



Key Stage 5 Biology			
Year title / big question:	A-level Biology Year 1 – Foundations in Biology; Exchange and Transport; Biodiversity, Evolution and Disease	Year group:	12 Biology
Autumn Term 1: Cells, microscopes and Biological molecules	Spring Term 1: Biological membranes, Exchange surfaces, Cell division and Enzymes	Summer Term 1: Transport in animals, Communicable Disease, Biodiversity, Classification and Evolution	
Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	
<p>To explore the ultrastructure of eukaryotic and prokaryotic cells, and examine how the structures of both compare. To explore how organelles work together in protein synthesis.</p> <p>To explore the use of the magnification formula and how a calibrated eyepiece graticule can be used to measure cells and organelles.</p> <p>To explore the structure, properties and uses of water, proteins, and nucleic acids as biological molecules.</p>	<p>To explore the structure and function of biological membranes, as well as the methods of transport across membranes and factors that affect the rate of these.</p> <p>To explore the methods of gaseous exchange in mammals.</p> <p>To explore tissues, organs and organ systems leading to organisation in multicellular organisms (plants and animals).</p> <p>To explore the structure, function, modes of action and factors that affect the working of enzymes.</p>	<p>To explore the structure, function, and adaptations of the mammalian heart.</p> <p>To explore the wide variety of pathogens that cause disease in animals and plants, as well as the physical defences in animals and plants, phagocytosis and antibody structure.</p> <p>To explore sampling methods and describe how biodiversity can be studied both qualitatively and quantitatively. To explore how biodiversity can be managed worldwide.</p> <p>To explore the different ways in which we can classify living organisms and how this is linked to variation.</p>	
Summative assessment:	Summative assessment:	Summative assessment:	
<p>Cell Structure end of topic test.</p> <p>Water and proteins end of topic test.</p>	<p>Biological membranes end of topic test.</p> <p>Cell division, cell diversity and cellular organisation end of topic test.</p> <p>Enzymes test.</p>	<p>Transport in animals end of topic test (part 2).</p> <p>Biodiversity test.</p> <p>Communicable Disease end of topic test (part 1).</p>	

Autumn Term 2: Biological molecules and Cell division	Spring Term 2: Exchange surfaces, Transport in animals, and Transport in plants	Summer Term 2: Communicable Disease, Evolution, and Populations, Sustainability
Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	Intent and composite knowledge (overview):
<p>To explore the structure, properties, and uses of carbohydrates and lipids as biological molecules.</p> <p>To explore methods for qualitative and quantitative testing of the range of biological molecules studied.</p> <p>To explore the use of nucleic acids in protein synthesis, and ATP as a phosphorylated nucleotide.</p> <p>To explore the mitotic cell cycle, and its control.</p>	<p>To explore ventilation in mammals.</p> <p>To explore the methods of gaseous exchange in fish and insects.</p> <p>To explore the structure, function and adaptations of blood, and blood vessels.</p> <p>To explore the methods of material transport in plants through the transpiration stream and translocation.</p> <p>To describe how plants are adapted to survive a range of habitats.</p>	<p>To explore how the immune system fights disease and prevents autoimmunity. To explore how we can utilise our knowledge of the immune system and pathogens in vaccines and drugs.</p> <p>To explore how organisms from different kingdoms are adapted and to link this to evolution by natural selection.</p> <p>To explore the factors that limit the size of populations and how humans can use resources sustainably.</p>
Summative assessment:	Summative assessment:	Summative assessment:
<p>Carbohydrates and lipids end of topic test.</p> <p>Testing for Biological Molecules end of topic test.</p> <p>Nucleotides and nucleic acids end of topic test.</p> <p>Year 12 mid-year PPE.</p>	<p>Exchanges surfaces end of topic test.</p> <p>Transport in animals end of topic test (part 1).</p> <p>Transport in plants end of topic test.</p>	<p>Communicable Disease end of topic test (part 2).</p> <p>Evolution and Classification end of topic test.</p> <p>End of Year 12 Exam.</p> <p>Populations and sustainability end of topic test.</p>



