

Year 13 Biology Curriculum Unit Overview

Curriculum Catch up Statement

During school closure, students continued to follow the Year 12 Scheme of Learning covering the following topics: Biodiversity, Classification and Evolution. We have identified the key knowledge and concepts within the topics covered during school closure and we have mapped when we will revisit them. There will be a catch-up period for the first two weeks of term when we will revisit key concepts and knowledge. Following this, we will carry on with our planned curriculum and address any misconceptions and missing knowledge of concepts as the student progresses through the topics. Prior knowledge is always assessed before a topic is started so the teacher can plan accordingly. Students will be assessed during class using questioning, quick quizzes, group activities and low stakes testing. They will be provided with knowledge organisers that clearly sets out a checklist of concepts required for that topic. End of topic tests will give a clear indication of knowledge that still needs to be embedded and then targeted tasks will be issued to students as and when required. Homework and practice exam questions will occasionally be based on the 'lockdown' topics so that teachers can gain a greater understanding of students retained knowledge. Homework may also be based on current topics, so that additional judgements can be made on student's progress. Fortunately, we have gained teaching hours this year for A level which will benefit the catch-up requirements. Planned revision time at the end of the course will still go ahead before the exams.

Areas covered in the catch-up work are indicated below in red in the curriculum summary grids.

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	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	Students will be able to: 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	Picks up themes from KS3 work on organisms, respiration and photosynthesis as well as food and digestion (Year 7, 8 and 9) Develops work from GCSE Biology from units in infection and response, bioenergetics and homeostasis (Year 10 and 11)	OCR Year 1 textbook
Excretion				OCR Year 2 textbook
Neuronal communication				OCR practical skills guide
Hormonal communication				OCR Biology drawing skills handbook
Plant and animal responses				OCR Mathematical skills guide
Photosynthesis				

<p>Respiration</p>	<p>of photosynthesis; structure and function of mitochondria; glycolysis, link reaction; Krebs's cycle; oxidative phosphorylation; chemiosmosis; anaerobic respiration; respiratory quotient and substrates 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 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>critically reflect on and evaluate results produced, and outline the steps needed to improve in future tasks</p>	<p>Picks up themes from GCSE Chemistry on chemical analysis (Year 10 and 11) 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) The work carried out in 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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Parts of this topic will be reviewed in the first two weeks of September, prior knowledge will be checked in individual classes to gauge the level of teaching required.

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?
Cellular control Patterns of inheritance Manipulating genomes Cloning and biotechnology Ecosystems Populations and sustainability	<p>Knowledge 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 how mutation is linked to changes in protein production; how homeobox sequences determine body plan; examples of <i>lac</i> operon, post-transcriptional and post-translational control of expression; explaining monohybrid, dihybrid, multiple alleles, sex-linkage and codominance; epistasis; the ethical considerations</p>	Students will be able to: 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 carry out statistical tests in relation to data from sampling or genetics data and interpret results justifiably	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) Develops work from GCSE Biology from units in infection and response, inheritance and ecology (Year 10 and 11) Picks up themes from GCSE Chemistry on organic chemistry (Year 10 and 11) 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) Some students taking Statistics at GCSE will be familiar with basic statistical tests, but this unit builds on that knowledge	OCR Year 1 textbook OCR Year 2 textbook OCR practical skills guide OCR Biology drawing skills handbook OCR Mathematical skills guide

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

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

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