

Biology A Level Year 12			
Topic 1 - Lifestyle, health and risk		Topic 2 - Genes and Health	
Teaching hours		Teaching hours	
Context	Cardiovascular disease as a vehicle to investigate the heart and circulation	Context	Cystic fibrosis
Textbook	Pearson Salters-Nuffield 1 – pages 2 – 55	Textbook	Pearson Salters-Nuffield 1 – pages 56 – 103
Key Biological Principles		Key Biological Principles	
The need for a Heart and circulation The structure and properties of water		The importance of Surface area : volume ratio for diffusion Protein structure and function Enzyme function and tertiary protein structure Factors affecting enzyme activity	
Declarative knowledge covered		Declarative knowledge covered	
The limitations of diffusion in supplying oxygen Open and closed circulations Single and double circulations Structure and function of the heart, arteries, arterioles, capillaries, venules and veins The stages of the cardiac cycle The blood clotting cascade The process of atherosclerosis Risk factors for CVD Formation of tissue fluid and Blood pressure Structure of carbohydrates (polysaccharides and cellulose) and lipids		The role of mucus The structure of ciliated epithelium The structure of amino acids and proteins Fluid mosaic model of cell membrane structure Different methods of transport across a membrane Cause of cystic fibrosis Effect of CF on body systems The structure of DNA and mutation Protein synthesis Inheritance of CF Testing for CF	
Procedural knowledge covered		Procedural knowledge covered	
How to calculate risk from mortality data How to control risk factors for CVD Assessing the strengths and weaknesses of case control and cohort studies		Assessing relative merits and risk of different methods of prenatal testing Ethical issues relating to prenatal and genetic testing	
Key Experiments/Demos		Key Experiments/Demos	
Core Practical 1: Investigating the effect of caffeine on daphnia Core Practical 2: Investigating the vitamin C content of different fruit juices Heart dissection Measuring blood pressure and oxygen saturation		Core Practical 3: Investigating the Effect of Temperature or Alcohol concentration on the permeability of beetroot membranes Core Practical 4: Investigating the Effect of Enzyme and Substrate Concentration on Initial Rate of Reaction Extracting DNA	
Retrieval focus	Key words and biochemical structures	Retrieval focus	
Skills focus	Controlling variables in investigations	Skills focus	
Assessment	End of topic assessment, maths skills questions (HW), glossary crosswords (HW)	Assessment	End of topic assessment, maths skills questions (HW), glossary crosswords (HW)
Mock exam	Past AS Paper 1 in January when topics 1 and 2 have been completed		

Biology A Level Year 12			
Topic 3 - Voice of the Genome		Topic 4 - Making Use of Biodiversity	
Teaching hours		Teaching hours	
Context	How complex multicellular organisms develop from a single cell	Context	Investigates the extensive biodiversity on Earth and how it came about
Textbook	Pearson Salters-Nuffield 1 – pages 104 – 149	Textbook	Pearson Salters-Nuffield 1 – pages 150 - 203
Key Biological Principles		Key Biological Principles	
The ultrastructure of prokaryotic and eukaryotic cells The importance of mitosis Polygenic inheritance		The definition of a species as a group of organisms that can interbreed to produce fertile offspring How plant cells differ from animal cells The importance of water to plants The pattern of bacterial growth The key to survival in a changing environment	
Declarative knowledge covered		Declarative knowledge covered	
The origins of chloroplasts and mitochondria The structure of mammalian gametes Meiosis and genetic variation through independent assortment and crossing over Linkage and Sex linkage Fertilisation in mammals and plants The cell cycle Meiosis Stem cells and cloning The control of development Epigenetics and the lac operon Genes and environment Cancer – inheritance and environment		The concept of a niche in a habitat Understand how natural selection leads to evolution Understand that reproductive isolation is necessary for the formation of new species Classification is a means of organizing the variety of living organisms according to similarity of phenotype Modern methods of classification based on molecular phylogeny The ultrastructure of plant cells The structure and function of the polysaccharides starch and cellulose Similarities and differences in structure and function between sclerenchyma, xylem and phloem The development of drug testing from historical to present day protocols How plant fibres and starch can replace oil-based plastics	
Procedural knowledge covered		Procedural knowledge covered	
Evaluate ethical issues relating to the use of stem cells Understand the role of the regulatory authorities Construct genetic diagram to assess the results of genetic crosses		Be able to calculate the Heterozygosity Index and the (Simpsons) Index of Diversity discuss the anatomical, physiological and behavioural adaptations of an organism to their niche Be able to use the Hardy-Weinberg equation to calculate allele and genotype frequencies Evaluate the conservation methods used by zoos and seedbanks	
Key Experiments/Demos		Key Experiments/Demos	
Core Practical 5: Prepare and stain a root tip squash to observe the stages of mitosis		Core Practical 6 – Plant Stem Microscopy Core Practical 7 – Investigating Plant Mineral Deficiencies Core Practical 8 – Determine the tensile strength of plant fibres Core Practical 9 – Investigating Antimicrobial Properties of Plants	
Assessment	End of topic assessment, maths skills questions (HW), glossary crosswords (HW)	Assessment	End of topic assessment, maths skills questions (HW), glossary crosswords (HW)
Mock exam	Past AS Paper 2 in April when topics 3 and 4 have been completed		

