



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	<p>The structure of Alpha and Beta glucose, starch and cellulose</p> <p>The structure of amino acids and proteins</p> <p>The structure of glycerol, fatty acids, phosphoric acids and triglycerides</p> <p>The role of these in the body</p> <p>Enzyme structure and</p>	<p>Level three technical and practical skills, including use of advanced glassware to carry out a wide range of investigations.</p> <p>Practical Microscopy and drawing of scientific diagrams</p> <p>Accurate measurement of substances using a variety of equipment.</p>		<p>Confusion between the structures of Alpha and Beta Glucose</p> <p>Confusion between fatty and phosphoric acids.</p> <p>Students have studied lock and key model at KS4, so may struggle with the concept of induced fit at KS5</p>	<p>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.</p> <p>Students have previously studied enzymes, and the reactions they catalyse. They will have an understanding</p>	<p>Linking the structure of biological molecules to their chemical properties and therefore their role in the body</p>	<p>Safe working in a lab, and respecting each other's working space.</p> <p>Ethical issues surrounding the use of biological samples, including the use of live samples.</p>	<p>The ubiquity of biology allows for examples to be taught in a wide variety of familiar and unfamiliar contexts</p>	<p>An A-level in biology opens to doors to a wide range of STEM field careers.</p> <p>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</p>

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

		<p>cells</p> <p>Microscopy, including practical investigation of cellular and tissue samples</p>	<p>scientific diagrams</p> <p>Accurate measurement of substances using a variety of equipment.</p> <p>Safe handling of corrosive and toxic chemicals, including cellular stains</p> <p>Presenting and interpreting data in graphical and tabular form</p> <p>Extended writing, including producing formal lab write ups with references and citations</p> <p>Following written methods</p>							<p>biomedical and healthcare courses or to enter these fields through employment</p>
Two	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

		<p>Calculation and observation of mitotic index</p> <p>The structure and function of the cell membrane</p> <p>Transport across the membrane, including osmosis, diffusion and active transport</p>	<p>practical skills, including use of advanced glassware to carry out a wide range of investigations.</p> <p>Practical Microscopy and drawing of scientific diagrams</p> <p>Accurate measurement of substances using a variety of equipment.</p> <p>Safe handling of corrosive and toxic chemicals, including cellular stains</p> <p>Presenting and interpreting data in graphical and tabular form</p> <p>Extended writing, including producing formal lab</p>		<p>subject of an equation</p> <p>Confusion with converting units.</p> <p>The differences between facilitated diffusion and active transport</p>	<p>on from the work done before by providing an opportunity for students to study replication of cells through practical investigation.</p>	<p>involving substitution into more than one learnt equation.</p>			<p>to doors to a wide range of STEM field careers.</p> <p>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</p>
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			write ups with references and citations							
			Following written methods							
Two into three	Cell Biology	<p>Cell recognition</p> <p>The roles of T-Cells and B-Cells</p> <p>The production, structure and function of antibodies</p> <p>The impact of HIV on the immune system</p> <p>How vaccination works</p> <p>The production and use of monoclonal antibodies</p>	<p>Level three technical and practical skills, including use of advanced glassware to carry out a wide range of investigations.</p> <p>Practical Microscopy and drawing of scientific diagrams</p> <p>Accurate measurement of substances using a variety of equipment.</p> <p>Safe handling of corrosive and toxic chemicals, including cellular stains</p> <p>Presenting and</p>		<p>Confusion between the role of T-Cells and B-Cells</p> <p>The difference between HIV and AIDS</p> <p>Confusion between passive, innate and specific immunity.</p>	<p>This unit extends students' work from the previous unit on proteins to look at a very specific case of proteins in the human body.</p>	<p>Comparison of in vivo and in vitro antibodies</p>			<p>An A-level in biology opens to doors to a wide range of STEM field careers.</p> <p>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</p>

