

## Biology Curriculum Overview – Year 12

Sequencing of topics	What knowledge will students develop? (Including key terminology)	What skills will students develop? (Including literacy & numeracy)	Assessment opportunities	Homework opportunities	Personal development (Ursuline Values, Catholic Social Teaching, Cultural Capital, Cross-curricular, Careers)	Curriculum links
<b>Autumn Term 1</b>						
<p>Topic 1: Lifestyle, health and disease</p>	<ul style="list-style-type: none"> <li>○ Understand the importance of water as a solvent in transport, including its dipole nature.</li> <li>○ Know the difference between monosaccharides, disaccharides and polysaccharides, including glycogen and starch (amylose and amylopectin).</li> <li>○ Be able to relate the structures of monosaccharides, disaccharides and polysaccharides to their roles in providing and storing energy (<math>\beta</math>-glucose and cellulose are not required in this topic).</li> <li>○ Know how monosaccharides join to form disaccharides (sucrose, lactose and maltose) and polysaccharides (glycogen and amylose) through condensation reactions forming glycosidic bonds, and how these can be split through hydrolysis reactions.</li> <li>○ Know how a triglyceride is synthesised by the formation of ester bonds during condensation reactions between glycerol and three fatty acids.</li> <li>○ Know the differences between saturated and unsaturated lipids.</li> <li>○ Understand why many animals have a heart and circulation (mass transport to overcome limitations of diffusion in meeting the requirements of organisms).</li> <li>○ Know the cardiac cycle (atrial systole, ventricular systole and cardiac diastole) and relate the</li> </ul>	<ul style="list-style-type: none"> <li>○ Magnification</li> <li>○ Rearranging equations</li> <li>○ Order of magnitude</li> <li>○ Drawing results tables</li> <li>○ Analysing results</li> <li>○ Calculating an average</li> <li>○ Drawing graphs</li> <li>○ Interpreting graphs</li> <li>○ SD</li> <li>○ Serial dilutions</li> <li>○ Calculating concentration</li> <li>○ Unit conversion</li> <li>○ Causation and correlation</li> <li>○ Risk</li> <li>○ Probability</li> <li>○ Percentage change</li> <li>○ Scientific report writing</li> <li>○ Essay writing</li> <li>○ Reading scientific articles</li> <li>○ Mid-topic assessments</li> <li>○ Exam technique</li> </ul>	<ul style="list-style-type: none"> <li>○ Summative assessment</li> <li>○ Formative assessment</li> <li>○ CPAC skills assessment</li> <li>○ Scientific report writing</li> </ul>	<ul style="list-style-type: none"> <li>○ Practice exam questions done throughout</li> <li>○ Research Tasks/Projects</li> <li>○ Flipped Learning worksheet</li> <li>○ Satchel/Neeto Quizzes</li> </ul>	<ul style="list-style-type: none"> <li>○ <b>United in harmony</b> when we consider the wider uses CV treatment</li> <li>○ <b>Grateful</b> for the beauty in a cell and how it works</li> <li>○ <b>Faith-filled and hopeful</b> when seeing beyond the naked eye</li> <li>○ <b>Discerning and joyful</b> at the possibilities of science and medicine</li> <li>○ <b>Leading others in pursuit of justice</b> when planning and carrying out a practical</li> <li>○ <b>Service and sacrifice</b> when we recognise the scientific work that has been done before us</li> </ul>	<ul style="list-style-type: none"> <li>KS1/2               <ul style="list-style-type: none"> <li>○ Digestion</li> <li>○ Nutrient transport in animals</li> <li>○ Healthy human development</li> </ul> </li> <li>KS3               <ul style="list-style-type: none"> <li>○ Y7 Cells</li> <li>○ Y8 Digestion</li> <li>○ Y8 Respiration</li> </ul> </li> <li>KS4               <ul style="list-style-type: none"> <li>○ Y10 Cell transport</li> <li>○ Y10 Homeostasis and the NS</li> <li>○ Y10 Respiration</li> <li>○ Y11 Enzymes and the digestive system</li> <li>○ Y11 Circulatory system</li> </ul> </li> <li>KS5               <ul style="list-style-type: none"> <li>○ Topic 2,3,7,8</li> </ul> </li> </ul>

