

Curriculum Content Map			Subject: Biology Combined Science Year 11											
		Month	Term 1				Term 2				Revision			
	Units of Work		September B8 Photosynthesis B9 Respiration B10 The Human nervous system	October B11 Hormonal communication B12 Homeostasis in action	November B12 Homeostasis in action B13 Reproduction	December Revision	January B13 Reproduction B14 Variation and Evolution	February B15 Genetics and evolution	March B15 Genetics and evolution B16 Adaptation, interdependence and competition	April B16 Adaptation, interdependence and competition B17 Organising an ecosystem	May B18 Biodiversity and ecosystems	June Revision	July Revision	
Cultural Transmission	National Curriculum area – KS4		Photosynthesis • photosynthesis as the key process for food production and therefore biomass for life • the process of photosynthesis • factors affecting the rate of photosynthesis. Transport systems • the need for transport systems in multicellular organisms, including plants The relationship between the structure and function of the human nervous system The relationship between structure and function in a reflex arc	Coordination and control • principles of hormonal coordination and control in humans • homeostasis. The genome as The entire genetic material • • • How The genome and its interaction with The environment , influence The development of The phenotype of an organism	Coordination and control • principles of hormonal coordination and control in humans • hormones in human reproduction, hormonal and non-hormonal methods of contraception • homeostasis. • The genome as The entire genetic material • • • How The genome and its interaction with The environment , influence The development of The phenotype of an organism	Students will have the opportunity to have targeted revision lessons prior ot their AP1 mock exam. Following AP1 in December 2023, teachers of science used the question by question analysis to identify gaps and misconceptions in students knowledge. Normal lessons were paused and students had gap filling lessons onthe circulatory system and heart structure, starch and amylase required practical and monoclonal antibodies. Each student was then given a learning booklet and time was given for students to revisit those topics that they needed in order to fill these gaps, which they personalised using the question by question analysis for their AP1 exam.	• DNA structure and protein synthesis • Most phenotypic features being The result of multiple, rather than single genes • single gene inheritance and single gene crosses with dominant and recessive phenotypes • Sex determination in humans • genetic variation in populations of a species • The process of natural selection leading to evolution • The evidence for evolution • The uses of modern biotechnology including gene technology and The practical and ethical considerations of modern biotechnology	• genetic variation in populations of a species • The process of natural selection leading to evolution • The evidence for evolution • The uses of modern biotechnology including gene technology and The practical and ethical considerations of modern biotechnology	• The uses of modern biotechnology including gene technology and The practical and ethical considerations of modern biotechnology Ecosystems • how materials cycle through abiotic and biotic components of the role of microorganisms (decomposers) in the cycling of materials through an ecosystem • how materials cycle through abiotic and biotic components of the role of microorganisms (decomposers) in the cycling of materials through an ecosystem • organisms are interdependent and are adapted to their environment • the importance of biodiversity • methods of identifying species and measuring distribution, frequency and abundance of species within a habitat • positive and negative human interactions with ecosystems.	Ecosystems • The importance of biodiversity • positive and negative human interactions with ecosystems.	GCSE Examinations	GCSE Examinations		
	Substantive Knowledge	The What!	The need to transport substances into and out of a range of organisms, including oxygen, carbon dioxide, water, dissolved food molecules, mineral ions and urea. The need for exchange surfaces and a transport system in multicellular organisms including the calculation of surface area : volume ratio. The process of photosynthesis, how a leaf is adapted for photosynthesis and why photosynthesis is important for almost all life on Earth. The limiting factors of photosynthesis, including light intensity, and how they change the rate of photosynthesis. How plant roots use diffusion, osmosis and active transport to transport substances, and how root hair cells are adapted to their functions. Factors affecting the rate of transpiration, the translocation of sugar in plants and how the structures of xylem and phloem are adapted to their functions. The role of respiration in the production of ATP. Aerobic respiration and exercise, anaerobic respiration and metabolism in the liver The control of the human body by reflex actions, including the structure and function of the nervous system. The structure of the brain and eye and causes and treatments for common problems of the eye	Describe where hormones are produced and how they are transported from endocrine glands to their target organs, including the pituitary gland, thyroid gland, pancreas, adrenal glands, ovaries and testes. The principle of negative feedback. Explaining what homeostasis is, how blood glucose concentration is regulated and how type 1 diabetes can be controlled. How type 2 diabetes is caused, controlled and correlates to body mass. How body temperature is regulated and how waste products are removed, including the structure of the kidney and problems and solutions in kidney disease	How body temperature is regulated and how waste