

Department: Biology



Our Curriculum Aims:

Biology is an exciting dynamic subject that aims to understand the very basis of life itself. It ranges from the interactions that occur at the molecular level within and between cells to the interactions within and between whole ecosystems. It is constantly evolving and is a subject that is relevant to every single person.

David Attenborough said

“It seems to me that the natural world is the greatest source of excitement; the greatest source of visual beauty; the greatest source of intellectual interest. It is the greatest source of so much in life that makes life worth living”

In our Biology curriculum we aim

- To enable students to have a good understanding of the biological principles that will enable them to make sense of the Biology they encounter in their lives.
- To develop scientific curiosity and enable students to understand the importance of science to society.
- To encourage independent learning so students have the skills to be lifelong learners.
- To encourage our students to become questioning thinkers so they are able to consider data presented to them in a critical manner.
- To enable the students to develop their core scientific analytical skills as well as scientific literacy.
- To develop the practical skills necessary to carry out valid investigations.
- To prepare students with a solid foundation of the knowledge and skills required to enter a wide range of technical and scientific professions.

We have a range of extracurricular opportunities which include, IRIS project and the opportunity to take part in the RSB Biology challenge and intermediate Biology Olympiad.

Students are taught in one of our five dedicated Biology labs by experienced teachers whose specialisms range from Biochemistry to Ecology.

In year 13 Students take part in a field trip to Rhyd-Y Creuau field studies centre in Wales.

Key Stage Three Curriculum Overview

Year 9

	Name of topic	Key Content of the Topic	Assessment points
HT 1	Photosynthesis and Plant Growth Respiration	Investigation of the requirements of Photosynthesis and Respiration. Development of Practical skills and competencies needed to pass the GCSE practical skills assessment.	Tests at the end of photosynthesis topic and end of respiration topic.
HT 2	Start of the GCSE AQA specification 4.1 Cells 4.1.1.1-4.1.1.5 1-4.1.3.2 4.1.3.3	Animal and plant cells Microscopy Eukaryotes and prokaryotes Cell specialisation and differentiation	Tests at the end of the topic
HT 3	AQA specification 4.1.3	Transport in cells Diffusion Osmosis Active transport	Tests at the end of the topic
HT 4	AQA specification 4.2 Organisation within biological systems 4.2.1	Principles of organisation within biological systems	Test at the end of topic
HT 5	AQA specification 4.2.3.1, 4.2.3.2	Plant tissues Plant organ systems	Trial Exam
HT 6	AQA specification 4.7.1.4, 4.7.1.1	Adaptations Communities	Test at the end of topic

GCSE Course Followed: Biology

Specification: [AQA \(Syllabus code 8461\)](#)

Why Choose GCSE Biology

GCSE Biology offers a broad base of Biological areas to ensure students are informed about key issues in Biology and the implications for humans and other organisms. It provides students with the greatest range of biological areas for further study at university and beyond. It provides access to a wide range of vocational careers in many different fields such as agriculture, forestry, medicine, conservation and biotechnology. Biology also develops critical thinking, organisational skills, analytical skills and practical skills too.

All students will study: Cell Biology
Organisation
Infection and Response
Bioenergetics
Homeostasis and Response
Inheritance, Variation and Evolution
Ecology

Key Stage Four Curriculum Overview

Year 10

	Name of topic	Key Content of the Topic	Assessment points
HT 1	Ecology 4.7.1.2, 4.7.1.3 4.7.2.1 4.7.4.2, 4.7.4.3	Abiotic and Biotic factors, Food webs and trophic levels Pyramids of Biomass Transfer of Biomass	Test at end of topic
	Organisation in animals 4.2.2, 4.2.2.2, 4.2.2.3	Animal tissues organs and organ systems exemplified by the Circulatory system.	Test at end of topic
HT 2	Non communicable diseases 4.2.2.4, 4.2.2.5,4.2.2.6, 4.2.2.7	Health issues, the effect of lifestyle on non communicable diseases and cancer	Test at end of topic
	Infection and response 4.3.1.1, 4.3.1.2, 4.3.1.3, 4.3.1.4, 4.3.1.5,	Communicable diseases in plants and animals	Test at end of topic
HT 3	Infection and response 4.1.1.6 4.3.1.6 4.3.1.7, 4.3.1.8 4.3.1.9 4.3.2.1, 4.3.2.2 4.3.3.1 4.3.3.2	Culturing Microorganisms Human defence systems Vaccination, antibiotics and painkillers The discovery and development of drug Production and uses of monoclonal antibodies Detection and identification of plant disease Plant defence responses.	Test at end of topic
HT 4	Bioenergetics 4.4.1.1, 4.4.1.2 4.4.1.3	Photosynthesis	Test at end of topic
	Bioenergetics 4.4.2.1, 4.4.2.2 4.4.2.3	Respiration, Metabolism and response to exercise	Test at end of topic
HT 5	Cell division 4.1.2.1, 4.1.2.2, 4.1.2.3	Chromosomes, Cell division and Stem cells	Trial Exam

