



MDI

Teacher 1	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
End point	To develop scientific knowledge and conceptual understanding of the following topics:					
Teaching focus	Module 2 Foundations in Biology	Module 2 – Foundations in Biology	Module 3- Exchange and Transport	Module 3- Exchange and Transport	Revision	
	Biological Molecules, water, Carbohydrates, Lipids, Proteins, Nucleic Acids, DNA Replication and the Genetic Code, Protein Synthesis, ATP.	Enzymes, Factors Affecting Enzyme Activity, Enzyme Inhibitors, Co Factors, Co enzymes and Prosthetic groups	Exchange Surfaces and Breathing, Measuring the Process, Ventilation and Gas Exchange in other Organisms, Transport in Animals, Blood Vessels, Transport of Oxygen and Carbon Dioxide in the blood	The Heart Transport in Plants, Transpiration, Translocation, Plant Adaptations.		
Rationale	This module acts as an important bridge into AS and A level from GCSE Biology. Covering basic biological concepts, why and how molecules perform and trigger important biochemical reactions in living organisms. Students will gain an understanding of the physiological functions that regulate the growth and development of organisms.	Metabolism in living organisms relies upon enzyme controlled reactions. Students will build upon their knowledge of proteins by studying how enzymes function and the factors that affect enzyme action. They will gain knowledge of how this has improved our understanding of biological processes and increased our use of enzymes in industry.	In this module, students study the structure and function of gas exchange and transport systems in a range of animals and in terrestrial plants. The significance of surface area to volume ratio in determining the need for ventilation, gas exchange and transport systems in multicellular organisms is emphasised. Students will be able to give examples of terrestrial green plants and a range of animal phyla are used to illustrate the principles.			



Subject: Biology Year 12

NPCAT Curriculum Overview 2021-2022

Maths skills	M0.1, M0.2, M1.1, M1.3, M2.2, M2.3, M2.4	M0.1, M0.2, M0.3, M1.1, M1.3, M1.11, M3.1, M3.2, M3.3, M3.5, M3.6	M0.1, M0.2, M0.3, M0.4, M1.1, M1.3, M2.1, M4.1, M2.4	
Practical skills	PAG 9, 10	PAG 4	PAG 1, 2, 5, 10, 11	
Key Vocab	Cohesion, adhesion, capillary action, condensation, hydrolysis, glycosidic bond, glucose, phospholipids, monomer, polymer, amino acids, peptide bond, ester bond, hydrogen bond, nucleic acids, nucleotide, triglyceride, amylopectin, fibrous, globular and conjugated proteins, antiparallel, complementary base pairs, ATP, codon.	Primary, secondary, tertiary and quaternary structure, active site, denature, pH, Cofactors, Coenzymes, Inhibitors, Vmax, optimum, coefficient, activation energy, substrate, catabolic, anabolic, induced fit.	Surface area to volume ratio, thin layers, diffusion pathways, good blood supply, concentration gradient, gill lamellae, gill filaments, operculum, counter-current system, spiracles, inspiratory reserve volume, expiratory reserve volume.	
Summative assessment	AP1 (Biological Molecules, water, Carbohydrates, Lipids, Proteins, Nucleic Acids, DNA Replication and the Genetic Code, Protein Synthesis, ATP).	Enzymes end of unit assessment.	AP2 (Biological Molecules, water, Carbohydrates, Lipids, Proteins, Nucleic Acids, DNA Replication and the Genetic Code, Protein Synthesis, ATP Exchange Surfaces and Breathing, Measuring the Process, Ventilation and Gas Exchange in other Organisms, Transport in Animals).	AP3- Breadth and Depth



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NPCAT Curriculum Overview 2021-2022