Programme of Learning – Overview

Key Stage 5 Biology				
Year title / big question:	A-level Biology Year 2 – Communication, homeostasis and Energy; Genetics, Evolution and Energy.		Year group:	13 Biology
Autumn Term 1: Photosynthesis, Respiration, Ecosystems and Communication	Spring Term 1: Animal Responses, Plant Responses, Excretion and Patterns of inheritance part 1	Summer Term 1: Biotechnology and Cloning		
Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	Intent and composite knowledge (overview):		
<p>To explore the reaction of and organelle associated with photosynthesis in plants, looking at this on a cellular and biochemical level.</p> <p>To explore the reaction of and organelle associated with respiration (both aerobic and anaerobic), looking at this on a cellular and biochemical level.</p> <p>To explore the use of food chains and energy transfer in ecosystems, with a focus on the cycling of carbon and nitrogen, as well as how organisms change over time in a habitat.</p> <p>To explore what makes an effective communication system, and how endothermic animals respond when they are too hot.</p>	<p>To explore the sliding filament hypothesis of skeletal muscle contraction, along with the control of heart rate and the “flight of fight” response.</p> <p>To explore the use of hormones used in plant development and their applications by humans.</p> <p>To explore the structure and function of the liver and kidney in homeostasis, with reference to the loop of Henle, ASH production, kidney failure, dialysis and urine testing.</p> <p>To explore the stage of meiosis and how these compare to the stages in mitosis. To apply knowledge and understanding meiosis to genetic crosses involving monogenic inheritance, codominance, sex linkage and dihybrid inheritance.</p>	<p>To explore the applications of modern DNA technology in the fields of biotechnology and cloning in terms of making valuable products for humans, and the issues surrounding these new technologies.</p>		
Summative assessment:	Summative assessment:	Summative assessment:		
<p>Photosynthesis end of topic test.</p> <p>Ecosystems end of topic test.</p>	<p>Animal Responses end of topic test.</p> <p>Plant Responses end of topic test.</p> <p>Excretion end of topic test.</p>	<p>Biotechnology end of topic test.</p> <p>Cloning end of topic test.</p>		

Autumn Term 2: Respiration, Neuronal Communication, Animal Responses, Communication, Hormonal Communication and Excretion	Spring Term 2: Cellular, Control Manipulating genomes and Patterns of Inheritance parts 1 and 2	Summer Term 2:
Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	Intent and composite knowledge (overview):
<p>To explore methods for measuring the rate of respiration.</p> <p>To explore the resting and action potential in neurones, as well as the junctions between neurones.</p> <p>To explore the different organs and branches of the nervous system. To explore mammalian muscle and neuromuscular junctions.</p> <p>To explore how endothermic animals respond when they are too cold, and compare response of endotherms to ectotherms.</p> <p>To explore the use of the hormones insulin, glucagon and adrenaline and their associated organs of manufacture and target.</p> <p>To explore the structure and function of the liver and kidney in homeostasis, with reference to ultrafiltration and selective reabsorption.</p>	<p>To explore gene expression in prokaryotes and eukaryotes.</p> <p>To explore the applications of modern DNA technology in the field of genetic engineering in terms of making valuable products for humans, and the issues surrounding these new technologies.</p> <p>To explore epistasis. To explore the use of the chisquared test to study phenotypic ratios.</p> <p>To explore population genetics with reference to evolutionary forces, speciation, and artificial selection. To explore allele frequencies in populations.</p>	
Summative assessment:	Summative assessment:	Summative assessment:
<p>Respiration end of topic test.</p> <p>Neuronal Communication end of topic test.</p> <p>Communication end of topic test.</p> <p>Hormonal Communication end of topic test.</p>	<p>Cellular Control end of topic test.</p> <p>Manipulating Genomes end of topic test.</p> <p>Patterns of Inheritance end of topic test part 1.</p> <p>Patterns of Inheritance end of topic test part 2.</p>	