HT 6	Homeostasis and response 4.5.2.1, 4.5.2.2 4.5.2.3,4.5.3.1, 4.5.3.2, 4.5.3.3	Nervous system The brain The Eye Homeostasis Control of body temperature Human endocrine system Control of blood glucose Maintaining water balance and nitrogen balance in the body	Test at end of topic
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Year 11

	Name of topic	Key Content of the Topic	Assessment points
HT 1	Homeostasis and response 4.5.3.4 4.5.3.5 4.5.3.6 4.5.3.7 4.5.4.1 4.5.4.2	Hormones in human reproduction Contraception The use of hormones to treat infertility Negative feedback Plant hormones coordination and control Use of plant hormones	Test at end of topic
HT 2	Inheritance Variation and Evolution 4.6.1.1 4.6.1.2 4.6.1.3 4.6.1.4 4.6.1.5 4.6.1.6 4.6.1.7	Sexual and asexual reproduction Meiosis Advantages and disadvantages of sexual and asexual reproduction DNA and the genome DNA structure Genetic inheritance Inherited disorders	Test at end of topic
HT 3	Inheritance, Variation and Evolution 4.6.1.8 4.6.2.1 4.6.2.2 4.6.2.3 4.6.2.5 4.6.3.1 4.6.3.2 4.6.3.3 4.6.3.4 4.6.3.5 4.6.3.6 4.6.3.7 4.6.4	Sex determination Variation Evolution Selective Breeding Genetic engineering Theory of evolution Speciation The understanding of genetics Evidence for evolution Fossils Extinction Resistant Bacteria Classification of living organisms	Test at end of topic
HT 4	Ecology (continued) 4.7.2.2 4.7.2.3 4.7.3.1 4.7.3.2	Biodiversity Waste management Land use Deforestation	Test at end of topic

	4.7.3.3 4.7.3.4 4.7.3.5 4.7.5.1 4.7.5.2 4.7.5.3 4.7.5.4	Global warming Impact of environmental change Maintaining Biodiversity Factors affecting food security Farming techniques Sustainable Fisheries Role of Biotechnology	
HT 5		Revision and exam technique practice	
HT 6	NA		GCSE exams

Recommended Revision Guides for GCSE

Pupils have access to the online textbook through Kerboodle. There are revision materials available on Office 365. Revision guides are available from bookstores such as W.H.Smith and Waterstones. As long as it is AQA Biology GCSE specific and it is in a style that appeals to your son, then it will be suitable. Particularly recommended is the Oxford University Press Revise: AQA GCSE Biology Revision and Practice

[Oxford Revise: AQA GCSE Biology Revision and Exam Practice](#)



Support available for GCSE Students

Drop in sessions are available if students need to seek advice or support. Students should ask their biology teachers about these sessions. Students could also be paired with a sixth form mentor if they request it.

A level Course followed **Biology**

Specification: AQA A level [Biology 7402](#)

Why choose A level Biology

A Biology A level encompasses many skills which demonstrates to employers and universities that you have strong scientific and academic capabilities. Being such a highly respected qualification, taking A Level Biology will give you access to many degree courses and careers.

It makes an excellent base for degrees in healthcare and biological sciences. And can complement those in sports science, psychology and sociology among others. A strong scientific background develops analytical skills, independent thought, critical evaluation and can be useful in careers such as law, finance, business and engineering.

A Biology qualification can open a variety of career opportunities too. Employers who typically recruit graduates for biology-related jobs include:

- Universities and clinical research organisations

- Pharmaceutical and biotechnology companies
- Private hospitals and NHS trusts
- National/global health conservation and environmental charities
- Scientific and technical consultancies
- Outreach organisation

Keystage 5 Curriculum Overview

	Specification Reference and Topic: Teacher 1 Year 1	Assessment points
First half term Year 12	3.1.1 Monomers and Polymers	
First half term year 12	3.1.2 Carbohydrates	
First half term Year 12	3.1.3 Lipids	
First half term Year 12	3.1.4 Proteins	
Second half term Year 12	3.1.4.2 Many Proteins are enzymes Required practical 1 Investigation into the effect of a named variable on the rate of an enzyme controlled reaction.	
Second half term Year 12	3.1.5.1 Structure of DNA and RNA	
Second half term Year 12	3.1.5.3 DNA Replication	
Second half term Year 12	3.1.6 ATP	
First half term Year 12	3.1.7 Water	
First half term Year 12	3.1.8 Inorganic ions	
Second Half term Year 12	3.3.1 Surface area to volume ratio	
Third Half term Year 12	3.3.2 Gas Exchange	
Third Half Term Year 12	3.3.3 Digestion and absorption	
Fourth Half	3.3.4.1 Mass Transport in animals Required practical 5: Dissection of animal or plant gas exchange system or mass transport system or of organ within such a system.	