	<p>structure and operation of the mammalian heart, including the major blood vessels, to its function.</p> <ul style="list-style-type: none"> <li>○ Know how the relationship between heart structure and function can be investigated practically. (Dissection)</li> <li>○ Understand how the structures of blood vessels (capillaries, arteries and veins) relate to their functions.</li> <li>○ <b>CORE PRACTICAL 1:</b> Investigate the effect of caffeine on heart rate in daphnia. (CPAC 1,4,8)</li> <li>○ Discuss the potential ethical issues regarding the use of invertebrates in research.</li> <li>○ Understand the blood-clotting process (thromboplastin release, conversion of prothrombin to thrombin and fibrinogen to fibrin) and its role in cardiovascular disease (CVD).</li> <li>○ Understand the course of events that leads to atherosclerosis (endothelial dysfunction, inflammatory response, plaque formation, raised blood pressure)</li> <li>○ Know how factors such as genetic, diet, age, gender, high blood pressure, smoking and inactivity increase the risk of cardiovascular disease (CVD).</li> <li>○ Know the benefits and risks of treatments for cardiovascular disease (CVD) (antihypertensives, statins, anticoagulants and platelet inhibitors).</li> <li>○ Be able to analyse and interpret data on the possible significance for health of blood cholesterol levels and levels of high-density lipoproteins (HDLs) and low-density lipoproteins (LDLs).</li> <li>○ Know the evidence for a causal relationship between blood cholesterol levels (total cholesterol and LDL cholesterol) and cardiovascular disease (CVD).</li> <li>○ Understand how people use scientific knowledge about the effects of diet including obesity indicators body mass index and waist-to-hip ratio,</li> </ul>				<ul style="list-style-type: none"> <li>○ <b>Dignity of the human person</b> when considering healthcare</li> <li>○ <b>Discerning and joyful</b> when we consider the future of medical healthcare</li> <li>○ <b>Loving and compassionate/ Serviam</b> when students consider a career helping others</li> <li>○ <b>Dignity and compassion/ rights and responsibilities/ humility and gentleness</b> for those organisms that we use in our practicals</li> <li>○ Dignity of God's people</li> <li>○ Community and participation</li> <li>○ Care for creation</li> <li>○ Dignity of work</li> <li>○ Peace and reconciliation</li> <li>○ Solidarity</li> <li>○ Personal</li> <li>○ Social</li> <li>○ Physical</li> <li>○ Spiritual</li> <li>○ Moral</li> <li>○ Cultural</li> </ul>	
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	<p>exercise and smoking to reduce their risk of coronary heart disease.</p> <ul style="list-style-type: none"> <li>○ <b>CORE PRACTICAL 2:</b> Investigate the vitamin C content of food and drink. (CPAC 3 and 6)</li> <li>○ Be able to analyse and interpret quantitative data on illness and mortality rates to determine health risks (including distinguishing between correlation and causation and recognising conflicting evidence).</li> <li>○ Be able to analyse data on energy budgets and diet.</li> <li>○ Understand the consequences of energy imbalance, including weight loss, weight gain, and development of obesity.</li> <li>○ Be able to evaluate the design of studies used to determine health risk factors including sample selection and sample size used to collect data that is both valid and reliable.</li> <li>○ Understand why people’s perceptions of risks are often different from the actual risks including underestimating and overestimating the risks due to diet and other lifestyle factors in the development of heart disease.</li> </ul>				<ul style="list-style-type: none"> <li>○ BTEC Health and social care</li> <li>○ BTEC Applied human biology</li> <li>○ BTEC PE</li> <li>○ A-level Sociology</li> <li>○ BTEC Sociology</li> <li>○ A-level Psychology</li> <li>○ BTEC Psychology</li> <li>○ A-level Chemistry</li> <li>○ A-level Maths</li> <li>○ Biomedical scientist</li> <li>○ Biochemist</li> <li>○ Doctor</li> <li>○ Nurse</li> <li>○ Epidemiologist</li> <li>○ Research</li> <li>○ Nutritionist</li> <li>○ Charity work</li> <li>○ Risk analysis</li> </ul>	
