

Biology Year 13 Curriculum Overview 2023-24

	Autumn		Spring		Summer
	Learning Cycle 1	Learning Cycle 2	Learning Cycle 3	Learning Cycle 4	Learning Cycle 5
Topic	Teacher A: Respiration and photosynthesis Teacher B: Response to stimuli	Teacher A: Inherited change, populations and evolution Teacher B: Nerves and muscles	Teacher A: Gene expression and Recombinant DNA technology Teacher B: Homeostasis	Teacher A: AS Revision and Synoptic question practice Teacher B: AS revision and maths for Biology practice	Teacher A: AS/A2 revision and maths and practical revision Teacher B: AS/A2 revision and maths and practical revision
Critical Prior Knowledge	GCSE: Respiration and photosynthesis. GCSE Homeostasis Y12 Biological molecules, Mass transport Y12 Cells, transport across cell membranes	GCSE: GCSE Inheritance and variation GCSE: Homeostasis Y12 Genes, DNA, genetic diversity Y12 Cells, transport across cell membranes	GCSE: DNA and protein synthesis Y12 Genes, DNA, genetic diversity GCSE: Homeostasis Y12 Cells, transport across cell membranes	Y12 and 13 content	Y12 and 13 content
Overall Intent (Big ideas and key concepts)	Students will look at how light energy provided by the sun is converted into organic compounds through a series of biochemical reactions. Following this students will explore how these biological compounds are metabolised to release energy to drive organisms other metabolic reactions that enable life to exist. Consideration is also given to how photosynthesis (for	Students study how the individuals of a species share the same genes but usually have different combinations of alleles of these genes. Students study how genes are passed on to the next generation and patterns of inheritance. Students also cover how populations of different species live in communities and how competition occurs within and between these populations for	Students will cover how at the cellular level, control of metabolic activities is achieved by regulating which genes of the genome are transcribed and translated, and when this takes place. Students study how in multicellular organisms this control enables cells to have specialised functions and form specific tissues and organs. Cells formed from the zygote are	Revision of key ideas from year 12 and 13 (Autumn and spring terms)	Revision of key ideas from year 12 and 13 (Autumn and spring terms)

	<p>photoautotrophs) and respiration being common to all organisms provides indirect evidence for evolution.</p> <p>Multicellular organisms are able to respond to stimuli that originate from outside and from within their bodies. Students will cover the mechanisms by which an internal environment provides the optimum conditions for their metabolism. Students examine how organisms control their activities through a combination of growth factors, hormones and nerve impulses.</p>	<p>means of survival. Students will learn that a species exists as one or more populations. The phenotypes of organisms in a population vary due to both genetic and environmental factors. Students consider the factors that influence genetic drift and how natural selection can occur when alleles that enhance the survival chances of individuals that carry them to rise in frequency, therefore changing the allele frequency in a population. This is known as evolution.</p> <p>Students will cover the principles of nervous communication and how multicellular animals pass electrical impulses along nerve cells. Chemical messenger interactions between nerve cells and target cells such as muscles are covered.</p>	<p>initially able to differentiate. In mature mammals, only a few cells retain the ability – stem cells. Students also cover how discovery of environmental factors can cause heritable changes in gene function without any change in the base sequence of DNA – epigenetic regulation of transcription. Students will cover how scientists are able to control the expression of genes by altering the epigenome, allowing alteration of the proteome. The use of DNA technology also enables medical techniques as gene therapy and the use of DNA probes, hybridisation and genetic fingerprinting.</p> <p>Multicellular organisms are able to respond to stimuli that originate from outside and from within their bodies.</p>		
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<p>Essential Knowledge milestones (What students must master)</p>	<p>Teacher A: The light dependent reaction and the light independent reaction. Glycolysis, the link reaction and Krebs cycle. Oxidative phosphorylation and anaerobic respiration.</p> <p>Teacher B: Survival and response. Plant growth factors. The anatomy and function of a reflex arc. Receptors and control of heart rate.</p>	<p>Teacher A: Studying inheritance, monohybrid inheritance, probability and genetic crosses. Dihybrid inheritance. Codominance and multiple alleles. Sex-linkage and autosomal linkage. Epistasis, and the chi-squared test. Population genetics. Variation in phenotype. Natural selection. Effects of different forms of selection on evolution. Isolation and speciation.</p> <p>Teacher B:</p>	<p>Teacher A: Gene mutations. Stem cells and totipotency. Regulation of transcription and translation. Epigenetic control of gene expression. Gene expression and cancer. Genome projects. Producing DNA fragments. In vivo gene cloning. In vitro gene cloning. Locating genes, genetic screening and counselling. Genetic fingerprinting.</p> <p>Teacher B: Principles of homeostasis. Feedback mechanisms. Hormones and the</p>	<p>Revision of key ideas from year 12 and 13 (Autumn and spring terms)</p>	<p>Revision of key ideas from year 12 and 13 (Autumn and spring terms)</p>

		<p>Neurones and nervous coordination. The nerve impulse. Passage of an action potential. Speed of the nerve impulse.</p> <p>Structure and function of synapses. Transmission across a synapse. Structure of skeletal muscle.</p> <p>Contraction of skeletal muscle.</p>	<p>regulation of blood glucose concentration. Diabetes and its control. Control of blood water potential – the structure of the nephron.</p> <p>Role of the nephron in osmoregulation. The role of hormones in osmoregulation.</p>		
Cultural Capital	<p>Fundamental practical course is followed by all students to ensure correct use of apparatus, measuring skills and errors. Maths skills are also covered including statistics.</p>				
Mode of Retrieval	<p>In class teacher led reviews and formative feedback – this low-risk challenge and review environment for pupils will include:</p> <ul style="list-style-type: none"> - recap recall quick starters from reading ahead booklet, homework(know) - review tasks, multiple choice and extended questions (extend) - in class exam style questions (apply) <p>Through rigorous, reliable and accessible assessment:</p> <ul style="list-style-type: none"> - Formal assessments at the end of two sections (9 Multi-topic assessments 50 mins each, with dip-back questions to previous topics) - Mutli topic assessments (Mocks) to inform progress grades: - MTA 3 Nov: Y13 mock 1 Full paper 1 A level Paper 1 90 mins - MTA 4 Nov: Y13 mock 1 Adapted Paper 2 90 mins: Resp, ps, energy in eco, response to stim, nerves. - MTA 9 Mar: Y13 Mock 2 Full paper 2 120 mins - MTA 10 Mar: Y13 Mock 2 Full paper 3 120 mins 				
ECC Student Characteristics	<p>Through these units we will encourage students to work hard and be resilient individuals who embrace challenge and through their creativity and endeavours become reflective learners. Mastering the key concepts of each topic before being able to build on these ideas as they are interleaved through other units later in the course.</p>				

Connection to future learning (When is this developed / revisited)?	Dependent on choice of further education course/career.	Dependent on choice of further education course/career.	Dependent on choice of further education course/career.	Dependent on choice of further education course/career.	Dependent on choice of further education course/career.
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