

KS5 Curriculum Plan 2024-25						
TOPIC	LP1	LP2	LP3	LP4	LP5	
	Cell Structure	Biological Membranes	Cell Division	Transport in Animals	Communicable Disease	
Year 12	<p>The use of a light microscope, the ultrastructure of eukaryotic cells and the functions of different cellular components, the interrelationship between the organelles involved in the production and secretion of proteins, the ultrastructure of eukaryotic cells and the functions of different cellular components, the structure and ultrastructure of prokaryotic cells, the similarities and differences in the structure and ultrastructure of prokaryotic and eukaryotic cells, the difference between magnification and resolution, Laser scanning confocal microscopy</p>	<p>The roles of membranes within the cells and at the surface of cells, the fluid mosaic model of membrane structure and the roles of its components, factors affecting membrane structure and permeability, the passive movement of molecules across membranes, active transport of molecules across membranes, the movement of water across membranes by osmosis.</p>	<p>Sections of the cell cycle and control of the cell cycle, how the cell cycle is controlled, the significance of mitosis in life cycles, the significance of meiosis in life cycles, how cells of multicellular organisms are specialised, specialised tissues in an animal, the features and differentiation of stem cells, the need for specialised transport systems, the structure and functions of arteries, arterioles, capillaries, venules and veins, the differences in the composition of blood, tissue fluid and lymph.</p>	<p>The role of haemoglobin in transporting oxygen and carbon dioxide, the Bohr effect- changes due to carbon dioxide, how carbon dioxide is transported using haemoglobin, the external and internal structure of the mammalian heart, the stages of the cardiac cycle.</p>	<p>The different types of pathogen that can cause communicable diseases in plants and animals, the transmission of animal and plant communicable pathogens, plant defences against pathogens, the primary non-specific defences against pathogens in animals, the structure and mode of action of lymphocytes and antibodies, the structure and mode of action of phagocytes, the structure and mode of action of humoral immunity, the differences between active and passive immunity and between natural and artificial immunity, the principles of vaccination and the role of vaccination programmes in the prevention of epidemics, the benefits and risks of antibiotics to manage bacterial infection, the benefits and risks of antibiotics to manage bacterial infection.</p>	
	<p>Skills</p> <p>The preparation of microscope slides for use in light microscopy, the preparation and examination of microscope slides for use in microscopy, the use of staining in light microscopy, the use and manipulation of magnification formula, Research task, "Is there still a place for microscopy in Biology?" Practical investigations into membrane permeability, practical investigations into the factors affecting diffusion rates in model cells, practical investigations into the effects of solutions of different water potential on plant and animal cells. Investigate microscopic sections of plant tissue showing the cell cycle and stages of mitosis, CPAC- dissection of a fish gas exchange system. CPAC- heart dissection, interpret electrocardiograms to diagnose conditions. Research the different types of pathogen that can cause communicable diseases in plants and animals.</p>					
	<p>Key Vocab</p> <p>Cells, prokaryotic, eukaryotic, subcellular structures, organelles, nucleus, cytoplasm, cell membrane, mitochondria, ribosomes, cell wall, permanent vacuole, chloroplasts, chlorophyll, bacterial cells, plasmids, light microscopes, electron microscopes, magnification, staining, differential staining, microscopy, ultrastructure.</p>	<p>Fluid mosaic, phospholipid, cholesterol, glycolipid, glycoprotein, cell signalling, receptor, diffusion, facilitated diffusion, active transport, exocytosis, osmosis, water potential, solute, solvent, solution, isotonic, hypertonic, hypotonic, flaccid, turgid, lysis.</p>	<p>Cytokinesis, interphase, mitosis, chromatids, haploid, diploid, homologous chromosomes, meiosis, differentiation, epithelial, nucleotide, complementary, gene, codon, allele, locus, independent segregation, crossing over, metaphase, anaphase, prophase, telophase, semi-conservative replication, cell cycle, checkpoints.</p>	<p>Affinity, association, dissociation, oxygen dissociation curve, surface area to volume ratio, spiracles, gill lamellae, countercurrent exchange, stomata, double circulatory system, arteries, veins, tissue fluid, cardiac cycle, aorta, pulmonary artery, pulmonary vein, vena cava, right atrium, right ventricle, left atrium, left ventricle, tricuspid, bicuspid, atrioventricular valves, semilunar valves, tendinous cords, septum, cardiac muscle, coronary artery.</p>	<p>Communicable, non-communicable, immunity, pathogen, reservoir, endemic, epidemic, vectors, infectious, natural barriers, lysozyme, microorganisms, invasion, antigens, glycoproteins, antibodies, polypeptide chains, natural acquired, passive, active, artificially acquired, humoral immune response, B-lymphocytes, close, cell-mediated immune response, T-lymphocytes, killer cells, helper cells, suppressor cells, memory cells, vaccines, innate immune system, adaptive immune system, monoclonal antibodies, antibiotics, antibiotic resistance.</p>	