Teacher 2	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
End point	To develop scientific knowledge and conceptual understanding of the following topics:					
Teaching Focus	Module 2 Foundations in Biology		Module 4 – Biodiversity, Evolution and Disease			
	Basic Components of Living Things	Plasma Membranes	Cell Division	Classification and Evolution	Communicable Disease	Biodiversity
Rationale	<p>This module acts as an important bridge into AS and A level from GCSE Biology. Covering basic biological concepts, why and how molecules perform and trigger important biochemical reactions in living organisms. Students will gain an understanding of the physiological functions that regulate the growth and development of organisms.</p>		<p>This module studies the biodiversity of organisms; how they are classified and the ways in which biodiversity can be measured. It serves as an introduction to ecology, emphasising practical techniques and an appreciation of the need to maintain biodiversity. The learners also gain an understanding of the variety of organisms that are pathogenic and the way in which plants and animals have evolved defences to deal with disease. The impact of the evolution of pathogens on the treatment of disease is also considered.</p> <p>The relationships between organisms are studied, considering variation, evolution and phylogeny.</p>			
Maths Skills	Application & understanding that requires a choice of data or equation to be used. Problem solving involving use of mathematics from different areas of maths and decisions about direction to proceed. Calculation of magnification, conversion between units, standard deviation, student t-test, Spearman’s rank correlation coefficient, Simpson’s Index of Diversity.					
Practical skills	PAG 1.3 – Using a Light Microscope; PAG 8.1 – Investigating the Water Potential of a Potato				PAG 3.1 Calculation of Species Diversity	



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<p>Key Vocabulary</p>	<p>Optical light Microscope, SEM, TEM, Resolution, Magnification, Contrast, Staining, Artefact, Stage Micrometre, Eyepiece Graticule, Calibrate, Nucleus, Nucleolus, Chromosomes, Chromatin, Histones, RER, SER, Ribosomes, Cytosol, Cytoplasm, Mitochondria, Cristae, Matrix, Chloroplast, Thylakoid, Stroma, Vacuole, Tonoplast, Plasma Membrane, Cell Wall, Cellulose Prokaryote, Eukaryote, Vesicle, Plasmid, Flagella, Lysosome, Cytoskeleton, Microfilament, Actin, Microtubule, Tubulin, Intermediate Filament, Endocytosis, Exocytosis, Treadmilling, Peptidoglycan, Atomic Force Microscope, Laser Scanning Confocal Microscope, Endosymbiosis, Endocytosis, Golgi Apparatus, Granum, Extrinsic Protein, Intrinsic Protein, Channel Protein, Carrier Protein, Glycoprotein, Glycolipid, Phospholipid, Cholesterol, Diffusion, Active Transport, Osmosis, Water Potential, Mitosis, Mitotic Phase, Interphase, Prophase, Metaphase, Anaphase, Telophase, Meiosis, Diploid, Haploid, Chromatid, Centromere, Telomere, Homologous Chromosomes</p>		<p>Kingdom, Phylum, Class, Order, Family, Genus, Species, Binomial Nomenclature, Hierarchy, Domain, Palaeontology, Comparative Anatomy, Comparative Biochemistry, Homologous Structures, Analogous Structures, Convergent Evolution, Divergent Evolution, Pentadactyl Limb, Discontinuous Variation, Continuous Variation, Physiological, Behavioural, Anatomical, Eukarya, Archaea, Archaeobacteria, Mutation</p>	<p>Pathogen, Antibiotics, Toxins, Viruses, Bacteria, Protist, Fungi, Glucanases, Mucous Membranes, mast Cells, histamines, Opsonin, Cytokinins, T Memory Cells, T Regulator Cells, T Helper Cells T Killer Cells Interleukins, Clonal Selections, Clonal Expansion, Natural Immunity, Passive Immunity, Phagocytosis, Macrophages, Leukocytes, Penicillin, Epidemic, Major Histocompatibility Complex, Antigens, Antibodies, Plasma Cells, B Cells, Potato Blight, Perforin, Lysosome</p>	<p>Habitat Biodiversity, Species Biodiversity, Species Evenness, Species Richness, Genetic Biodiversity, Opportunistic, Systematic, Line Transect, Sampling Bias, Quadrat, gene Pool, Monoculture, Climate Change, Global Warming, In Situ Conservation, Ex Situ Conservation</p>	
<p>Summative Assessment</p>		<p>AP 1 – Foundations in Biology</p>		<p>AP 2 – Foundations, Classification and Evolution</p>		<p>Mock AS</p>