

Long Term Plan: Biology Year 13 (Teacher Two)

“Science is simply the word we use to describe a method of organising our curiosity.”

Half term	Unit title	Key knowledge/ Content to learn and retain	Essential skills to acquire (subject & generic)	Anticipated misconceptions	Links to previous KS	Opportunity for stretch for high prior attainers
One	Energy Transfers (This topic spans across 2 half terms)	Light dependant and light independent reactions of photosynthesis Leaf pigment chromatography The biochemistry of respiration, including detail of glycolysis, the Krebs Cycle and oxidative phosphorylation	Level three technical and practical skills, including use of advanced glassware to carry out a wide range of investigations. 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	The various stages, substrates and enzymes of photosynthesis and respiration are very easy to confuse and so will need lots of explicit practice and over teaching	Students will have a very general overview of the starting materials and end products of photosynthesis and respiration; however the vast majority of this unit will be brand new to them.	Control points of respiration - why are they there and what makes them points at which the rate can be controlled?
SMSC & British Values	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.					
Cultural Capital	The ubiquity of biology allows for examples to be taught in a wide variety of familiar and unfamiliar contexts					
Career Link	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 conservation or ecology courses or to enter these fields through employment					

Two	Energy Transfers (This topic spans across 2 half terms)	Biomass GPP and NPP Food chains and webs - including the importance of simplifying human food chains Nitrogen and phosphorus cycles Minerals in plant growth	Level three technical and practical skills, including use of advanced glassware to carry out a wide range of investigations. 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	Confusion between the nitrogen and phosphorus cycles	This unit follows on directly from work students have previously done on the carbon and water cycles - extending it to look at two other examples of biological cycles.	Combining cycles and carrying out quantitative analysis
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Three	Control of Gene Expression (This topic spans across 2 half terms)	Cause and impact of genetic mutations The use of Stem Cells Tissue culture, including practical investigation Transcription factors and epigenetics	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 heritability of genetic and epigenetic information	This unit follows directly on the end of Y12 work on genetics, with much of the content being new to students.	Comparing methods of tissue culture

			<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>			
SMSC & British Values	<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>					
Cultural Capital	The ubiquity of biology allows for examples to be taught in a wide variety of familiar and unfamiliar contexts					
Career Link	<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 conservation or ecology courses or to enter these fields through employment</p>					
Four	Control of Gene Expression (This topic spans across 2 half terms)	<p>Tumors</p> <p>DNA Sequencing technology</p> <p>PCR and Gel electrophoresis</p> <p>DNA fingerprinting and diagnosis of genetic disorders</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 interpreting data in graphical and tabular form</p> <p>Extended writing, including producing formal lab write ups with references and citations</p>	Confusion between the methodology and application of the different genetic technologies studied.	This unit follows directly on the end of Y12 work on genetics, with much of the content being new to students.	Comparing genetic technologies

			Following written methods			
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Cultural Capital	The ubiquity of biology allows for examples to be taught in a wide variety of familiar and unfamiliar contexts					
Career Link	<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 conservation or ecology courses or to enter these fields through employment</p>					
Five	<p>Revision and preparation for A-Level exams</p> <p>Revisit to subject knowledge from across the course & use of PLC to ensure that students have a good grasp of all aspects of the specification</p> <p>Use of retrieval quizzes and activities to identify gaps in SK and misconceptions</p> <p>Support students in developing summary notes, flash cards etc to aid retrieval of key facts</p> <p>Ensure that students have the necessary skills for effective revision</p> <p>Review the wider reading that students have been doing to support their preparation for the essay question.</p> <p>CPAC</p> <p>Ensure that CPAC evidence is in place for all students for all required practical work</p>					
Six	<p>Revision and preparation for A-Level exams</p> <p>Focus on past exam questions and papers – command words and application of knowledge</p> <p>Practice the application of knowledge that draws upon the practical aspects of the course</p> <p>Specific focus on the essay question for paper 3</p> <p>Timed completion of questions to support with pace through the exam paper</p> <p>SLOP style activities to ensure that all are prepared for the aspects of maths that will be present on the exam papers</p>					