prepare slides of animal and plant cells to view under a microscope and how to draw a low and high plan drawing of these [Required Practical]

Video: **Culturing Microorganisms**

- Describe how to prepare an uncontaminated bacterial culture using aseptic techniques.
- Calculate the number of bacteria in a population after a certain time, given the mean division time for that bacteria. [Maths skills]
- Required Practical: After creating an uncontaminated culture of bacteria, compare the effects of different antibiotics on the bacteria by measuring the area of the inhibition zone.

Video: **Chromosomes and Mitosis**

- Distinguish between chromosomes, DNA and genes.
- Describe the stages of the cell cycle.
- Explain the importance of mitosis.
- Given the cell cycle time for a particular tissue, calculate the proportion of time spent in mitosis. [Maths skills]

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Video: **Stem Cells**

- Define what is meant by a stem cell.
- Describe the function of stem cells in embryos, adult animals and plant meristems.
- Describe how stem cells can be used in medicine and agriculture.
- Evaluate the benefits and risks of using stem cells.

Video: **Diffusion**

- Define diffusion and describe the factors that affect diffusion.
- Calculate the surface area to volume ratio and relate this to diffusion rates. [Maths skills]
- Explain why multicellular organisms require an exchange surface and transport system.
- Describe how the breathing system and the small intestine are adapted to maximise diffusion.

Video: **Osmosis**

- Define osmosis.
- Define the variables in the Required Practical 'investigate the effect of a range of concentrations of sugar solutions on the mass of plant tissue', and analyse and graph some typical data. [Maths skills].
- Explain the importance of osmosis in animals.
- Calculate the percentage change in mass of plant tissue [Maths skills]

Video: **Active Transport**

- Define active transport.
- Describe the importance of active transport in animals and plants.

Topic 2. Organisation

Video: **An Introduction to Enzymes**

- Describe how enzymes work.
- Describe and explain the effect of temperature and pH on enzyme activity.
- Understand the method, variables and math skills associated with the required practical 'To investigate the effect of pH on enzyme activity'

Video: **Enzymes in the digestive system**

- Describe the structure and use of the three major food groups.
- Required practical: Describe the chemicals and colour changes in the food tests.
- Describe how and where in the digestive system carbohydrase, protease and lipase enzymes work.
- Explain the importance of bile.

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Video: **Cardiovascular disease**

- Describe what coronary heart disease is and the role of statins and stents in treating it.
- Understand the consequences of faulty valves and evaluate their replacement with mechanical or biological valves.
- Evaluate the treatment of heart failure with a heart transplant or an artificial heart.

Video: **The Circulatory System**

- Compare the components of the blood.
- Relate blood vessel structure to the function of the vessel.
- Label a diagram of the heart.

Video: **Health and risk factors**

- Define health.
- Describe risk factors that correlate with cancer and cardiovascular disease.
- Distinguish between correlation and causation and identify these from graphs [Maths skills].

Video: **Transpiration in plants**

- Describe the role of stomata and guard cells in controlling water loss in a plant.
- Describe how to investigate transpiration using a potometer.
- Explain the effect of changing temperature, humidity, light intensity and air movements on the rate of transpiration.

Video: **Organisation in plants**

- Describe how the tissues in a leaf are adapted to help a leaf carry out photosynthesis.
- Describe how guard cells and stomata help with gas exchange.

Topic 3. Infection and response

Video: **Preventing the spread of pathogens**

- Describe how the work of Semmelweis led to the theory of germs.
- Define a pathogen and describe how they make us ill.
- Describe the barriers our body has to infection.

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Video: **Bacterial, fungal, viral and protist diseases**

- Compare the cause and treatment of the bacterial disease salmonella and gonorrhoea.
- Compare the causes and treatment of the viral diseases measles, HIV and tobacco mosaic virus.
- Describe the issues with the fungal disease rose black spot and how it is prevented and treated.
- Describe the issues with the protist that causes malaria and how to prevent malaria and how to treat it.

Video: **Immunity and vaccination**

- Describe the role of white blood cells.
- Describe how antibodies work.
- Describe how vaccines work.

Video: **Fighting diseases with drugs**

- Compare antibiotics and painkillers.
- Describe the process of pre-clinical and clinical drug trialling with reference to how bias is minimised.

Video: **Monoclonal antibodies**

- Describe how monoclonal antibodies are produced.
- Describe how they can be used.
- [HT] Evaluate the advantages and disadvantages of using monoclonal antibodies.

