

BIOLOGY

Biology is studied as part of the core science curriculum in all years up to the age of sixteen. First Years study science with one teacher for four lessons a week, and spend approximately one term studying variety in living organisms. Second and Third Year students each have two lessons a week of Biology, taught by a subject specialist. The Second Years explore the natural environment and the key role of plants in ecosystems, whilst the Third Years go on to study aspects of human biology and health. At GCSE, most students study Biology as part of a Double Award Science course, although one set of students takes examinations in the three separate sciences, working at an accelerated rate. Biology is a popular subject, and alongside encouraging a respect for life, the department also incorporates the application of biological knowledge to new developments in the field of biological research. At Godolphin, Biology is a science for life!

BIOLOGY IN THE LOWER & MIDDLE SCHOOL (First, Second & Third Years)

First Year: Living organisms and variation

In the First Year the students are taught science by one teacher; they spend approximately one term studying biology. They review the basic principles of cell biology, and the organisation of living organisms into tissues and organs. They also study classification and learn about the main animal groups, exploring the reproductive strategies of each group, and taking into account the increasing degree of parental care. As they study vertebrates, students will learn about the functions of the skeleton. Finally they investigate variation and the relationship between genetic and environmental causes of differences between individuals of the same species.

Second Year: The environment around us

Second Year students begin their course by studying habitats and adaptations. This includes a trip to the New Forest to explore the range of habitats and communities of plants and animals to be found in our local National Park. They then study plant biology, including the processes of photosynthesis, reproduction, seed dispersal and germination. In the Summer Term they draw together the information gathered throughout the year to prepare displays concerning the effects of humans on the environment.

Third Year: Human health and disease

The Third Years will study various aspects of human biology, including diet, digestion, breathing, circulation and human reproduction. They will then explore microbes and their effects on human health, including aspects of disease transmission and prevention. In the Summer Term they will learn about the effects of drugs on the human body, to include smoking and alcohol. This forms a strong foundation for the biology component of the GCSE science course.

BIOLOGY IN THE UPPER SCHOOL (Fourth & Fifth Years)

Most of our students will follow a balanced Double Award course of Science, with components of Biology, Chemistry and Physics.

Syllabus

Edexcel IGCSE (from 2008 onwards)

We have adopted the IGCSE course, in common with many independent schools, as 'domestic' GCSE science syllabi are changing from 2008 onwards. The IGCSE courses retain the academic rigour to prepare students for A level and, frankly, to keep them interested. The course offers the opportunity to continue all elements of science: Chemistry, Physics, Biology and Earth Science. The eventual qualification is Double Award Science; it counts as two GCSEs and you would be awarded two grades.

Edexcel IGCSE:	Three Written Examinations (one in each science)	80%
	Two Written Examinations on Practical Science	20%

Double Award Science Content:

Life and living processes:	Life processes and cell activity Variation, inheritance and evolution Humans as organisms Green plants as organisms Living things in their environment
Materials and their properties:	Properties, classification and structure Explanations of properties of materials Useful products from chemical changes The earth and its atmosphere
Physical processes:	Electricity and magnetism Energy resources and transfer Forces and motion Light and sound The Earth's place in the Universe Radioactivity.

Separate Sciences

We enter some of our students for the three separate science GCSE examinations. They are selected by us and taught at an accelerated pace in the usual timetable allocation. There may be a limited number of extra lessons outside the timetable.

These courses have extra content compared with the Double Award sciences, but it must be emphasised that either route is a perfectly good foundation for science AS/A2 courses.

IGCSE Biology

Assessment pattern

GCSE Biology is assessed by a 2 hour written paper testing knowledge of content and by a 1 hour 15 minute examination testing investigative skills gained by candidates from practical work undertaken during the course.

Syllabus content

These areas are the same as those studied for Biology in the Double Award Science course, although the IGCSE Biology does explore some of these in greater depth.

- Section 1: Nature and variety of living organisms
- Section 2: Structures and functions in living organisms
- Section 3: Reproduction and inheritance
- Section 4: Ecology and the environment
- Section 5: Use of biological resources

BIOLOGY IN THE SIXTH FORM

Syllabus

Edexcel - Salters-Nuffield Biology

Assessment pattern

The full A level course consists of six assessed units. All students take the first three units in the Lower Sixth, and then those wishing to take Biology in the Upper Sixth take the last three units at that stage.

Unit 1: Lifestyle, Transport, Genes and Health - Written test 1 hour 15 minutes

Unit 2: Development, Plants and the Environment - Written test 1 hour 30 minutes

Unit 3: Report and Practical Review

Visit or Issue Report - Students present a written report of around 1500 words which will be marked by Edexcel. The report may be a record of a visit to a site of biological interest, or a report of non-practical research into a biological topic. The report must be word processed.

Practical Work Review- Students sit a written paper to which they attach their own write ups of two practicals which they select to review.

