



## Biology Curriculum Overview - Year 11 - Combined Higher

Unit	Details
<b>Hormonal control</b>	Pupils will study the principles of hormonal control and the endocrine system. They will explore how blood-glucose concentration is controlled. All pupils should be aware of the causes and treatments of both type 1 and type 2 diabetes. This links this with work in B2.3 <i>Stem cells</i> and with the effect of lifestyle on type 2 diabetes in B7.4 <i>Diet, exercise, and disease</i> . They will apply the process of negative feedback to the hormones adrenaline and thyroxine. Pupils study hormones in human reproduction. They will recall the action of hormones in bringing about puberty and how hormones interact in the menstrual cycle in females, as well as the role of testosterone in males. Pupils should understand how hormones are used in the control of fertility as applied to contraception and to infertility treatments.
<b>Reproduction</b>	Pupils will outline asexual and sexual reproduction, and should be aware of the importance of meiosis, fertilisation, and variation in sexual reproduction. They should link this with work on chromosomes and mitosis and the cell cycle in B2 <i>Cell division</i> . They will study DNA and its role in inheritance. They should be aware of the genetic code and genomes, including how the data produced by genome research can be used. Inheritance is studied and pupils should be able to use genetic terms and set out a genetic cross with the use of a Punnett square. They should be able to predict ratios of different phenotypes, and apply this to sex determination and family trees. Pupils should be able to describe the inheritance of genetic disorders as applied to polydactyly and cystic fibrosis. They should be aware of developments in genetic engineering with the aim of curing genetic disorders, for example screening and the implications of technology.
<b>Variation and evolution</b>	Pupils should be able to discuss the causes of variation in terms of genetic, environmental, or a combination of both. They should link environmental variation with the effect of alcohol on a foetus in B7.5 <i>Alcohol and other carcinogens</i> . Pupils should understand the role of mutation in variation, understand the theory of evolution by survival of the fittest and natural selection, and be able to give examples. They should link this with previous studies on sexual reproduction and meiosis in B12.2 <i>Cell division in sexual reproduction</i> . Pupils study the process of selective breeding. They should understand this as an example of artificial selection, and be aware of its limitations. In studying genetic engineering, they should understand what is meant by the term, and be able to give examples of its use and consider the potential benefits and problems. They should link this with work on diabetes treatment using human insulin in B11.3 <i>Treating diabetes</i> , and with the treatment of cystic fibrosis in B12.6 <i>Inherited disorders</i> . They should be able to recall the steps involved in the process of genetic engineering.
<b>Genetics and evolution</b>	Pupils should be aware of evidence for evolution, including the fossil record and reasons for extinction. They should be able to describe antibiotic resistant bacteria and their fast evolution, in particular the problem of MRSA. They should link this with work in B6 <i>Preventing and treating disease</i> on antibiotics and the discovery and development of drugs. Finally, all pupils should understand how living organisms are classified. They should recall the natural system designed by Linnaeus, and be able to give the rules of the binomial system of naming living things. They should be familiar with the three-domain system developed in the light of recent technological advances. They should link this with B1.3 <i>Eukaryotic and prokaryotic cells</i> .
<b>Adaptation, interdependence &amp; competition</b>	Pupils study communities, environments, adaptations, and competition. Pupils should understand the importance of communities including the interdependence of all the species present, and be able to give real examples to illustrate interdependence. Pupils should understand the effects of abiotic and biotic factors on populations. They should link this with the importance of temperature and pH on the action of enzymes in B3 <i>Organisation and the digestive system</i> . Pupils will measure the distribution of organisms with quadrats and transects, and carry out a practical to investigate the population size of a common species in a habitat. Pupils study competition in animals and plants and should recall what factors they compete for and how they compete. Pupils should understand how organisms are adapted to survive in many different conditions. They should be able to give examples of the ways in which animals and plants are adapted to their environments. In studying animals in cold climates students should make the link to surface area to volume ratio in their work on diffusion in B1 <i>Cells and organisation</i> .
<b>Organising an ecosystem</b>	Pupils study how feeding relationships are represented in food chains. They should understand the importance of photosynthesis in feeding relationships, linking with work in B8 <i>Photosynthesis</i> . They should recall the main feeding relationships within a community and understand how the numbers of predators and prey are inter-related, including interpreting predator-prey population graphs. Pupils have looked at mineral cycling and the microbes involved. They should understand how materials are recycled through the abiotic and biotic components of an ecosystem, and the importance of decay. They should link this with the main chemicals that make up cells in B1.2 <i>Animal and plant cells</i> , respiration in B9 <i>Respiration</i> , and transpiration in B4.8 <i>Evaporation and transpiration</i> . Pupils have studied the water cycle and should recall the main stages of condensation, precipitation, evaporation, transpiration, and respiration. They should understand what the carbon cycle is and recall the processes that remove carbon dioxide from the atmosphere and return it again.
<b>Biodiversity &amp; ecosystems</b>	Pupils will study biodiversity and ecosystems, starting with the reasons for and the effects of the human population explosion. Pupils should understand the effect of different types of pollution including land, water, and air pollution. Pupils should be able to outline the processes of deforestation and peat destruction. They should link this with how materials are cycled in B16.3 <i>The carbon cycle</i> . Pupils should understand what is meant by the greenhouse effect, global warming, and its predicted effects. They should be able to distinguish greenhouse gases from those that cause acid rain. On the topic of maintaining biodiversity, all should understand how waste, deforestation, and global warming affect biodiversity, and be able to give examples of some of the actions being taken to stop the reduction in biodiversity.