Year 13	TOPIC	LP1	LP2	LP3	LP4	LP5
		Neuronal Communication	Hormonal Communication and Homeostasis	Plant Responses and Energy	Energy for Biological Processes	
	<p>Knowledge</p> <p>The need for communication systems in multicellular organisms, the structure and functions of sensory, relay and motor neurones, the roles of mammalian sensory receptors in converting different types of stimuli into nerve impulses, the generation and transmission of nerve impulses in mammals, the structure and roles of the synapses in neurotransmission, the organisation of the mammalian nervous system, the structure of the human brain and the functions of its parts, understand the propagation and journey of the reflex arc, the structure of mammalian muscle and the mechanism of muscular contraction.</p>	<p>Endocrine communication by hormones, the histology of the pancreas, how blood glucose concentration is regulated, the differences between type 1 and type 2 diabetes, the coordination of responses by the nervous and endocrine systems, the effects of hormones and nervous mechanisms on heart rate, the principles of homeostasis, the physiological and behavioural responses involved in temperature control in ectotherms, the physiological and behavioural responses involved in temperature control in endotherms, the term excretion and its importance in maintaining metabolism and homeostasis, the structure, mechanisms of action and functions of the mammalian kidney.</p>	<p>The control of the water potential of the blood, the effects of kidney failure and its potential treatments, the roles of plant hormones, the types of plant responses, the commercial use of plant hormones, the need for cellular respiration, the chemiosmotic theory, the structure of a chloroplast and the sites of the two main stages of photosynthesis, the fixation of carbon dioxide and the light-independent stage of photosynthesis</p>	<p>The fixation of carbon dioxide and the light-independent stage of photosynthesis, factors affecting photosynthesis and investigations in these factors, the process and site of glycolysis, the link reaction and its site in the cell, the process and the site of the Krebs cycle, the process and site of oxidative phosphorylation, the process of anaerobic respiration in eukaryotes, the difference in relative energy values of carbohydrates, lipids and proteins as respiratory substrates.</p>		
<p>Skills</p> <p>The structure of the human brain and the functions of its parts, the structure of mammalian muscle and the mechanism of muscular contraction. The structure, mechanisms of action and functions of the mammalian kidney. How excretory products can be used in medical diagnosis, practical investigation into the effect of plant hormones on growth. Practical investigations into the effect of factors such as temperature, substrate concentration and different respiratory substrates on the rate of respiration.</p>						
<p>Key Vocab</p> <p>Maltose, cellulose, beta glucose, alpha glucose, condensation reaction, haemoglobin, starch, amylose, fibrous proteins, hexose sugar, microfibrils, polymer, globular proteins, collagen, glycine, disulphide bonds, protease enzymes, beta pleated sheet, saturated, genetic code, mono-unsaturated, polyunsaturated, lipids, fatty acids, triglyceride, amylopectin, peptide bond, glycosidic bond, ester.</p>	<p>Nucleotide, pentose sugar, organic base, adenine, thymine, cytosine, guanine, uracil, phosphate group, mononucleotide, dinucleotide, polynucleotide, transcription, mutation, deoxyribose, RNA polymerase, ribose, phosphodiester, ATP, phosphorylation, codon, complementary, purine, pyrimidine, sugar phosphate backbone.</p>	<p>Surface area: volume ratio, exchange surface, concentration gradient, tracheae, tracheoles, spiracle, gill, gill filaments, diffusion distance, ventilation mechanism, adaptations, alveoli, capillary, countercurrent flow, gill arch, lamellae, oxygenated, deoxygenated, saturated, unsaturated, haemoglobin, deoxyhaemoglobin, oxyhaemoglobin, carboxyhaemoglobin, diffusion, osmosis, active transport, co-transport, active transport, permeability.</p>	<p>Classification, hierarchy, taxa, domain, kingdom, phylum, class, order, family, genus, species, physical characteristics, DNA sequencing, animalia, plantae, fungi, protoctista, prokaryotae, binomial, phylogeny, lineage, natural selection, allele frequency, evolution, anatomical, behavioural, physiological, convergent evolution, fossil record, natural selection, interspecific, intraspecific, characteristics, continuous variation, discontinuous variation, mutations, environment, genetic.</p>			