

Year 13 Biology Curriculum Unit Overview

Year 13 A Level Biology A Module 5: Communication, homeostasis and energy				
What are we learning?	What knowledge, understanding and skills will we gain? ¹	What does mastery look like? ²	How does this build on prior learning? ³	What additional resources are available?
Communication and homeostasis Excretion Neuronal communication Hormonal communication Plant and animal responses Photosynthesis Respiration	<p>Knowledge - cell signalling; homeostatic principles; endotherms and ectotherms; structure and function of mammalian liver; water potential control; kidney failure and treatment; excretory products in diagnostic testing; structures and functions of mammalian neuronal system; generation and maintenance of nerve impulses; synapses; mammalian glands; diabetes and treatment; plant response types; auxins and other plant hormones; structure and function of human brain; coordination of human endocrine and nervous system; muscle contraction in humans; neuromuscular junctions; chloroplast structure and function; photosynthetic pigments; light dependent stage; fixation of carbon dioxide and the light independent stage; rate of photosynthesis; structure and function of mitochondria; glycolysis, link reaction; Krebs's cycle; oxidative phosphorylation; chemiosmosis; anaerobic respiration; respiratory quotient and substrates</p> <p>Understanding - why homeostasis is necessary; applying temperature control mechanism strategies to different organisms; why excretion is important; comparison of different dialysis methods and transplantation; pregnancy testing and anabolic steroid analysis by GC-MS; comparison of myelinated and non-myelinated neurones, neurotransmitter function; pancreas function and adrenal glands; comparison of type I and II</p>	<p>Students will be able to:</p> <ul style="list-style-type: none"> work entirely independently when carrying out practical work work with a high level of safety, ensuring the health and safety of self and peers by carefully considering the hazards and risks associated with the task design robust investigations alone or as part of a student team without teacher input consistently produce accurate results critically reflect on and evaluate results produced, and outline the steps needed to improve in future tasks 	<p>Picks up themes from KS3 work on organisms, respiration and photosynthesis as well as food and digestion (Year 7, 8 and 9)</p> <p>Develops work from GCSE Biology from units in infection and response, bioenergetics and homeostasis (Year 10 and 11)</p> <p>Picks up themes from GCSE Chemistry on chemical analysis (Year 10 and 11)</p> <p>Further develops the practical skills acquired in GCSE Science / Biology from both the general practical activities and specifically from the Required Practicals (Year 10 and 11)</p> <p>The work carried out in</p>	<p>OCR Year 1 textbook</p> <p>OCR Year 2 textbook</p> <p>OCR practical skills guide</p> <p>OCR Biology drawing skills handbook</p> <p>OCR Mathematical skills guide</p>

	<p>diabetes; how apical dominance is controlled; seed germination and stem elongation; commercial use of plant hormones; how heart rate is controlled; how photosynthesis and respiration are inter-related; the importance of photosynthesis bioenergetically; uses of triose phosphate; factors affecting photosynthesis; the importance of cellular respiration; factors affecting the rate of respiration; the significance of different respiratory substrates; Skills - microscopic examination and drawing of histology of liver; microscopic examination and drawing of histology of kidney; pregnancy testing; microscopic examination and drawing of histology of pancreatic tissue; investigations into phototropism and geotropism; the examination of stained sections or photomicrographs of skeletal muscle; TLC of photosynthetic pigments; practical investigations using respirometers; data-logger use</p>		<p>Year 1 of the A level Biology course is incorporated into the learning and understanding of this module throughout. There is an expectation that Year 1 knowledge and understanding is used synoptically in Year 2 (the Unified Paper 3 specifically examines the link between Year 1 and 2 topics and themes)</p>	
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Year 13 A Level Biology A Module 6: Genetics, evolution and ecosystems

What are we learning?	What knowledge, understanding and skills will we gain?	What does mastery look like?	How does this build on prior learning?	What additional resources are available?
<p>Cellular control</p> <p>Patterns of inheritance</p> <p>Manipulating genomes</p> <p>Cloning and biotechnology</p> <p>Ecosystems</p> <p>Populations and sustainability</p>	<p>Knowledge</p> <p>gene mutations; regulation of gene expression; control of body plan; apoptosis and control of mitosis; environmental and genetic factors contributing to phenotypic variation; patterns of inheritance; allele frequencies in populations; speciation; artificial selection; DNA sequencing; DNA profiling and uses; polymerase chain reaction and applications; genetic engineering; gene therapy; plant cloning; animal cloning; microorganisms in biotechnological processes; growth curves; culturing microbes; immobilised enzymes; ecosystem types; biomass transfer; recycling; succession; sampling for abundance and distribution; population size; interactions between populations; conservation and preservation; sustainability</p> <p>Understanding</p> <p>how mutation is linked to changes in protein production; how homeobox sequences determine body plan; examples of <i>lac</i> operon, posttranscriptional and post-translational control of expression; explaining monohybrid, dihybrid, multiple alleles, sex-linkage and codominance; epistasis; the ethical considerations</p>	<p>Students will be able to:</p> <p>work entirely independently when carrying out practical work</p> <p>work with a high level of safety, ensuring the health and safety of self and peers by carefully considering the hazards and risks associated with the task</p> <p>design robust investigations alone or as part of a student team without teacher input</p> <p>consistently produce accurate results</p> <p>critically reflect on and evaluate results produced, and outline the steps needed to improve in future tasks</p> <p>carry out statistical tests in relation to data from sampling or genetics data and interpret results justifiably</p>	<p>Picks up themes from KS3 work on organisms, as well as evolution and ecology. Some students will have carried out basic field work (Year 7, 8 and 9)</p> <p>Develops work from GCSE Biology from units in infection and response, inheritance and ecology (Year 10 and 11)</p> <p>Picks up themes from GCSE Chemistry on organic chemistry (Year 10 and 11)</p> <p>Further develops the practical skills acquired in GCSE Science</p> <p>/ Biology from both the general practical activities and specifically from the Required Practicals (Year 10 and 11)</p> <p>Some students taking Statistics at GCSE will be familiar with basic statistical tests, but this unit builds on that knowledge</p> <p>The work carried out in</p>	<p>OCR Year 1 textbook</p> <p>OCR Year 2 textbook</p> <p>OCR practical skills guide</p> <p>OCR Biology drawing skills handbook</p> <p>OCR Mathematical skills guide</p>

	<p>around the use of artificial selection; how gene sequencing has led to prediction of protein structure and artificial biology; the ethical considerations around the use of genetic engineering; plant cloning techniques (micro propagation, cuttings, tissue culture; animal cloning techniques (embryo twinning, enucleation, somatic cell transfer); micros used in medicine and food production; the dynamic nature of ecosystems; the nitrogen cycle and carbon cycle; limiting factors in a population; social, economic and ethical reasons for conservation of resources; management of environment with reference to case studies from around the world</p> <p>Skills drawing genetic diagrams to show inheritance; use of χ^2 tests to determine significance in genetic outcomes; applying calculations of Hardy-Weinberg to allele frequencies in populations; the use of gel electrophoresis in separating nucleic acid fragments; working with microorganisms using serial dilution methods and aseptic technique; use of field sampling techniques to measure abundance and distribution of organisms</p>		<p>Year 1 of the A level Biology course is incorporated into the learning and understanding of this module throughout. There is an expectation that Year 1 knowledge and understanding is used synoptically in Year 2 (the Unified Paper 3 specifically examines the link between Year 1 and 2 topics and themes)</p>	
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