

Long Term Plan Year 12 Biology



Half term	Unit title	Key knowledge/ Content to learn and retain	Essential skills to acquire	Link to subject ethos and driver	Anticipated misconceptions	Links to previous KS	Opportunity for stretch for high prior attainers	SMSC & British Values	Cultural Capital	Career Link
One	Biological Molecules	The structure of Alpha and Beta glucose, starch and cellulose The structure of amino acids and proteins The structure of glycerol, fatty acids, phosphoric acids and triglycerides The role of these in the body Enzyme structure and	Level three technical and practical skills, including use of advanced glassware to carry out a wide range of investigations. Practical Microscopy and drawing of scientific diagrams Accurate measurement of substances using a variety of equipment.		Confusion between the structures of Alpha and Beta Glucose Confusion between fatty and phosphoric acids. Students have studied lock and key model at KS4, so may struggle with the concept of induced fit at KS5	In KS4, students studied carbohydrates, lipids and proteins in the context of nutrition. This unit extends this by looking at their chemical structure and role in the body. Students have previously studied enzymes, and the reactions they catalyse. They will have an understanding	Linking the structure of biological molecules to their chemical properties and therefore their role in the body	Safe working in a lab, and respecting each other's working space. Ethical issues surrounding the use of biological samples, including the use of live samples.	The ubiquity of biology allows for examples to be taught in a wide variety of familiar and unfamiliar contexts	An A-level in biology opens to doors to a wide range of STEM field careers. The topics covered in this unit would build the foundations for students to study a range of biomedical and healthcare courses or to enter these fields through employment

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		function The structure and function of DNA; including replication The structure and function of ATP The role of water in the cell	Safe handling of corrosive and toxic chemicals, including cellular stains Presenting and interpreting data in graphical and tabular form Extended writing, including producing formal lab write ups with references and citations Following written methods		of substrate specificity from KS4, and this unit expands this to look at more complex cases. Students who studied separate sciences will have a basic background on the structure of DNA, but for trilogy students this will be new.			
One into two	Cell Biology	Plant and Animal cells The structure and function of organelles Cell Specialization Comparing eukaryotic and prokaryotic	Level three technical and practical skills, including use of advanced glassware to carry out a wide range of investigations. Practical Microscopy and drawing of	Confusion changing the subject of an equation Confusion with converting units.	This first section of the cells unit follows directly on from GCSE work on cells, reviewing the work previously done and delving deeper into the structure of cells	Multi-step calculations, involving substitution into more than one learnt equation.		An A-level in biology opens to doors to a wide range of STEM field careers. The topics covered in this unit would build the foundations for students to study a range of

		cells Microscopy, including practical investigation of cellular and tissue samples	scientific diagrams Accurate measurement of substances using a variety of equipment. Safe handling of corrosive and toxic chemicals, including cellular stains Presenting and interpreting data in graphical and tabular form Extended writing, including producing formal lab write ups with references and citations Following written methods					biomedical and healthcare courses or to enter these fields through employment
Тwo	Cell Biology	Mitosis	Level three technical and	Confusion changing the	This section of the unit follows	Multi-step calculations,		An A-level in biology opens

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	Calculation and	practical skills,	subject of an	on from the	involving		to doors to a
	observation of	including use	equation	work done	substitution into		wide range of
	mitotic index	of advanced		before by	more than one		STEM field
		glassware to	Confusion with	providing an	learnt equation.		careers.
	The structure	carry out a	converting	opportunity for			
	and function of	wide range of	units.	students to			The topics
	the cell	investigations.		study			covered in this
	membrane		The differences	replication of			unit would build
		Practical	between	cells through			the foundations
	Transport	Microscopy	facilitated	practical			for students to
	across the	and drawing of	diffusion and	investigation.			study a range of
	membrane,	scientific	active transport				biomedical and
	including	diagrams					healthcare
	osmosis,						courses or to
	diffusion and	Accurate					enter these
	active transport	measurement					fields through
		of substances					employment
		using a variety					
		of equipment.					
		Safe handling					
		of corrosive					
		and toxic					
		chemicals,					
		including					
		cellular stains					
		Presenting and					
		interpreting					
		data in					
		graphical and					
		tabular form					
		Extended					
		writing,					
		including					
		producing					
		formal lab					

Two into three	Cell Biology	Cell recognition	write ups with references and citations Following written methods Level three	Confusion	This unit	Comparison of		An A-level in
Two into three	Cell Biology	Cell recognition The roles of T-Cells and B-Cells The production, structure and function of antibodies The impact of HIV on the immune system How vaccination works The production and use of monoclonal antibodies	Level three technical and practical skills, including use of advanced glassware to carry out a wide range of investigations. Practical Microscopy and drawing of scientific diagrams Accurate measurement of substances using a variety of equipment. Safe handling of corrosive and toxic chemicals, including cellular stains Presenting and	Confusion between the role of T-Cells and B-Cells The difference between HIV and AIDS Confusion between passive, innate and specific immunity.	This unit extends students' work from the previous unit on proteins to look at a very specific case of proteins in the human body.	Comparison of in vivo and in vitro antibodies		An A-level in biology opens to doors to a wide range of STEM field careers. The topics covered in this unit would build the foundations for students to study a range of biomedical and healthcare courses or to enter these fields through employment