Video: **Plant diseases and defence responses**

- Describe the symptoms of plant diseases and how to identify the diseases using manuals, lab testing or monoclonal antibodies [Higher Tier only].
- Describe and explain the symptoms of nitrate and magnesium ion deficiencies.
- Describe how plants can defend against these diseases using physical, chemical and mechanical barriers.

Topic 4. Bioenergetics

Video: **Photosynthesis**

- State the word, symbol or balanced symbol equation for photosynthesis.
- Describe five uses for the glucose made by the plant.

Video: **Investigating the rate of photosynthesis**

- Describe how to investigate the effect of light intensity on the rate of photosynthesis (Required Practical).
- Understand inverse proportion and the inverse square law in relation to light intensity and photosynthesis [Higher Tier only].

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Video: **The Rate of Photosynthesis - Limiting Factors**

- Interpret graphs of separate limiting factors. [Maths skills]
- Explain why light intensity, carbon dioxide and temperature are limiting factors.
- [HT] Interpret limiting factor graphs for more than one limiting factor.
- [HT] Explain how limiting factor graphs are useful in maximising profit from plants grown in greenhouses.

Video: **Respiration and Metabolism**

- Describe the uses of the energy released from respiration.
- Define metabolism.
- Compare aerobic and anaerobic respiration.
- [HT] Define oxygen debt and the role of the liver in removing lactic acid.

Video: **The effect of exercise on the body**

- Explain the physiological changes our bodies undergo during exercise.
- [HT] Describe the role of the liver in removing lactic acid.

Topic 5. Homeostasis and response

Video: **The Nervous System**

- Describe the role of receptors, the coordination centre and effectors in homeostatic control systems involving the nervous system.
- Describe how information from receptors passes along neurones and synapses to generate a response.
- Explain the importance of a reflex.
- Describe the role of sweating and vasodilation in cooling down.
- Describe the role of body hair in controlling body temperature.

Video: **The Brain**

- Label the parts of the brain and describe the function of each part.
- [HT] Describe how neuroscience has developed.

Video: **The Eye**

- Relate the structures of the eye to their functions.
- Describe what accommodation is and how this occurs in the eye.
- Describe the pupil reflex in the context of adaptation to dim light.
- Describe how myopia and hyperopia can be corrected.

Video: **Controlling body temperature**

- Describe the role of sweating and vasodilation in cooling down.
- Describe the role of body hair in controlling body temperature.

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Video: **Adrenalin and Thyroxine**

- State where adrenalin and thyroxine are secreted from.
- Describe their role in the body.

Video: **Controlling blood glucose**

- Define homeostasis.
- Compare endocrine to the nervous system.
- Describe how insulin can lower blood glucose.
- [HT] Describe how glucagon can raise blood glucose.

Video: **Maintaining water and nitrogen balance**

- Compare how water, ions and urea are removed from the body.
- [HT] Describe how urea is produced.
- Describe how the kidneys work in controlling water.
- [HT] Describe the role of ADH in osmoregulation.
- Understand the basic principles of dialysis.

Video: **Hormones in human reproduction**

- Describe the roles of FSH, LH, oestrogen and progesterone in the menstrual cycle; interpret graphs of the effect of these hormones.
- Describe different types of contraception.
- Describe how to treat infertility.

Video: **Plant hormones: Coordination and use**

- Describe the role of auxin in phototropism and gravitropism.
- Investigate the effect of light on the growth of newly germinated seedlings (Required Practical).
- [HT] Describe the commercial uses of auxins, giberrellins and ethene.

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Topic 6. Inheritance, variation and evolution

Video: **Genetic Inheritance**

- Define a number of genetic key terms.
- Show, using a genetic cross, how fur colour is determined in animals.
- Show via a genetic cross why there is always a 50% chance that a baby could be born either a boy or a girl.

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

- Compare mitosis and meiosis.
- Evaluate the benefits and drawbacks of sexual and asexual reproduction.
- Describe how meiosis produces four haploid daughter cells.

Video: **Reproducing both ways**

- Evaluate the pros and cons of sexual and asexual reproduction.
- Describe how the malarial parasite reproduces sexually in mosquitos and asexually in humans.
- Describe how strawberry plants reproduce asexually with runners.
- Describe how fungi reproduce both ways.

Video: **DNA and the Genome**

- Describe the structure of DNA and define the genome.
- Describe the role of the Human Genome Project.

