

A level Biology at

The Polesworth School
ENSURING EXCELLENCE



Why should I choose to study Biology?

Biology is the science of life. Its name is derived from the Greek words "bios" (life) and "logos" (study). Biologists study the structure, function, growth, origin, evolution and distribution of living organisms. There are generally considered to be at least nine "umbrella" fields of biology, each of which consists of multiple subfields.

- Biochemistry: the study of the material substances that make up living things
- Botany: the study of plants, including agriculture
- Cellular biology: the study of the basic cellular units of living things
- Ecology: the study of how organisms interact with their environment
- Evolutionary biology: the study of the origins and changes in the diversity of life over time
- Genetics: the study of heredity
- Molecular biology: the study of biological molecules
- Physiology: the study of the functions of organisms and their parts
- Zoology: the study of animals, including animal behaviour

The 20th and 21st centuries may be known to future generations as the beginning of the "Biological Revolution." Beginning with Watson and Crick explaining the structure and function of DNA in 1953, all fields of biology have expanded exponentially and touch every aspect of our lives. Medicine will be changed by development of therapies tailored to a patient's genetic blueprint or by combining biology and technology with brain-controlled prosthetics. Economies hinge on the proper management of ecological resources, balancing human needs with conservation. We may discover ways to save our oceans while using them to produce enough food to feed the nations. We may "grow" batteries from

bacteria or light buildings with bioluminescent fungi. The possibilities are endless; biology is just coming into its own.

How will I know if I will be good at it?

Biology is ideal for students who have an interest in the world and organisms around us. You'll need to be able to plan and schedule work. This could include being able to prioritise what needs to be done and by when. Sound background knowledge in mathematics is essential. 10% of the total marks in A-level Biology exams will require the use of mathematical skills.

Examinations

All exams are taken at the end of the two-year course, for biology this is three 2-hour papers. There is no coursework module however there are a series of practical experiments which pupils will complete over the 2-year course and these may be assessed in the paper 3 exam.



Entry Requirements

Students must achieve at least a Grade 6 in Maths along with a minimum of a 65 in Combined Science or if Triple Science is taken, a grade 6 in Biology with a grade 5 in either Physics or Chemistry.

Students should be aware that Biology is an academically demanding subject and a willingness to work hard is essential. Students will be expected to complete at least 3 hours of independent work per week.

Exam Board

AQA Biology Syllabus 7402

Will I need Biology for my Career?

Biology can be useful in many different careers including jobs within environmental sciences, medicine and nursing, science and research.

Contents

Paper 1

2-hour exam – 91 marks (76 marks short and long answer Qs and 15 marks extended response questions).

35% of A level

Topic list:

- Biological molecules: monomers and polymers, carbohydrates, lipids, proteins, enzymes, nucleic acids, DNA replication, ATP, water and inorganic ions.
- Cells: eukaryotic cells, prokaryotic cells, viruses, microscopes, the cell cycle, transport across cell membranes, cell recognition and the immune system.
- Organisms exchange substances with their environment: surface area to volume ratio, gas exchange, digestion and absorption, mass transport in plants and animals.
- Genetic information, variation and relationships between organisms: DNA, genes and chromosomes, protein synthesis, mutations, meiosis, biodiversity, adaptation, species, taxonomy and investigating diversity.

Paper 2

2-hour exam – 91 marks (76 marks short and long answer Qs and 15 marks comprehension question).

35% of A level

Topic list:

- Energy transfers in and between organisms: photosynthesis, respiration, energy, ecosystems and nutrient cycles.
- Organisms respond to changes in their internal and external environments: survival and response, receptors, control of heart rate, nerve impulses, synaptic transmission, muscle contraction, homeostasis, control of blood glucose concentration and control of blood water potential.
- Genetics, populations evolution and ecosystems: inheritance, populations, evolution may lead to speciation and populations in ecosystems.
- The control of gene expression: alteration of DNA base sequences, most of a cell's DNA is not translated, regulation of transcription and translation, gene expression and cancer, using genome projects, recombinant DNA technology, identification and diagnosis of heritable conditions and genetic fingerprinting.

Paper 3

2-hour exam – 78 marks (38 marks structured questions including practical techniques, 15 marks critical analysis of given experimental data, 25 marks one essay from a choice of two titles).

30% of A level

Practical skills:

- Any content from topics 1– 8, including relevant practical skills.

At least 15% of the overall assessment of A-level Biology will assess knowledge, skills and understanding in relation to practical work.