Year 13 Biology Curriculum Map

Overview	Year 13 biology starts by looking at the idea that life depends on continuous transfers of energy. In photosynthesis, light is absorbed by chlorophyll and this is linked to the production of ATP. In respiration, various substances are used as respiratory substrates. The hydrolysis of these respiratory substrates is linked to the production of ATP. Energy is then transferred between organisms. In communities, the biological molecules produced by photosynthesis are consumed by other organisms, including animals, bacteria and fungi. Students now learn about ow organisms respond to changes in their external and internal environments. Nerve cells pass electrical impulses along their length. A nerve impulse is specific to a target cell only because it releases a chemical messenger directly onto it, producing a response that is usually rapid, short-lived and localised. In contrast, mammalian hormones stimulate their target cells via the blood system. Plants control their response using hormone-like growth substances. The theory of evolution underpins modern Biology. All new species arise from an existing species. This results in different species sharing a common ancestry, as represented in phylogenetic classification. The individuals of a species share the same genes but (usually) different combinations of alleles of these genes. Students study the process of inheritance. A species exists as one or more populations. There is variation in the phenotypes of organisms in a population, due to genetic and environmental factors. Two forces affect genetic variation in populations: genetic drift and natural selection. Natural selection occurs when alleles that enhance the fitness of the individuals that carry them rise in frequency. A change in the allele frequency of a population is evolution. The Year 13 course finishes by looking at gene expression and recombinant DNA technology. Cells are able to control their metabolic activities by regulating the transcription and translation of their genome. Humans are learning how to control the expression of genes by altering the epigenome, and how to alter genomes and proteomes of organisms. This has many medical and technological applications. Consideration of cellular control mechanisms underpins the content of this section.				
Year 13	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1 & 2
Topic	Photosynthesis and respiration	Receptors, nerves and homeostasis	Inheritance and evolution	Gene expression and genetic engineering	Exam preparation
Knowledge	Photosynthesis Respiration Energy and ecosystems Nutrient cycles	Survival and response Receptors Nerve impulses Synaptic transmission Principles of homeostasis and negative feedback Control of blood glucose concentration Control of blood water potential	Inheritance Populations Evolution may lead to speciation Populations in ecosystems	The control of gene expression Regulation of transcription and translation Gene expression and cancer Using genome projects Gene technologies allow the study and alteration of gene function allowing a better understanding of organism function and the design of new industrial and medical processes	Review of whole course

Skills	Students carry out experiments to investigate the rate of photosynthesis Students calculate: the net productivity of producers or consumers the efficiency of energy transfers within ecosystems. Students calculate percentage yields.	Students calculate the maximum frequency of impulse conduction Students examine prepared slides of skeletal muscle using an optical microscope.	Students show understanding of the probability associated with Inheritance. Students investigate the significance of differences between expected and observed phenotypic ratios. Students calculate allele, genotype and phenotype frequencies using the Hardy–Weinberg equation.		