<b>Autumn Term 2</b>						
<p>Topic 2: Genes and health</p>	<ul style="list-style-type: none"> <li>○ Know the structure and properties of cell membranes.</li> <li>○ Understand how models such as the fluid mosaic model of cell membranes are interpretations of data used to develop scientific explanations of the structure and properties of cell membranes.</li> <li>○ Understand what is meant by osmosis in terms of the movement of free water molecules through a partially permeable membrane (consideration of water potential is not required).</li> <li>○ Understand what is meant by passive transport (diffusion, facilitated diffusion), active transport</li> </ul>	<ul style="list-style-type: none"> <li>○ Magnification</li> <li>○ Rearranging equations</li> <li>○ Order of magnitude</li> <li>○ Drawing results tables</li> <li>○ Analysing results</li> <li>○ Calculating an average</li> <li>○ Drawing graphs</li> <li>○ Interpreting graphs</li> <li>○ SD</li> <li>○ Serial dilutions</li> <li>○ Calculating concentration</li> </ul>	<ul style="list-style-type: none"> <li>○ Summative assessment</li> <li>○ Formative assessment</li> <li>○ CPAC skills assessment</li> <li>○ Scientific report writing</li> </ul>	<ul style="list-style-type: none"> <li>○ Practice exam questions done throughout</li> <li>○ Research Tasks/Projects</li> <li>○ Flipped Learning worksheet</li> <li>○ Satchel/Neeto Quizzes</li> </ul>	<ul style="list-style-type: none"> <li>○ <b>United in harmony</b> when we appreciate the role of scientific breakthroughs</li> <li>○ <b>Grateful</b> for the beauty in a cell and how it works</li> <li>○ <b>Faith-filled and hopeful</b> when seeing</li> </ul>	<p>KS1/2</p> <ul style="list-style-type: none"> <li>○ Healthy human development</li> <li>○ Genetic variation</li> </ul> <p>KS3</p> <ul style="list-style-type: none"> <li>○ Y7 Cells</li> <li>○ Y7 Variation</li> <li>○ Y7 Human reproduction</li> <li>○ Y8 Inheritance</li> <li>○ Y8 Breathing</li> </ul>

	<p>(including the role of ATP as an immediate source of energy), endocytosis and exocytosis.</p> <ul style="list-style-type: none"> <li>○ Understand the involvement of carrier and channel proteins in membrane transport.</li> <li>○ Know the properties of gas exchange surfaces in living organisms (large surface area to volume ratio, thickness of surface, difference in concentration).</li> <li>○ Understand how the rate of diffusion is dependent on these properties and can be calculated using Fick's Law of Diffusion.</li> <li>○ Understand how the structure of the mammalian lung is adapted for rapid gaseous exchange.</li> <li>○ <b>CORE PRACTICAL 3:</b> Investigate membrane structure, including the effect of alcohol concentration or temperature on membrane permeability. (CPAC 1,3,5,8)</li> <li>○ Know the basic structure of an amino acid (structures of specific amino acids are not required).</li> <li>○ Understand the formation of polypeptides and proteins (amino acid monomers linked by peptide bonds in condensation reactions).</li> <li>○ Understand the significance of a protein's primary structure in determining its three-dimensional structure and properties (globular and fibrous proteins and the types of bonds involved in its three-dimensional structure).</li> <li>○ Understand the mechanism of action and the specificity of enzymes in terms of their three-dimensional structure.</li> <li>○ Understand that enzymes are biological catalysts that reduce activation energy.</li> <li>○ Know that there are intracellular enzymes catalysing reactions inside cells and extracellular enzymes produced by cells catalysing reactions outside of cells.