Programme of Learning – Overview

Key Stage 5			
Year title / big question:		Year group: 12	
Autumn Term 1 title:		Spring Term 1 title:	
Intent and composite knowledge (overview):		Intent and composite knowledge (overview):	
Introduction to chemistry Atomic Structure Acids and salts Quantitative chemistry (part 1)		Inorganic analysis Thermodynamics Introduction to organic chemistry Alkanes	
Summative assessment:		Summative assessment:	
Atomic Structure test Acids and salts test		Redox test Thermodynamics test Organic intro test	
Autumn Term 2 title:		Spring Term 2 title:	
Intent and composite knowledge (overview):		Intent and composite knowledge (overview):	
Quantitative (part 2) Bonding and structure Redox and periodic table		Alkenes Kinetics Equilibrium	
Summative assessment:		Summative assessment:	
Quantitative chemistry test Bonding and structure test PPE		Alkanes and alkenes test Kinetics and Eqm test	
		Summer Term 1 title:	
		Intent and composite knowledge (overview):	
		Haloalkanes Alcohols Organic analysis	
		Summative assessment:	
		Haloalkanes and Alcohols test Analysis test	
		Summer Term 2 title:	
		Intent and composite knowledge (overview):	
		Revision Further Organic Analysis - Chromatography	
		Summative assessment:	
		PPE	

Programme of Learning – Overview

Key Stage 5			
Year title / big question:		Year group: 13	
Autumn Term 1 title:	Spring Term 1 title:	Summer Term 1 title:	
Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	
Further Thermodynamics Further Analysis - NMR Carbonyl chemistry	Equilibrium in gases Acid Base Equilibrium Nitrogen based organic chemistry	Revision	
Summative assessment:	Summative assessment:	Summative assessment:	
Analysis test Thermodynamics test	Combined Eqm test Nitrogen chem test Acid-Base eqm test	2 nd PPE	
Autumn Term 2 title:	Spring Term 2 title:	Summer Term 2 title:	
Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	Intent and composite knowledge (overview):	
Kinetics and The Rate Equation Aromatic chemistry Dynamic equilibrium in solutions	Redox and electrode potentials Transition metals Redox titrations and conversions		
Summative assessment:	Summative assessment:	Summative assessment:	
Carbonyl test Kinetics test Aromatics test PPE	Electrode potential test Transition metal test Redox titrations test		

Key Stage 5 Physics			
Year title / big question:	Y12 A-Level Physics: §1 Particles, §2 Waves, §3 Forces, §4 Motion, §5 Electricity, §6 Thermal Physics & Further Mechanics	Year group:	Y12 Physics
Autumn Term 1: Maths, Particle Physics, Forces	Spring Term 1: Waves, and Mechanics	Summer Term 1: Electricity, Circular Motion	
Intent & composite knowledge (overview):	Intent & composite knowledge (overview):	Intent & composite knowledge (overview):	
On one side of the course: to assess essential practical & maths skills, and to expand students' awareness of the particle world (beginning of section 1) On the other side of the course: to begin the formal teaching of forces and their consequences (beginning of section 3)	On one side of the course: to explore wave theory and wave mathematics, including refraction & diffraction (beginning of section 2) On the other side of the course: the mathematical approach to motion problems, including the Newton's Laws (beginning of section 4)	On one side of the course: to complete the teaching of electrical circuits, including the internal resistance of cells, and Kirchhoff's Laws (to the end of section 5) On the other side of the course: to look deeper into mechanics starting with the circular motion equations (beginning of section 6)	
Summative assessment:	Summative assessment:	Summative assessment:	
Topic Tests in Maths Skills, Forces & Moments	End Section 1 exam Topic Tests in Waves, Newton's Laws	Topic Tests in Electrical Circuits, Circular Motion End of Section 5 Exam	
Autumn Term 2: Quantum Physics & Elastic Physics	Spring Term 2: Optics, and Momentum	Summer Term 2: Beginning of Year 13 work, PPE season	
Intent & composite knowledge (overview):	Intent & composite knowledge (overview):	Intent & composite knowledge (overview):	
On one side of the course: to expand students' awareness of the particle-scale world & understand the first principles of quantum physics (to the end of section 1) On the other side of the course: to explore energy and its mathematical application. To complete learning of elastic physics, and its material application (a foundation of engineering pathways) (to the end of section 3)	On one side of the course: to continue to explore wave theory and wave mathematics, including diffraction, and lasers (to the end of section 2). Begin Section 5: Electricity On the other side of the course: continuing the mathematical approach to motion problems, including the SUVAT equations and Momentum (to the end of section 4)	Finish any outstanding Y12 work/content On one side of the course: to then begin the teaching of thermal physics (part of section 6), and revise for the formal PPEs On the other side of the course: to begin the teaching of Simple Harmonic Motion, and their consequences (part of section 6), Revise for the formal PPEs	
Summative assessment:	Summative assessment:	Summative assessment:	
Topic Test in Particle Physics Y12 December PPEs, End of Section 3 exam	Topic Tests in Mechanics (SUVAT) End of Section 2 and Section 4 exams	Y12 PPEs	