Video: **DNA Structure and Protein Synthesis**

- Describe the impact of mutations on proteins.
- Describe how the bases on DNA are used to make a protein.
- Describe the structure of DNA.

Video: **Inherited disorders - Polydactyly**

- Use punnet squares and interpret genetic diagrams to determine the inheritance of Polydactyly.

Video: **Inherited disorders - Cystic Fibrosis**

- Use punnet squares and interpret genetic diagrams to determine the inheritance of Cystic Fibrosis.

Video: **Screening for genetic disorders**

- Describe the process of embryo screening.
- Evaluate the social, economic and ethical issues surrounding embryo screening.

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Video: **Natural Selection**

- Define a species.
- Compare inherited and environmental characteristics.
- Describe the process of natural selection using the example of the peppered moth.

Video: **Selective Breeding**

- Describe the process of selective breeding.
- Evaluate the benefits and risks of selective breeding.

Video: **Genetic Engineering**

- Define genetic engineering.
- State some ways plants, animals and microbes have been genetically modified.
- Discuss the pros and cons of genetic engineering.
- Describe the process of producing a GM product including a reference to a vector.

Video: **Cloning**

- Compare cloning in plants and the advantages and disadvantages of each approach.
- Describe the process of embryo cloning and how adult cell cloning overcomes the issue of relying on sexual reproduction prior to cloning.
- Describe the process of adult cell cloning.

Video: **The History of Genetics**

- Describe the development of the study of inheritance including the work of Mendel.
- Explain why Mendel's work was not accepted at the time.

Video: **Theories of Evolution and Speciation**

- Compare Darwin's theory of evolution by natural selection with Lamarck's theory of evolution by the inheritance of acquired characteristics.
- Describe the process of speciation.
- Describe how Wallace came up with the same theory as Darwin.

Video: **Evidence of Evolution and Extinction**

- Describe what a fossil is and how fossils are formed.
- Describe how bacteria provide evidence of evolution when they develop resistance to antibiotics and how human activity can speed up this evolution.
- Define extinction and describe the biological and environmental causes of it.

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Video: **Classification and Evolutionary Trees**

- Describe what is meant by binomial classification.
- Describe how organisms are classified into kingdoms, phyla, class, order, family, genus, and species.
- Describe the three domains of classification.
- Interpret evolutionary tree diagrams. [Maths skills]

Topic 7. Ecology

Video: **Communities and Interdependence**

- Define all the ecology key terms.
- Use a given example to explain what is meant by interdependence.

Video: **Adaptations**

- Compare structural, behavioural and functional adaptations for animals in hot and cold climates and as predators or prey.
- Describe how plants are adapted to light, water and space.
- Define an extremophile and describe their adaptations to extreme environments.

Video: **Measuring the Distribution of Organisms**

- Describe how to measure the population of a given species.
- Describe how to measure the effect an abiotic factor has on the distribution of a species.

Video: **Cycling in ecosystems**

- Describe how nutrients and carbon are cycled through decay.
- Describe how water is cycled.
- Explain how photosynthesis, respiration and combustion interact in the carbon cycle.

Video: **Rates of decomposition**

- Describe how temperature, water and oxygen availability affect the rate of decay of biological material.
- Conditions of decay - investigate how temperature effects the rates of decay of fresh milk by measuring the change in pH. [Required Practical]
- Describe the importance of decay in compost and biogas production.

Video: **Impact of environmental change**

- Evaluate the impact of environmental changes on the distribution of species in an ecosystem.
- Explain how natural changes in temperature, water availability and air availability affect distribution of species.
- Explain how human activities can affect these abiotic factors.

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Video: **Human impact on the environment**

- Explain how human population growth has led to an increase in air, water and land pollution.
- Explain how deforestation and the destruction of peat bogs is contributing the global warming.
- Define biodiversity.
- Suggest how biodiversity is reducing and what can be done to conserve it.

Video: **Trophic levels in an ecosystem**

- Describe the differences between the trophic levels in organisms in an ecosystem.
- Interpret pyramids of biomass and calculate the efficiency of energy transfer along a food chain. [Maths skills]
- Interpret predator and prey cycle graphs.

Video: **Sustainable food production**

- Describe the threats to our food security.
- Describe how oceanic fish numbers are being maintained.
- Describe how farmers maintain energy levels in livestock by reducing energy losses in an organism and in a food chain.
- Describe the role of biotechnology in sustainable food production.