</li> </ul>	<ul style="list-style-type: none"> <li>○ Unit conversion</li> <li>○ Rates of reaction</li> <li>○ Genetic diagrams</li> <li>○ Scientific report writing</li> <li>○ Essay writing</li> <li>○ Reading scientific articles</li> <li>○ Mid-topic assessments</li> <li>○ Exam technique</li> </ul>			<p>beyond the naked eye</p> <ul style="list-style-type: none"> <li>○ <b>Discerning and joyful</b> at the possibilities of science and medicine</li> <li>○ <b>Leading others in pursuit of justice</b> when planning and carrying out a practical</li> <li>○ <b>Service and sacrifice</b> when we recognise the scientific work that has been done before us</li> <li>○ <b>Dignity of the human person</b> when considering healthcare</li> <li>○ <b>Discerning and joyful</b> when we consider the future of medical healthcare</li> <li>○ <b>Loving and compassionate/ Serviam</b> when students consider a career</li> </ul>	<p>KS4</p> <ul style="list-style-type: none"> <li>○ Y9 Evolution (variation)</li> <li>○ Y10 Cell transport</li> <li>○ Y10 Respiration</li> <li>○ Y11 Circulatory system and NCD</li> <li>○ Y11 Cell division and reproduction</li> </ul> <p>KS5</p> <ul style="list-style-type: none"> <li>○ Topic 1,3,6,7,8</li> </ul>
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	<ul style="list-style-type: none"> <li>○ <b>CORE PRACTICAL 4:</b> Investigate the effect of enzyme <b>and</b> substrate concentrations on the initial rates of reactions. (CPAC 1,3,5,6)</li> <li>○ Know the basic structure of mononucleotides (deoxyribose or ribose linked to a phosphate and a base, including thymine, uracil, cytosine, adenine or guanine) and the structures of DNA and RNA (polynucleotides composed of mononucleotides linked through condensation reactions).</li> <li>○ Know how complementary base pairing and the hydrogen bonding between two complementary strands are involved in the formation of the DNA double helix.</li> <li>○ Describe DNA replication (including the role of DNA polymerase) and how Meselson and Stahl's classic experiment provided new data which supported the accepted theory of replication of DNA and refuted competing theories.</li> <li>○ Understand the process of DNA replication, including the role of DNA polymerase.</li> <li>○ Understand how Meselson and Stahl's classic experiment provided new data that supported the accepted theory of replication of DNA and refuted competing theories.</li> <li>○ Understand the process of protein synthesis (transcription) including the role of RNA polymerase, translation, messenger RNA, transfer RNA, ribosomes and the role of start and stop codons.</li> <li>○ Understand the roles of the DNA template (antisense) strand in transcription, codons on messenger RNA and anticodons on transfer RNA.</li> <li>○ Understand the nature of the genetic code (triplet code, non-overlapping and degenerate).</li> <li>○ Know that a gene is a sequence of bases on a DNA molecule that codes for a sequence of amino acids in a polypeptide chain.</li> </ul>				<ul style="list-style-type: none"> <li>○ helping others</li> <li>○ <b>Family and community</b> when we consider the impact of genetic disease</li> <li>○ Dignity of God's people</li> <li>○ Community and participation</li> <li>○ Care for creation</li> <li>○ Dignity of work</li> <li>○ Peace and reconciliation</li> <li>○ Solidarity</li> <li>○ Personal</li> <li>○ Social</li> <li>○ Physical</li> <li>○ Spiritual</li> <li>○ Moral</li> <li>○ Cultural</li> <li>○ BTEC Health and social care</li> <li>○ BTEC Applied human biology</li> <li>○ BTEC PE</li> <li>○ A-level Sociology</li> <li>○ BTEC Sociology</li> <li>○ A-level Psychology</li> <li>○ BTEC Psychology</li> </ul>	
