

Year 11- GCSE Biology

Continuing the KS4 Biology topics from year 10, our curriculum will advance upon the knowledge gained in KS3 with greater detail while also making links to other topics within the Science course. We will also continue layering in the “working scientifically” content previously introduced in the experimental procedure topics of year 7 and 8. Examples of how we are building upon KS3 knowledge can be seen in the “Coordination and control” topic, where KS3 simple knowledge of reproductive organs is built upon with the introduction of hormones and their part in controlling fertility and the menstrual cycle.

Topics covered from “KS4 Programme of Study”

Coordination and control

- principles of nervous coordination and control in humans
- the relationship between the structure and function of the human nervous system
- the relationship between structure and function in a reflex arc
- principles of hormonal coordination and control in humans
- hormones in human reproduction, hormonal and non-hormonal methods of contraception
- homeostasis.

Ecosystems

- levels of organisation within an ecosystem
- some abiotic and biotic factors which affect communities; the importance of interactions between organisms in a community □ how materials cycle through abiotic and biotic components of ecosystems
- the role of microorganisms (decomposers) in the cycling of materials through an ecosystem
- organisms are interdependent and are adapted to their environment
- the importance of biodiversity
- methods of identifying species and measuring distribution, frequency and abundance of species within a habitat
- positive and negative human interactions with ecosystems.

Evolution, inheritance and variation

- the genome as the entire genetic material of an organism
- how the genome, and its interaction with the environment, influence the development of the phenotype of an organism □ the potential impact of genomics on medicine
- most phenotypic features being the result of multiple, rather than single, genes
- single gene inheritance and single gene crosses with dominant and recessive phenotypes
- sex determination in humans
- genetic variation in populations of a species
- the process of natural selection leading to evolution
- the evidence for evolution
- developments in biology affecting classification
- the importance of selective breeding of plants and animals in agriculture
- the uses of modern biotechnology including gene technology; some of the practical and ethical considerations of modern biotechnology.

Year 11- GCSE Chemistry

Continuing the KS4 Chemistry topics from year 10, our curriculum will advance upon the knowledge gained in KS3 with greater detail while also making links to other topics within the Science course. We will also continue layering in the “working scientifically” content previously introduced in the experimental procedure topics of year 7 and 8. Examples of how we are building upon KS3 knowledge can be seen in the “Earth’s atmosphere” topic, where we previously learned about the composition of the atmosphere today, and during year 11 we will show how this atmosphere has developed over the history of the Earth to result in its current composition. In “Chemical analysis”, we build upon the previous knowledge of pure substances and mixtures from year 7 and 9, and introduce more chemical tests to identify them and some unknown gases.

Topics covered from “KS4 Programme of Study”

Rate and extent of chemical change

- factors affecting reversible reactions.

Chemical analysis

- distinguishing between pure and impure substances
- separation techniques for mixtures of substances: filtration, crystallisation, chromatography, simple and fractional distillation
- quantitative interpretation of balanced equations
- concentrations of solutions in relation to mass of solute and volume of solvent.

Chemical and allied industries

- life cycle assessment and recycling to assess environmental impacts associated with all the stages of a product's life the viability of recycling of certain materials
- carbon compounds, both as fuels and feedstock, and the competing demands for limited resources
- fractional distillation of crude oil and cracking to make more useful materials
- extraction and purification of metals related to the position of carbon in a reactivity series.

Earth and atmospheric science

- evidence for composition and evolution of the Earth's atmosphere since its formation
- evidence, and uncertainties in evidence, for additional anthropogenic causes of climate change
- potential effects of, and mitigation of, increased levels of carbon dioxide and methane on the Earth's climate
- common atmospheric pollutants: sulphur dioxide, oxides of nitrogen, particulates and their sources the Earth's water resources and obtaining potable water.

Year 11- GCSE Physics

Continuing the KS4 Physics topics from year 10, our curriculum will advance upon the knowledge gained in KS3 with greater detail while also making links to other topics within the Science course. We will also continue layering in the “working scientifically” content previously introduced in the experimental procedure topics of year 7 and 8. Examples of how we are building upon KS3 knowledge can be seen in the “Forces and motion” topic, where we build upon KS3 knowledge of drag forces and friction and introduce the concept of terminal velocity and calculation of braking distances. In “Wave motion”, we build upon the ability to label a simple transverse wave by linking the wave motion to its speed, frequency and wavelength.

Topics covered from “KS4 Programme of Study”

Forces and motion

- speed of sound, estimating speeds and accelerations in everyday contexts
- interpreting quantitatively graphs of distance, time, and speed
- acceleration caused by forces; Newton’s First Law
- weight and gravitational field strength
- decelerations and braking distances involved on roads, safety.

Wave motion

- amplitude, wavelength, frequency, relating velocity to frequency and wavelength
- transverse and longitudinal waves
- electromagnetic waves, velocity in vacuum; waves transferring energy; wavelengths and frequencies from radio to gamma-rays
- velocities differing between media: absorption, reflection, refraction effects
- production and detection, by electrical circuits, or by changes in atoms and nuclei
- uses in the radio, microwave, infra-red, visible, ultra-violet, X-ray and gamma- ray regions, hazardous effects on bodily tissues.

Magnetism and electromagnetism

- exploring the magnetic fields of permanent and induced magnets, and the Earth's magnetic field, using a compass
- magnetic effects of currents, how solenoids enhance the effect
- how transformers are used in the national grid and the reasons for their use.