Programme of Learning – Overview

Key Stage 5 Physics			
Year title / big question:	Y13 A-Level Physics: §6 Thermal Physics & Further Mechanics, §7 Fields & their Consequences, §8 Nuclear Physics, §9 Option Module	Year group:	Y13 Physics
Autumn Term 1: Thermal Physics, SHM, Circular Motion	Spring Term 1: Nuclear Physics	Summer Term 1: Full revision	
Intent & composite knowledge (overview):	Intent & composite knowledge (overview):	Intent & composite knowledge (overview):	
Complete the teaching of Section 6: <ul style="list-style-type: none"> • Circular Motion • Simple Harmonic Motion (SHM) • Thermal Physics • The Gas Laws & Kinetic Theory These will have been started in Y12 but likely unfinished. Here, they are re-addressed and finished	Completion the Fields topics (to end of Section 7) Move on to final core topic: Nuclear physics (Section 8). Building on prior knowledge, students will explore nuclear forces; radioactive decay processes; the random nature of decay and the probability mathematics that can be used; calculating the size of a nucleus, and the storing and release of nuclear energy in chain reactions (nuclear reactors).	Pupils will complete an assortment of revision tasks and activities: <ul style="list-style-type: none"> • Past Papers • Revision of Practical Physics (which has been ongoing through the two years whenever Required Practicals have been done) • Exam technique, including the “One Markers” (MCQs) 	
Summative assessment:	Summative assessment:	Summative assessment:	
Topic Tests in SHM, Thermal Physics & Gas Laws End of Section 6 Exam	Topic Tests in Magnetic Fields, Radioactivity. End of Section 7 exam	More PPE Practice if possible/necessary, including Papers 3a and 3b	
Autumn Term 2: Fields & Their Consequences	Spring Term 2: The option module	Summer Term 2: No Teaching – Y13s are on formal study leave	
Intent & composite knowledge (overview):	Intent & composite knowledge (overview):	Intent & composite knowledge (overview):	
Section 7 is a large section. We begin with Gravitational Fields, and move on to Electrical Fields, addressing the universal nature of these forces, and complex interactions between mass and charges. We then move on to Capacitors, and Electromagnetic phenomena and uses, such as motors, generators & transformers	Completion the Nuclear topics (to end of Section 8) The students will then complete one of the five option modules: <ul style="list-style-type: none"> • Engineering • Turning Points in Physics • Astrophysics • Medical Physics • Electronics Pupils sit this as part of Paper 3 with Practical Physics	Teachers can stay in contact with and offer revision to students. In school, online, via Synergy, Teams etc.	
Summative assessment:	Summative assessment:	Summative assessment:	
Topic Tests in Gravitational Fields, Electrical Fields, and Capacitance; Y13 PPEs (Typically covering Y12 content)	End of Section 8 exam; Option Module test Paper 2 PPEs (Sat in lesson time)	Y13 Formal public examinations (A-Levels)	