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	<ul style="list-style-type: none"> <li>○ Understand how errors in DNA replication can give rise to mutations.</li> <li>○ Understand how cystic fibrosis results from one of a number of possible gene mutations.</li> <li>○ Know the meaning of the terms: gene, allele, genotype, phenotype, recessive, dominant, incomplete dominance, homozygote and heterozygote.</li> <li>○ Understand patterns of inheritance, including the interpretation of genetic pedigree diagrams, in the context of monohybrid inheritance.</li> <li>○ Understand how the expression of a gene mutation in people with cystic fibrosis impairs the functioning of the gaseous exchange, digestive and reproductive systems.</li> <li>○ Understand the uses of genetic screening, including the identification of carriers, pre-implantation genetic diagnosis (PGD) and prenatal testing, including amniocentesis and chorionic villus sampling.</li> <li>○ Understand the implications of prenatal genetic screening.</li> <li>○ Be able to identify and discuss the social and ethical issues related to genetic screening from a range of ethical viewpoints.</li> </ul>				<ul style="list-style-type: none"> <li>○ A-level Chemistry</li> <li>○ A-level Maths</li> <li>○ Biomedical scientist</li> <li>○ Biochemist</li> <li>○ Doctor</li> <li>○ Nurse</li> <li>○ Epidemiologist</li> <li>○ Research</li> <li>○ Radiographer</li> <li>○ Midwife</li> <li>○ Gynaecology</li> <li>○ Geneticist</li> </ul>	
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**Spring Term 1**

<p>Topic 3: Voice of the genome</p>	<ul style="list-style-type: none"> <li>○ Know that all living organisms are made of cells, sharing some common features.</li> <li>○ Know the ultrastructure of eukaryotic cells, including nucleus, nucleolus, ribosomes, rough and smooth endoplasmic reticulum, mitochondria, centrioles, lysosomes, and Golgi apparatus.</li> <li>○ Understand the role of the rough endoplasmic reticulum (Rer) and the Golgi apparatus in protein transport within cells, including their role in the formation of extracellular enzymes.</li> </ul>	<ul style="list-style-type: none"> <li>○ Magnification</li> <li>○ Rearranging equations</li> <li>○ Order of magnitude</li> <li>○ Drawing results tables</li> <li>○ Analysing results</li> <li>○ Calculating an average</li> <li>○ Drawing graphs</li> <li>○ Interpreting graphs</li> <li>○ SD</li> </ul>	<ul style="list-style-type: none"> <li>○ Summative assessment</li> <li>○ Formative assessment</li> <li>○ CPAC skills assessment</li> <li>○ Scientific report writing</li> </ul>	<ul style="list-style-type: none"> <li>○ Practice exam questions done throughout</li> <li>○ Research Tasks/Projects</li> <li>○ Flipped Learning worksheet</li> <li>○ Satchel/Neeto Quizzes</li> </ul>	<ul style="list-style-type: none"> <li>○ <b>United in harmony</b> when we appreciate the role of scientific breakthroughs</li> <li>○ <b>Grateful</b> for the beauty in a cell and how it works</li> </ul>	<p>KS1/2</p> <ul style="list-style-type: none"> <li>○ Healthy human development</li> <li>○ Genetic variation</li> </ul> <p>KS3</p> <ul style="list-style-type: none"> <li>○ Y7 Cells</li> <li>○ Y7 Variation</li> <li>○ Y7 Human reproduction</li> <li>○ Y8 Inheritance</li> </ul>
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	<ul style="list-style-type: none"> <li>○ Know the ultrastructure of prokaryotic cells, including cell wall, capsule, plasmid, flagellum, pili, ribosomes, mesosomes and circular DNA.</li> <li>○ Be able to recognise the organelles in 3.2 from electron microscope (EM) images.</li> <li>○ Understand the role of mitosis and the cell cycle in producing identical daughter cells for growth and asexual reproduction.</li> <li>○ Understand why the cells of multicellular organisms are organised into tissues, tissues into organs and organs into systems.</li> <li>○ <b>CORE PRACTICAL 5:</b> Understand how to prepare and stain a root tip squash to observe the stages of mitosis. (CPAC 3,4,5,8,10)</li> <li>○ Understand how mammalian gametes are specialised for their functions (including the acrosome in sperm and the zona pellucida in the egg).</li> <li>○ Know the process of fertilisation in mammals, including the acrosome reaction, the cortical reaction and the fusion of nuclei.</li> <li>○ Know that a locus (loci) is the location of genes on a chromosome.