AQA A-level Biology Year 12 and Year 13- course overview

Biology helps us understand living organisms, how they function, and how they interact with each other and their environment. In AQA A-level Biology, students build on their GCSE knowledge to explore the structure and function of biological molecules, cells, and organisms, as well as the processes that sustain life. They study topics such as genetics, biodiversity, physiology, ecology, and evolution, developing a deeper understanding of the biological principles that underpin the natural world. Through practical investigations, data analysis, and scientific enquiry, students develop the knowledge, analytical skills, and critical thinking needed to work like biologists and prepare for further study in the life sciences.

Year 12 content

Advent 1

Students studying Biological Molecules and Cells develop an understanding of the biochemical foundations of life, including the structure and function of key biological molecules, beginning to understand the complex organisation and processes of cells that underpin all living organisms.

Key areas of study:

- Biological molecules
- Cells

Advent 2

Students studying Enzymes and Digestion, Nucleic Acids, and Transport Across Membranes explore how enzymes catalyse essential biological reactions, how genetic information is stored and transmitted through DNA and RNA, and how substances move into and out of cells through a range of membrane transport processes.

Key areas of study:

- Enzymes & digestion
- Nucleic acids
- Transport across the membrane

Lent 1

Students studying Cell Recognition and the Immune System, and Exchange, investigate how organisms identify and defend against pathogens, the role of the immune response in maintaining health, and how specialised exchange surfaces enable the efficient movement of substances between organisms and their environment.

Key areas of study:

- Cell recognition
- the immune system
- exchange

Lent 2

Students studying Genetics, DNA and Protein Synthesis, and Genetic Diversity develop an understanding of how genetic information is inherited and expressed, how DNA directs the production of proteins, and how variation within populations contributes to biodiversity, adaptation, and evolution.

Key areas of study:

- genetics
- DNA/protein synthesis
- Genetic diversity

Trinity 1

Students studying Natural Selection, Species and Biodiversity, and Mass Transport in Animals explore how evolutionary processes drive adaptation and the formation of new species, how biodiversity is measured and conserved, and how specialised transport systems deliver substances efficiently throughout multicellular organisms.

Key areas of study:

- Natural selection
- species & biodiversity
- mass transport in animals

Trinity 2

Students studying Investigating Diversity and Mass Transport in Plants develop skills in classifying and analysing variation among organisms, while exploring the structure and function of plant transport systems that move water, minerals, and organic substances throughout the plant.

Key areas of study:

- Investigating diversity
- mass transport in plants

Year 13 Biology content

Advent 1

Year 13 AQA Biology develops students' understanding of how organisms capture and transfer energy, inherit genetic characteristics, and interact within ecosystems. Students study photosynthesis and energy transfer through food chains, as well as the principles of inheritance and genetic variation. They also explore the factors affecting population size, distribution, and interactions between organisms and their environment.

Key areas of study:

- Photosynthesis,
- Energy and ecosystems,
- Inheritance,
- Populations

Advent 2

Year 13 AQA Biology develops students' understanding of how energy is released and recycled within living systems, and how genetic variation drives evolution. Students study factors affecting populations within ecosystems. Students study nutrient cycling and respiration, including the role of ATP and the processes of aerobic and anaerobic respiration in providing energy for cellular activities. They also explore how changes in DNA can alter protein structure and function, and how natural selection and isolation can lead to the formation of new species.

Key areas of study:

- Respiration,
- Nutrient cycles,
- Evolution may lead to speciation,
- Populations in ecosystems,
- Alteration of the sequence of bases in DNA can alter the structure of proteins

Lent 1

Year 13 AQA Biology develops students' understanding of how organisms detect and respond to changes in their internal and external environments. Students study the nervous and hormonal systems, including how stimuli are detected and

coordinated responses are produced. They also explore gene expression and the mechanisms that control when genes are switched on or off, helping to regulate cell function and development.

Key areas of study:

- internal and external stimuli,
- detection and response,
- Gene expression is controlled by a number of features

Lent 2

Year 13 AQA Biology develops students' understanding of how the nervous system coordinates responses and enables organisms to react to changes in their environment. Students study how skeletal muscles act as effectors, contracting in response to nerve impulses to produce movement. They also explore recombinant DNA technology, including genetic engineering techniques and their applications in medicine, agriculture, and biotechnology.

Key areas of study:

- Nervous coordination,
- Skeletal muscles
- Recombinant DNA technology

Trinity

Year 13 AQA Biology develops students' understanding of how organisms maintain a stable internal environment despite external changes. Students study homeostasis, including the regulation of factors such as blood glucose, water potential, and body temperature. They also explore the use of genome projects, examining how advances in DNA sequencing have improved our understanding of genetics, evolution, and disease.

Key areas of study:

- Homeostasis
- Using genome projects