products are removed, including the structure of the kidney and problems and solutions in kidney disease		Explaining the structure of DNA and how the cell makes proteins using the genetic information and hence controlling the cell. How genes are inherited and how genetic disorders occur and can be screened for How genes are inherited and how genetic disorders occur and can be screened for Explaining the structure of DNA and the genome as the total genetic material of an organism. Evaluating the use of evidence such as the fossil record to explain evolution. Understanding the use and misuse of genetic engineering and the ethics of gene technologies	Understanding the use and misuse of genetic engineering and the ethics of gene technologies particularly within modern classification and how this has changed our views on classification	The development of new technologies and how this has affected classification The overuse of antibiotics and the development of antibiotic resistant strains of bacteria Distribution and abundance of individuals within a community Adaptation and competition within communities and feeding relationships	Adaptation and competition within communities and feeding relationships feeding relationships and tropic levels in food chains and webs Students will be introduced to, abiotic and biotic factors and communities, parasitism, biodiversity, as well as the concepts of nutrient recycling with a particular focus on the water, carbon and nitrogen cycles. Students will investigate decomposition in ecosystems and its importance and how the rate of decomposition changes with changing abiotic factors	Students will be looking at sustainability and our ever increasing population and how the changing population, global warming and pollution affects food security and the world around us.	GCSE Examinations	GCSE Examinations	
	Disciplinary Knowledge	The How!	Recognise and use expressions in decimal form. Use ratios, fractions and percentages. Calculate areas of triangles and rectangles, surface areas and volumes of cubes. Substitute numerical values into algebraic equations using appropriate units for physical quantities. Understand that y = mx + c represents a linear relationship. Determine the slope and intercept of a linear graph.	Recognise and use expressions in standard form. Construct and interpret frequency tables and diagrams, bar charts and histograms. Translate information between graphical and numeric form. Plot two variables from experimental or other data. Understand the principles of sampling as applied to scientific data.	Recognise and use expressions in standard form. Construct and interpret frequency tables and diagrams, bar charts and histograms. Translate information between graphical and numeric form. Plot two variables from experimental or other data. Understand the principles of sampling as applied to scientific data. Dissection of animal tissues	The safe use of dissection equipment to investigate the gross structure of the heart Recognise and use expressions in decimal form. Use an appropriate number of significant figures. Understand and use the symbols: ≈, <, <<, >>, >, μ, τ. Change the subject of an equation. Translate information between graphical and numeric form. Plot two variables from experimental or other data. The use of ratios, fractions and percentages	Measurement of volumes of liquid using a respirometer and the surface area of the diameter of a capillary tube Recognise and use expressions in decimal form. Recognise and use expressions in standard form. Use ratios, fractions and percentages. Understand and use the symbols: ≈, <, <<, >>, >, μ, τ. Core Practical: Investigate the rate of respiration in living organisms.	Students will: Use ratios, fractions and percentages. Construct and interpret frequency tables and diagrams, bar charts and histograms. Understand the principles of sampling as applied to scientific data.	Students will: Complete a core practical: Investigate the relationship between organisms and their environment using field-work techniques, including quadrats and belt transects. Use ratios, fractions and percentages. Construct and interpret frequency tables and diagrams, bar charts and histograms. Understand the principles of sampling as applied to scientific data.	Adaaptation and competition within communities and feeding relationships	Students will: Complete a range of individual activities dependent of the strengths and weaknesses of individual groups	Students will: Complete a range of individual activities dependent of the strengths and weaknesses of individual groups	GCSE Examinations	
	Sequencing (Flow)	Retrieval & Extension	From KS3 - Photosynthesis From year 10 chapter 1 Cell structure and transport Chapter 3 The chemistry of food	From KS3: How obesity is caused, structure and function of the human reproductive system, the menstrual cycle From year 10 chapter B2 Cell division The structure of sperm and egg cells how enzymes help digest food molecules	From KS3: How obesity is caused, structure and function of the human reproductive system, the menstrual cycle Digestion How the breathing system gets oxygen into the blood Aerobic and anaerobic respiration	From KS3: How the breathing system gets oxygen into the blood Aerobic and anaerobic respiration From year 10 CB1 Key Concepts in biology: Diffusion Animal cells and their adaptations	From KS3: How the breathing system gets oxygen into the blood Aerobic and anaerobic respiration From year 10 CB1 Key Concepts in biology: Diffusion Animal cells and their adaptations	From KS3: How life on earth relies on photosynthesis interdependence of organisms, including food webs and insect pollination	N/A	N/A	N/A	N/A	GCSE Examinations	