</li> <li>○ Understand the linkage of genes on a chromosome and sex linkage.</li> <li>○ Understand the role of meiosis in ensuring genetic variation through the production of non-identical gametes as a consequence of independent assortment of chromosomes and crossing over of alleles between chromatids (details of the stages of meiosis are not required).</li> <li>○ Understand what is meant by the terms 'stem cell, pluripotency and totipotency'.</li> <li>○ Be able to discuss the way society uses scientific knowledge to make decisions about the use of stem cells in medical therapies.</li> </ul>	<ul style="list-style-type: none"> <li>○ Serial dilutions</li> <li>○ Calculating concentration</li> <li>○ Unit conversion</li> <li>○ Probability</li> <li>○ Genetic diagrams</li> <li>○ Scientific report writing</li> <li>○ Essay writing</li> <li>○ Reading scientific articles</li> <li>○ Mid-topic assessments</li> <li>○ Exam technique</li> </ul>			<ul style="list-style-type: none"> <li>○ <b>Faith-filled and hopeful</b> when seeing beyond the naked eye</li> <li>○ <b>Discerning and joyful</b> at the possibilities of science and medicine</li> <li>○ <b>Leading others in pursuit of justice</b> when planning and carrying out a practical</li> <li>○ <b>Service and sacrifice</b> when we recognise the scientific work that has been done before us</li> <li>○ <b>Dignity of the human person</b> when considering healthcare</li> <li>○ <b>Discerning and joyful</b> when we consider the future of medical healthcare</li> <li>○ <b>Loving and compassionate/ Serviam</b> when</li> </ul>	<p>KS4</p> <ul style="list-style-type: none"> <li>○ Y9 Evolution (variation)</li> <li>○ Y10 Cell transport</li> <li>○ Y10 Respiration</li> <li>○ Y11 Circulatory system and NCD</li> <li>○ Y11 Cell division and reproduction</li> </ul> <p>KS5</p> <ul style="list-style-type: none"> <li>○ Topic 1,2,6,7,8</li> </ul>
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	<ul style="list-style-type: none"> <li>○ Understand how cells become specialised through differential gene expression, producing active mRNA leading to synthesis of proteins, which in turn control cell processes or determine cell structure in animals and plants including lac operon.</li> <li>○ Understand how phenotype is the result of an interaction between genotype and the environment.</li> <li>○ Know how epigenetic changes (including DNA methylation and histone modification) can modify the activation of certain genes.</li> <li>○ Understand how epigenetic changes can be passed on following cell division.</li> <li>○ Understand how some phenotypes are affected by multiple alleles for the same gene at many loci (polygenic inheritance) as well as the environment and how this can give rise to phenotypes that show continuous variation.</li> </ul>				<p>students consider a career helping others</p> <ul style="list-style-type: none"> <li>○ <b>Family and community</b> when we consider the impact of genetic disease</li> <li>○ Dignity of God's people</li> <li>○ Community and participation</li> <li>○ Care for creation</li> <li>○ Dignity of work</li> <li>○ Peace and reconciliation</li> <li>○ Solidarity</li> <li>○ Personal</li> <li>○ Social</li> <li>○ Physical</li> <li>○ Spiritual</li> <li>○ Moral</li> <li>○ Cultural</li> <li>○ BTEC Health and social care</li> <li>○ BTEC Applied human biology</li> <li>○ BTEC PE</li> <li>○ A-level Sociology</li> <li>○ BTEC Sociology</li> </ul>	
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**Spring Term 2**

