

Biology at Norbury High

Overview

Biology at A level is an information-rich course designed to develop theoretical and practical scientific skills, knowledge and understanding. It offers exciting insights into the contemporary world of science.

Biology is a multidisciplinary subject that is made up of many different and interdependent fields.

Students study biology in a range of different contexts, including aspects of industrial and everyday life, which requires them to investigate and solve problems. There is 10% of mathematics in A level Biology.

KS5 A Level Biology

Students will sit two AS examinations at the end of year 12 (AQA 7401) and three A2 examinations at the end of year 13 (AQA 7402).

Year 12

During Year 12 the students will cover four main areas:

Section 1: Biological molecules

- o Different types of molecules such as carbohydrates, fats and proteins
- o The structure of DNA and methods of replication

Section 2: Cells

- o Their general structure and ways of studying them
- o Movement in and out of cells
- o The immune response

Section 3: Biological molecules

- o Gas exchange in a variety of animals and plants
- o Mass transport in animals & plants

Section 4: Genetic information, variation and relationships between organisms

- o DNA, genes and chromosomes
- o Genetic diversity
- o Biodiversity

During the year, students will cover six required practicals

Year 13

Section 5: Energy transfer in and between organisms

- o Photosynthesis
- o Respiration
- o Energy and ecosystems

Section 6: Organisms respond to changes in their environments

- o Stimuli, both internal and external
- o Nervous coordination
- o Principles of homeostasis and negative feedback

Section 7: Genetics, populations, evolution and ecosystems

- o Inheritance and speciation

Section 8: The control of gene expression

- o How the alteration of the sequence of bases in DNA can alter the structure of proteins
- o Regulation of transcription and translation
- o Gene technologies

During the year the students will cover six required practicals.

Below is a list of the 12 required practicals and the corresponding apparatus and techniques.

Number	Required Practical Activity	Apparatus and technique reference
1	Investigation into the effect of a named variable on the rate of an enzyme-controlled reaction	a, b, c, f, l
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	d, e, f
3	Production of a dilution series of a solute to produce a calibration curve with which to identify the water potential of plant tissue	c, h, j, l
4	Investigation into the effect of a named variable on the permeability of cell-surface membranes	a, b, c, j, l
5	Dissection of animal or plant gas exchange or mass transport system or of organ within such a system	e, h, j
6	Use of aseptic techniques to investigate the effect of antimicrobial substances on microbial growth	c, i
7	Use of chromatography to investigate the pigments isolated from leaves of different plants e.g., leaves from shade-tolerant and shade-intolerant plants or leaves of different colours	b, c, g
8	Investigation into the effect of a named factor on the rate of dehydrogenase activity in extracts of chloroplasts	a, b, c
9	Investigation into the effect of a named variable on the rate of respiration of cultures of single-celled organisms	a, b, c, i
10	Investigation into the effect of an environmental variable on the movement of an animal using either a choice chamber or a maze	h
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	b, c, f
12	Investigation into the effect of a named environmental factor on the distribution of a given species	a, b, h, k, l

Biology Apparatus and Techniques



Apparatus and techniques	
AT a	use appropriate apparatus to record a range of quantitative measurements (to include mass, time, volume, temperature, length and pH)
AT b	use appropriate instrumentation to record quantitative measurements, such as a colorimeter or potometer
AT c	use laboratory glassware apparatus for a variety of experimental techniques to include serial dilutions
AT d	use of light microscope at high power and low power, including use of a graticule
AT e	produce scientific drawing from observation with annotations
AT f	use qualitative reagents to identify biological molecules
AT g	separate biological compounds using thin layer/paper chromatography or electrophoresis
AT h	safely and ethically use organisms to measure: <ul style="list-style-type: none">• plant or animal responses• physiological functions
AT i	use microbiological aseptic techniques, including the use of agar plates and broth
AT j	safely use instruments for dissection of an animal organ, or plant organ
AT k	use sampling techniques in fieldwork
AT l	use ICT such as computer modelling, or data logger to collect data, or use software to process data