	Summative Assessment		Students will complete a range of activities such as long answer examination questions, multiple choice questions and short answer questions. Students will observe the dissection of an eyeball Core practical investigating the effect of light	Students will complete a range of activities such as long answer examination questions, multiple choice questions and short answer questions	Students will complete a range of activities such as long answer examination questions, multiple choice questions and short answer questions AP1 mock examinations	Students will complete a range of activities such as long answer examination questions, multiple choice questions and short answer questions	Students will complete a range of activities such as long answer examination questions, multiple choice questions and short answer questions AP2 Mock Examinations	Students will complete a range of activities such as long answer examination questions, multiple choice questions and short answer questions	Students will complete a range of activities such as long answer examination questions, multiple choice questions and short answer questions AP3 Mock examinations	Students will complete a range of activities such as long answer examination questions, multiple choice questions and short answer questions	Students will complete a range of activities such as long answer examination questions, multiple choice questions and short answer questions	Students will complete a range of activities such as long answer examination questions, multiple choice questions and short answer questions	GCSE Examinations	
	Personal Empowerment	Virtue	The opportunity to reflect, think deeply and critically about an issue.	Friendliness & Civility	Justice & Truthfulness	Courage	Generosity	Gratitude	Good Speech	Good Temper & Humour	Self-Mastery		Compassion	Good Sense
Link to Virtue		Students will need to demonstrate friendliness and civility as they work in groups to complete a variety of different practical activities. They will need to demonstrate civility as they work towards a method to ensure they are civil with each other to achieve a common goal.		Students will demonstrate truthfulness within their work as they reflect on their finding within an investigation. Students will look at the justice of people facing organ transplants.	Within the lessons, students will need to have the courage to answer the questions with their learning. Students will need to demonstrate their understanding of the courage by applying their learning to their exams and independent practice within lessons.	Students will need to demonstrate generosity of as they work with groups and demonstrate their understanding of their learning. They will need to be generous with their time and comments towards each other.	Within lessons students will need to demonstrate their gratitude towards their teachers who plan their lesson but also their fellow students as they work together to achieve a common goal.	Student will demonstrate good speech within their lessons by demonstrating their key words within lessons and their work.	As students work within group they will need to demonstrate, good temper as they work towards a practical to achieve the independent practice. Students will need to demonstrate good humour as they can work together and laugh as each other learn	Students will be able to explain how we can all aim high in our daily lives to minimise our impact on our planet	Students will be able to explain how we can all aim high in our daily lives to minimise our impact on our planet	Students will have compassion for other students during the stressful examination period and will offer support to one another at this time	GCSE Examinations	
Preparation for Work	Skill	Transferable skills	Listening	Leadership	Problem-Solving	Creativity	Staying Positive	Speaking	Staying Positive	Aiming High		Speaking	Teamwork	
	Link to Skill		Students will need to listen to safety instructions and instructions for practical activities to ensure that they carry out the activities correctly and safely	Students will use leadership skills when working in groups to discuss fertility and how infertility can be treated.	Students will need to use their problem solving skills to be able to draw conclusions from data in the investigating diffusion investigation	Students will express creativity during this topic when they draw and annotate biological drawings and when they use modelling to actively demonstrate how proteins are formed	Students will need to stay positive as they learn new key words and definitions. Building on their previous knowledge	Students will use good speech to accurately describe the process of evolution using key words. They will be able to explain the evidence for evolution and historical knowledge of the development of evolutionary theories.	Students will need to use good temper and good humour when they investigate the issues surrounding the delicate balance of the nutrient cycles and the consequences of unbalancing these cycles.	Students will demonstrate self-mastery byd by identifying and making changes in their lifestyle to reduce their impact on the planet.	Students will demonstrate self-mastery byd by identifying and making changes in their lifestyle to reduce their impact on the planet.	Students will use speaking skills when revising for the examinations in groups. They will need to ensure that they demonstrate scientific literacy at this time	GCSE Examinations	
Preparation for Citizenship	SMSC & British Values	Developing opinions on current issues	Respect	Democracy	Cultural	Respect		Moral	Moral				GCSE Examinations	
	Link to SMSC & British Values		Co-operation in practical activity.	Fertility, infertility and the treatments for infertility Debate - Should infertility treatment be available to all?	Pride in STEM day	Co-operation in practical activity.		Great Backyard Bird Count	Red Nose Day British Science Week World Engineering Day for Sustainable Development				GCSE Examinations	