<p>Topic 4: Biodiversity and natural resources</p>	<ul style="list-style-type: none"> <li>○ Know the ultrastructure of plant cells (cell walls, chloroplasts, amyloplasts, vacuole, tonoplast, plasmodesmata, pits and middle lamella) and be able to compare it with animal cells.</li> <li>○ Be able to recognise the organelles in 4.7 from electron microscope (EM) images.</li> <li>○ Understand the structure and function of the polysaccharides starch and cellulose, including the role of hydrogen bonds between <math>\beta</math>-glucose molecules in the formation of cellulose microfibrils.</li> <li>○ Understand how the arrangement of cellulose microfibrils and secondary thickening in plant cell walls contributes to the physical properties of xylem vessels and sclerenchyma fibres in plant fibres that can be exploited by humans.</li> <li>○ Know the similarities and differences between the structures, position in the stem and function of sclerenchyma fibres (support), xylem vessels (support and transport of water and mineral</li> </ul>	<ul style="list-style-type: none"> <li>○ Magnification</li> <li>○ Rearranging equations</li> <li>○ Order of magnitude</li> <li>○ Drawing results tables</li> <li>○ Analysing results</li> <li>○ Calculating an average</li> <li>○ Drawing graphs</li> <li>○ Interpreting graphs</li> <li>○ SD</li> <li>○ Serial dilutions</li> <li>○ Calculating concentration</li> <li>○ Unit conversion</li> <li>○ Hardy-Weinberg</li> <li>○ SSDI</li> <li>○ Measuring biodiversity</li> <li>○ Species richness</li> <li>○ Species evenness</li> </ul>	<ul style="list-style-type: none"> <li>○ Summative assessment</li> <li>○ Formative assessment</li> <li>○ CPAC skills assessment</li> <li>○ Scientific report writing</li> </ul>	<ul style="list-style-type: none"> <li>○ Practice exam questions done throughout</li> <li>○ Research Tasks/Projects</li> <li>○ Flipped Learning worksheet</li> <li>○ Satchel/Neeto Quizzes</li> </ul>	<ul style="list-style-type: none"> <li>○ <b>United in harmony</b> when we consider the biodiversity of species and the importance of maintaining this worldwide</li> <li>○ <b>Grateful</b> for the beauty in a cell and how it works</li> <li>○ <b>Faith-filled and hopeful</b> when seeing beyond the naked eye and the impact of</li> </ul>	<p>KS1/2</p> <ul style="list-style-type: none"> <li>○ Animal life cycles</li> <li>○ Plant growth and health</li> <li>○ Adaptation</li> <li>○ Function of plant parts</li> <li>○ Animal survival</li> <li>○ Classification</li> <li>○ Habitats</li> <li>○ Food chains</li> <li>○ Adaptation and the environment</li> </ul> <p>KS3</p> <ul style="list-style-type: none"> <li>○ Y7 Cells</li> <li>○ Y7 Interdependence</li> <li>○ Y8 Evolution</li> </ul> <p>KS4</p> <ul style="list-style-type: none"> <li>○ Y9 Evolution</li> <li>○ Y10</li> <li>○ photosynthesis</li> </ul>
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	<p>ions) and phloem (translocation of organic solutes).</p> <ul style="list-style-type: none"> <li>○ <b>CORE PRACTICAL 6:</b> Identify sclerenchyma fibres, phloem sieve tubes and xylem vessels and their location within stems through a light microscope. (CPAC 3,4,5,8,10)</li> <li>○ <b>CORE PRACTICAL 8:</b> Determine the tensile strength of plant fibres practically. (CPAC 1,2,3,8)</li> <li>○ Understand the importance of water and inorganic ions (nitrate, calcium ions and magnesium ions) to plants.</li> <li>○ Understand how the uses of plant fibres and starch may contribute to sustainability, including plant-based products to replace oil-based plastics.</li> <li>○ <b>CORE PRACTICAL 7:</b> Understand how to investigate plant mineral deficiencies practically. (CPAC 1,2,3,5,6,8)</li> <li>○ Understand the development of drug testing from historic to contemporary protocols, including William Withering’s digitalis soup, double blind trials, placebo, three-phased testing.</li> <li>○ Understand the conditions required for bacterial growth.</li> <li>○ <b>CORE PRACTICAL 9:</b> Investigate the antimicrobial properties of plants, including aseptic techniques for the safe handling of bacteria.(CPAC 1,3,5,8,9)</li> <li>○ Know that over time the variety of life has become extensive but is now being threatened by human activity.</li> <li>○ Understand the terms biodiversity and endemism.