Unit 4: Environment and Survival: Written test 1 hour 15 minutes

Unit 5: Energy, Exercise and Coordination: Written test 1 hour

Coursework Investigation - Students present a written report (a maximum of 3000 words) of an experimental investigation devised and carried out by the student. The report must be word processed and submitted electronically. This report is marked by the teacher.

Unit 6: Synoptic Paper - Written test 2 hours. This paper consists of two compulsory questions and one essay.

Syllabus content

SNAB does not present content in traditional themes such as 'cell structure'; instead the course adopts a context-led approach. Topics are based on a storyline or contemporary issue, with biological principles introduced when required to aid understanding of the context.

AS topics

Unit 1: Lifestyle, Transport, Genes and Health

This consists of two topics, the first of which, "Lifestyle, health and risk", starts with two people's experiences of cardiovascular disease. It looks at the biology related to the heart, circulation and risk factors that contribute to the development of cardiovascular disease. It also introduces the biochemistry of food. "Genes and health" starts by examining the symptoms and causes of cystic fibrosis. It includes details of how the disease affects the lungs and digestive system, and what is happening at a molecular level with respect to protein structure and synthesis. Enzymes, membrane transport and genetic inheritance are also covered. Genetic screening and gene therapy treatment of the disease introduce some ethical issues.

Unit 2: Development, Plants and the Environment

This unit also consists of two topics, "The voice of the genome" considers the most fundamental biological story there is – development from a single egg into a complex multi-cellular organism. Cell structure, gametes, DNA replication and mitosis are among the biological ideas studied in detail. The role of the genome in the control of development and the influence of the environment are considered. Stem cells, their potential in medicine, and the arguments for and against their use provide further opportunities for ethical debate. "Plants and climate change" investigates the methods plants have developed to overcome the difficulties of being located in one place, and looks at how humans have

exploited the ingenuity of plants. Plant cell structure, cellulose biochemistry and the role of xylem in support and transport are studied along with the genetic modification of plants. This topic also addresses the question of whether climate change is occurring by looking at the evidence including any effects on both plants and animals.

Unit 3: Report and Practical Review (as above)

Visit or Issue Report - Students present a written report of around 1500 words which will be marked by Edexcel. The report may be a record of a visit to a site of biological interest, or a report of non-practical research into a biological topic. The report must be word processed.

A2 topics

Unit 4: Environment and Survival

The first topic "On the wild side" takes the crisis in biodiversity as its context. The topic looks at the conservation of endangered species and in particular the changing role of zoos. Students will see that successful conservation requires an understanding of ecosystems, genetics and the interactions between wildlife and human populations. Ecology, photosynthesis and evolution are some of the biological concepts covered in this topic. "Infection, immunity and forensics" takes as its storyline the techniques used by forensic pathologists to determine the cause of death of organisms, including humans, and to establish the time that has elapsed since death occurred. It investigates the evolutionary battles that are taking place between invading pathogens and their hosts. The hosts' barriers and internal mechanisms to combat infections are studied.

Unit 5: Energy, Exercise and Coordination

This unit starts with the topic "Run for your life", which is centred on the physiological adaptations that enable humans, particularly sports people, and other animals to undertake strenuous exercise. The topic summarises the biochemical requirements for respiration and looks at the links between homeostasis, muscle physiology and performance. It looks at how medical technology is enabling more people to participate in sport, and ends by raising the issue as to whether the use of performance-enhancing substances by athletes can be justified. "Grey matter" sets the scene by considering how the working of the nervous system enables us to see. The topic demonstrates how an understanding of brain structure and functioning is relevant to such issues as the response to stimuli, the development of vision and learning. The methods used to compare the contributions of nature and nurture to brain development are examined along with the role of genetics and animal models in understanding brain structure. The topic requires students to discuss the ethics of using animals for medical research.

Biology and university entrance

The Salters Nuffield Biology course, which presents Biology in the context of real-life topics, has been praised by eminent scientist Professor Lord Robert Winston, who is one of many leading scientists on the SNAB Advisory Committee, which has helped the course developers to ensure that the course is as up-to-date and relevant as possible. With every sphere of life becoming ever more complex, both the professional biologist and individual citizen are faced with increasingly more difficult decisions. For example the rapid advances in gene technology present ethical dilemmas for everyone: the horticulturalist and farmer may have to decide whether to select a GM variety to plant, the supermarket shopper will decide whether to buy the product. The biological researcher will not only have to know the details of how a drug might affect the body, they will have to make decisions about whether they should use animals in the testing of the drug. Biology develops students' ability to discuss and debate these types of issues and students learn to justify their decisions using ethical frameworks. There is rarely a right or wrong answer, rather arguments to defend or counter the issue being debated. Thus Biology develops useful excellent skills for further study in any field. As a consequence, biology is an ideal subject to study if you intend to follow any further education course, whether it specifically involves Biology or not. It is obviously an important subject for traditional vocational areas including Medicine, Dentistry, Veterinary Science and Physiotherapy. It is also valuable for more applied courses such as Biochemistry, Environmental Studies, Molecular Biology, Forensic Science and Sports Medicine.