Biology A Level Year 13			
Topic 5 - On the Wild Side		Topic 6 – Infection, Immunity and Forensics	
Teaching hours		Teaching hours	
Context	Ecosystems as the place where photosynthesis captures energy and how they are changed by climate change	Context	The sequence of infection, immune response, disease and treatment is explored through HIV/AIDS and TB and from the viewpoint of forensic science
Textbook	Pearson Salters-Nuffield 2 – pages 2 – 65	Textbook	Pearson Salters-Nuffield 2 – pages 66 - 129
Key Biological Principles		Key Biological Principles	
Ecosystems Photosynthesis and the need for chloroplasts Metabolic pathways The effect of temperature on enzyme activity		Difference between a virus and a bacterium Antibodies rely on complementary protein shapes Protein synthesis (revisited)	
Declarative knowledge covered		Declarative knowledge covered	
The effect of biotic and abiotic factors on an ecosystem The concept of a niche Succession from colonization to climax community The biochemistry of photosynthesis, light dependent and light independent ATP as the energy currency of the cell Gross and net primary productivity Evidence for climate change Causes of anthropogenic climate change Extrapolation to predict future climate change The effects of climate change The effect of temperature on the rate of enzyme activity Evolution through gene mutation and natural selection The role of the scientific community in validating new evidence for evolution Allopatric and sympatric speciation The carbon cycle in relation to reducing atmospheric carbon dioxide Reforestation and renewable resources		Forensic investigation into time of death Role of microorganisms in the decay of organic matter and carbon recycling DNA profiling for identification and phylogeny Polymerase Chain Reaction Infection of human cells by TB and HIV pathogens Non-specific immune response Roles of antigens and antibodies in the immune response Roles of B cells and T cells in the immune response Post-transcriptional changes to mRNA Major routes and barriers to infection Natural, artificial, active, passive immunity The evolutionary “arms race” between pathogens and hosts The difference between bacteriostatic and bactericidal antibiotics Codes of practice regarding antibiotic prescription and hospital practice relating to infection control	
Procedural knowledge covered		Procedural knowledge covered	
Calculate the efficiency of energy transfers through an ecosystem Understand the way in which scientific conclusions about controversial issues can depend on who is reaching the conclusions		Interpret the results of forensic entomology to estimate time of death Able to compare the structures of viruses and bacteria	
Key Experiments/Demos		Key Experiments/Demos	
Core Practical 11: Investigate photosynthesis using isolated chloroplast Core Practical 12: Investigate the effect of temperature on enzymes, Q ₁₀ Core Practical 13: Effect of temperature on the development of organisms		Core Practical 14: Gel electrophoresis Core Practical 15: investigate the effect of different antibiotics on bacteria	
Assessment	End of topic assessment, maths skills questions (HW), glossary crosswords (HW)	Assessment	End of topic assessment, maths skills questions (HW), glossary crosswords (HW)
Mock exam	Past A Level Paper 1 in December when topics 5 and 6 have been completed		

Biology A Level Year 13			
Topic 7 – Run for your life		Topic 8 – Grey Matter	
Teaching hours		Teaching hours	
Context	Sport and exercise is the basis of investigation into the organs that are responsible for movement	Context	The nervous system
Textbook	Pearson Salters-Nuffield 2 – pages 130 – 193	Textbook	Pearson Salters-Nuffield 2 – pages 194 - 267
Key Biological Principles		Key Biological Principles	
The chemistry of respiration Homeostasis and feedback control measures Transcription factors		Potential difference across a cell membrane Comparing nervous and hormonal coordination Coordination in plants	
Declarative knowledge covered		Declarative knowledge covered	
How muscles, tendons, skeleton and ligament interact to create movement Sliding filament theory of muscle contraction The overall reactions of respiration Respiration as a sequence of reactions each catalysed by an enzyme The role of glycolysis in aerobic and anaerobic respiration The role of the link reaction and the Krebs cycle in the oxidation of glucose How ATP is synthesised by oxidation phosphorylation The fate of lactate in anaerobic respiration Myogenic nature of cardiac muscle and the electrical activity of the heart Electrocardiograms in the diagnosis of heart conditions Structure of a muscle fibre and differences between fast and slow twitch fibres Negative and positive feedback control The importance of Homeostasis during exercise including thermoregulation Medical technology enabling greater participation in sport Transcription factors switch on and off genes		Structure and function of sensory, relay and motor neurones How effectors respond to a stimulus How the pupil dilates and contracts How a nerve impulse is conducted along an axon Structure and function of synapses Vision in the mammalian nervous system Response to light in plants using phytochrome and IAA Nervous and hormonal control Functions of human brain and Brain imaging techniques The critical period in visual development Use of animal models Imbalance in natural brain chemicals The effect of drugs on synaptic transmission Genome sequencing in personalized medicines Drugs produced by genetically modified organisms The methods used to investigate contributions of nature and nurture to brain development	
Procedural knowledge covered		Procedural knowledge covered	
Calculate cardiac output and minute ventilation rate Understand how variations in cardiac output and ventilation enable rapid delivery of oxygen and removal of carbon dioxide Analysis and interpretation of data relating to dangers of over and under exercising, recognizing correlations and causal relationships Discuss the ethical position relating to the use of drugs in sport		Discuss moral and ethical issues relating to the use of animals in research Understand how animals can learn by habituation The social, moral and ethical issues raised by genome sequencing Understand the risks and benefits of using GMOs	
Key Experiments/Demos		Key Experiments/Demos	
Core Practical 16: Investigating the rate of respiration Core Practical 17: Investigate the effects of exercise on breathing		Core Practical 18: Investigate habituation to a stimulus	
Assessment	End of topic assessment, maths skills questions (HW), glossary crosswords (HW)	Assessment	End of topic assessment, maths skills questions (HW), glossary crosswords (HW)
Mock exam	Past A Level Paper 2 in March/April when topics 7 and 8 have been completed		