			<p>interpreting data in graphical and tabular form</p> <p>Extended writing, including producing formal lab write ups with references and citations</p> <p>Following written methods</p>							
Three	Exchange with the Environment	<p>Gas exchange systems in humans (as an example of an animal with lungs), fish and insects</p> <p>The structure and function of the lungs</p> <p>The structure and function of the heart.</p> <p>Absorption in the digestive system.</p>	<p>Dissection skills</p> <p>Extended writing - including writing full lab reports with references and citations</p> <p>Drawing and labelling scientific diagrams</p> <p>Interpreting data presented in tabular and graphical format</p>		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	<p>Safe working in a lab, and respecting each other's working space.</p> <p>Ethical issues surrounding the use of biological samples, including the use of live samples.</p>	The ubiquity of biology allows for examples to be taught in a wide variety of familiar and unfamiliar contexts	<p>An A-level in biology opens to doors to a wide range of STEM field careers.</p> <p>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</p>

Three	Exchange with the Environment	<p>Structure and function of xylem and phloem.</p> <p>Transpiration, and factors affecting the rate of transpiration</p>	<p>Dissection skills</p> <p>Extended writing - including writing full lab reports with references and citations</p> <p>Drawing and labelling scientific diagrams</p> <p>Interpreting data presented in tabular and graphical format</p>		<p>Confusion between the role of the xylem and phloem</p>	<p>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</p>	Multi Step quantitative analysis	<p>Safe working in a lab, and respecting each other's working space.</p> <p>Ethical issues surrounding the use of biological samples, including the use of live samples.</p>	The ubiquity of biology allows for examples to be taught in a wide variety of familiar and unfamiliar contexts	<p>An A-level in biology opens to doors to a wide range of STEM field careers.</p> <p>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</p>
Four	Genes, Variation and Evolution	<p>DNA replication</p> <p>Protein synthesis - transcription and translation</p> <p>Meiosis</p> <p>Natural Selection</p> <p>Investigating natural selection</p>	<p>Mathematical skills, including changing the subject of an equation, multi step problem solving, percentages, graph drawing, drawing tangents to a curve, ratios, using</p>		<p>Confusion between meiosis and mitosis.</p> <p>Evolution as a process over time, rather than occurring to one individual</p> <p>The sense and nonsense</p>	<p>This unit builds from both the study of genetics at KS4 - delving deeper into the details of each process.</p> <p>It also builds on study of evolution and ecology by first revising</p>	Multi Step quantitative analysis	<p>Safe working in a lab, and respecting each other's working space.</p> <p>Ethical issues surrounding the use of biological samples, including the use of live samples.</p>	The ubiquity of biology allows for examples to be taught in a wide variety of familiar and unfamiliar contexts	<p>An A-level in biology opens to doors to a wide range of STEM field careers.</p> <p>The topics covered in this unit would build the foundations for students to study a range of</p>

		using microbiology	standard form, fractions and working with powers.		strands of DNA as compared to non-coding	GCSE understandin g before extending this to include				ecology or conservation courses or to enter these
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		(aseptic technique)	<p>Extended writing - including writing full lab reports with references and citations</p> <p>Drawing and labelling scientific diagrams</p> <p>Interpreting data presented in tabular and graphical format</p>		DNA	practical, quantitative, investigation				fields through employment
Five	Genes, Variation and Evolution	<p>Classification</p> <p>Biodiversity</p> <p>Sampling and practical investigations of biodiversity</p>	<p>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.</p> <p>Extended writing -</p>		<p>Confusion between the purpose and appropriate usage of different sampling techniques</p> <p>Use of correct binomial names</p>		<p>Multi Step quantitative analysis</p> <p>What makes something a different species?</p>	<p>Safe working in a lab, and respecting each other's working space.</p> <p>Ethical issues surrounding the use of biological samples, including the use of live samples.</p>	<p>The ubiquity of biology allows for examples to be taught in a wide variety of familiar and unfamiliar contexts</p>	<p>An A-level in biology opens to doors to a wide range of STEM field careers.</p> <p>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</p>

			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 year assessment									