			interpreting data in graphical and tabular form Extended writing, including producing formal lab write ups with references and citations Following written methods						
Three	Exchange with the Environment	Gas exchange systems in humans (as an example of an animal with lungs), fish and insects The structure and function of the lungs The structure and function of the heart. Absorption in the digestive system.	Dissection skills Extended writing - including writing full lab reports with references and citations Drawing and laballeing scientific diagrams Interpreting data presented in tabular and graphical format	Students often confuse the left and the right side of the heart - as these are referred to from the owner's perspective, not the observers.	This unit builds from the work done during study for Paper One at KS4. Students should already have an understanding of the general structure and function of exchange systems, which this unit explores in greater depth	Use of dissociation curves while studying haemoglobin	Safe working in a lab, and respecting each other's working space. Ethical issues surrounding the use of biological samples, including the use of live samples.	The ubiquity of biology allows for examples to be taught in a wide variety of familiar and unfamiliar contexts	An A-level in biology opens to doors to a wide range of STEM field careers. The topics covered in this unit would build the foundations for students to study a range of biomedical and healthcare courses or to enter these fields through employment

Three	Exchange	Structure	Dissectio	Confusion	This unit	Multi Step	Safe working	The ubiquity	An A-level
	with the	and	n skills	between	builds from	quantitative	in a lab, and	of biology	in biology
	Environment	function of		the role	the work	analysis	respecting	allows for	opens to
		xylem and	Extended	of the	done during		each other's	examples to	doors to a
		phloem.	writing -	xylem	study for		working	be taught in	wide range
			including	and	Paper One		space.	a wide	of STEM
		Transpirati	writing full	phloem	at KS4.		spacer	variety of	field
		on, and	lab reports	phioenn	Students		Ethical issues	familiar and	careers.
		factors	with		should		surrounding	unfamiliar	curcers.
		affecting	references		already have		the use of	contexts	The topics
		the rate	and		an		biological	CONTEXES	covered in
		of	citations		understandin		samples,		this unit
		transpirati	citations		g of the		including the		would build
		on	Drawing		general		use of live		the
		UII	and		0		samples.		foundations
			labelling		structure and		samples.		for students
			scientific						to study a
			diagrams		function of				range of
			ulagranis		exchange				biomedical
			Interpreting		systems,				
			data		which this				and
			presented		unit				healthcare
			in tabular		explores in				courses or to
			and		greater				enter these
					depth				fields
			graphical						through
			format						employment
Four	Genes,	DNA	Mathematic	Confusio	This unit	Multi Step	Safe working	The ubiquity	An A-level
	Variation	replication	al skills,	n	builds from	quantitative	in a lab, and	of biology	in biology
	and	Protein	including	between	both the	analysis	respecting	allows for	opens to
	Evolution	synthesis -	changing	meiosis	study of		each other's	examples to	doors to a
			the subject	and	genetics at		working	be taught in	wide range
		transcription and	of an	mitosis.	KS4		space.	a wide	of STEM
			equation,		- delving			variety of	field
		translation	multi step	Evolution as	deeper into		Ethical issues	familiar and	careers.
		Majaja	problem	a process	the details		surrounding	unfamiliar	
		Meiois	solving,	over time,	of each		the use of	contexts	The topics
		Natur	percentages	rather than	process.		biological		covered in
		al	, graph	occurring to			samples,		this unit
		Selecti	drawing,	one	It also builds		including the		would build
			drawing	individual	on study of		use of live		the
		on	tangents to		evolution		samples.		foundations
		Investigating	a curve,	The sense	and ecology				for students
		0 0	ratios,	and	by first				to study a
		natural	using	nonsense	revising				range of
		selection	Ŭ			1			-

	using	standard	strands of	GCSE		ecology or
	microbiology	form,	DNA as	understandin		conservation
		fractions	compared to	g before		courses or to
		and	non-coding	extending		enter these
		working		this to		
		with		include		
		powers.				

		(aseptic technique)	Extended writing - including writing full lab reports with references and citations Drawing and laballeing scientific diagrams Interpreting data presented in tabular and graphical format	DNA Confusion with converting units and changing the subject of an equation	practical, quantitative, investigation				fields through employment
Five	Genes, Variation and Evolution	Classification Biodiversity Sampling and practical investigations of biodiversity	Mathematical skills, including changing the subject of an equation, multi step problem solving, percentages, graph drawing, drawing tangents to a curve, ratios, using standard form, fractions and working with powers. Extended writing -	Confusion between the purpose and appropriate usage of different sampling techniques Use of correct binomial names		Multi Step quantitative analysis What makes something a different species?	Safe working in a lab, and respecting each other's working space. Ethical issues surrounding the use of biological samples, including the use of live samples.	The ubiquity of biology allows for examples to be taught in a wide variety of familiar and unfamiliar contexts	An A-level in biology opens to doors to a wide range of STEM field careers. The topics covered in this unit would build the foundations for students to study a range of ecology or conservation courses or to enter these fields through employment

		including writing full lab reports with references and citations Drawing and labelling scientific diagrams Interpreting data presented in tabular and graphical format			
Six	Time spent on revision and end of ye	ar assessment			