Term Year 12		
Fifth Half Term Year 12	3.3.4.2 Mass Transport in Plants	
	Specification Reference and Topic: Teacher 2 Year 1	
First half term Year 12	3.2.1.1 Structure of Eukaryotic cells.	
First half term year 12	3.2.1.2 Structure of Prokaryotic cells and viruses	
First half term Year 12	3.2.1.3 Methods of studying cells	
Second half term Year 12	3.2.2 All cells arise from other cells Required practical 2: Preparation of stained squashes of cells from plant root tips; set-up and use of an optical microscope to identify the stages of mitosis in these stained squashes and calculation of a mitotic index Ate production of scientific drawings using annotations	
Second half term Year 12	3.2.3 Transport across cell membranes Required practical 3: Production of a dilution series of a solute to produce a calibration curve with which to identify the water potential of plant tissue. Required practical 4: Investigation into the effect of a named variable on the permeability of cell-surface membranes.	
Third half term Year 12	3.2.4 Cell recognition and the immune system	
Third half term Year 12	3.4.1 DNA Genes and chromosomes	
Fourth half term Year 12	3.4.2 DNA and Protein synthesis	
Fourth half term Year 12	3.4.3 Genetic Diversity can arise as a result of mutation or during meiosis	
Fourth half term Year 12	3.4.4 Genetic Diversity and Adaptation Required practical 6: Use of aseptic techniques to investigate the effect of antimicrobial substances on microbial growth.	
Fifth Half term Year 12	3.4.5 Species and taxonomy	
Fifth Half term Year 12	3.4.6 Biodiversity within a community	
Fifth Half Term Year 12	3.4.7 Investigating Diversity	

	Specification Reference and Topic: Teacher 1 Year 2	Assessment points
Sixth Half Term Year 12	3.5.2 Energy and Ecosystems	
Sixth Half Term Year 12	3.7.4 Populations in Ecosystems Required practical 12: Investigation into the effect of a named environmental factor on the distribution of a given species. This is done on the field trip	
First half term Year 13	3.5.4 Nutrient cycles	
First half term Year 13	3.6.1.1 survival and response Required practical 10: Investigation into the effect of an environmental variable on the movement of an animal using either a choice chamber or a maze. This is done on the field trip	
Second half term Year 13	3.6.1.2 Receptors	
Second half term Year 13	3.6.1.3 Control of Heart rate	
Second half term Year 13	3.6.2.1 Nerve Impulses	
Second half term Year 13	3.6.2.2 Synaptic Transmission	
Third half term Year 13	3.6.3 Skeletal muscles are stimulated to contract by nerve impulses and act as effectors	Trial Exam
Fourth half term Year 13	3.7.1 Inheritance	
Fifth Half term Year 13	3.7.2 Populations	
Fifth Half term Year 13	3.7.3 Evolution may lead to speciation	

	Specification Reference and Topic: Teacher 2 Year 2	Assessment points
Sixth Half Term Year 12	3.5.1 Photosynthesis Required practical 7 Use of chromatography to investigate the pigments isolated from leaves of different plants, Required practical 8. Investigation into the effect of a named factor on the rate of dehydrogenase activity in extracts of chloroplasts.	
First half term Year 13	3.5.2 Respiration Required practical 9. : Investigation into the effect of a named variable on the rate of respiration of cultures of single-celled organisms	

Second half term Year 13	3.6.4.1 Principles of Homeostasis and negative feedback	
Second half term Year 13	3.6.4.2 Control of blood glucose levels Required Practical 11. Production of a dilution series of a glucose solution and use of colorimetric techniques to produce a calibration curve with which to identify the concentration of glucose in an unknown 'urine' sample.	
Second half term Year 13	3.6.4.3 Control of blood water potential	
Third half term Year 13	3.8.1 Alteration of the sequence of bases in DNA can alter the structure of proteins.	
Third half term Year 13	3.8.2.1 Most of a cell's DNA is not translated	Trial Exam
Fourth Half term Year 13	3.8.2.2 Regulation of transcription and translation	
Fourth Half term Year 13	3.8.2.3 Gene expression and Cancer	
Fourth half term Year 13	3.8.3 Using genome projects	
Fifth Half term Year 13	3.8.4.1 Recombinant DNA technology	
Fifth Half term Year 13	3.8.4.2 Differences in DNA between individuals of the same species can be exploited for identification and diagnosis of inheritable disease	
Fifth Half term Year 13	3.8.4.3 Genetic finger printing	

The exact point in the specification that we get to in each half term will vary from year to year and class to class depending on timetabling, staff availability and the effect of school events. The students will be told by their teacher what point to revise up to for any assessment.