</li> <li>○ Know how biodiversity can be measured within a habitat using species richness and within a species using genetic diversity by calculating the heterozygosity index (H):</li> </ul>	<ul style="list-style-type: none"> <li>○ Scientific report writing</li> <li>○ Essay writing</li> <li>○ Reading scientific articles</li> <li>○ Mid-topic assessments</li> <li>○ Exam technique</li> </ul>			<p>plants on our lives</p> <ul style="list-style-type: none"> <li>○ <b>Discerning and joyful</b> at the possibilities of science and medicine</li> <li>○ <b>Leading others in pursuit of justice</b> when planning and carrying out a practical</li> <li>○ <b>Service and sacrifice</b> when we recognise the scientific work that has been done before us</li> <li>○ Dignity of God’s people</li> <li>○ Community and participation</li> <li>○ Care for creation</li> <li>○ Dignity of work</li> <li>○ Peace and reconciliation</li> <li>○ Solidarity</li> <li>○ Personal</li> <li>○ Social</li> <li>○ Physical</li> <li>○ Spiritual</li> <li>○ Moral</li> <li>○ Cultural</li> </ul>	<ul style="list-style-type: none"> <li>○ Y10 Ecosystems and trophic levels</li> <li>○ Y11 Effect of humans</li> </ul> <p>KS5</p> <ul style="list-style-type: none"> <li>○ Topic 5,7</li> </ul>
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	<ul style="list-style-type: none"> <li>○ <math>H = \frac{\text{number of heterozygotes}}{\text{number of individuals in the population}}</math></li> <li>○ Know how biodiversity can be compared in different habitats using Simpson's diversity index (D):  <math display="block">(D) = \frac{N(N - 1)}{\sum n(n - 1)}</math> </li> <li>○ Understand the concept of niche and be able to discuss examples of adaptation of organisms to their environment (behavioural, physiological and anatomical).</li> <li>○ Understand how natural selection can lead to adaptation and evolution.</li> <li>○ Understand how the Hardy-Weinberg equation can be used to see whether a change in allele frequency is occurring in a population over time.</li> <li>○ Understand that reproductive isolation can lead to accumulation of different genetic information in populations potentially leading to the formation of new species.</li> <li>○ Understand that classification is a means of organising the variety of life based on relationships between organisms using differences and similarities in phenotypes and in genotypes, and is built around the species concept.</li> <li>○ Understand the process and importance of critical evaluation of new data by the scientific community, which leads to new taxonomic groupings, including the three domains of life based on molecular phylogeny, which are Bacteria, Archaea, Eukaryota.</li> <li>○ Be able to evaluate the methods used by zoos and seed banks in the conservation of endangered species and their genetic diversity, including scientific research, captive breeding programmes, reintroduction programmes and education.</li> </ul>				<ul style="list-style-type: none"> <li>○ BTEC Health and social care</li> <li>○ BTEC Applied human biology</li> <li>○ BTEC PE</li> <li>○ A-level Sociology</li> <li>○ BTEC Sociology</li> <li>○ A-level Psychology</li> <li>○ BTEC Psychology</li> <li>○ A-level Chemistry</li> <li>○ A-level Maths</li> <li>○ Biomedical scientist</li> <li>○ Biochemist</li> <li>○ Environmentalist</li> <li>○ Zoologist</li> <li>○ Botanist</li> <li>○ Biology</li> <li>○ Research</li> <li>○ Geneticist</li> <li>○ Statistics</li> </ul>	
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## Summer Term

The curriculum for the summer term is determined by the progress and achievements of each A-Level group individually. For example, a group that is achieving as expected may proceed to Year 13 Biology topics, however, a group that is underperforming will require revision and intervention. In this manner our Biology curriculum is adapted to suit the unique needs of each group. The outcomes of this decision might be:

- Continuation of the A-level Biology course (Year 13 topics)
- Revision of Year 12 content
- Exam technique review
- Math skills
- CPAC practical skills review