Curriculum Content Map — **Subject: Biology Combined Science Year 11**

			Term 1				Term 2				Revision		
		Month	September	October	November	December	January	February	March	April	May	June	July
	Units of Work		Chapter 8- Photosynthesis Chapter 9 - Respiration Chapter 10 - The human nervous system	Chapter 11 Hormonal communication Chapter 12 Reproduction	Chapter 13 Variation and evolution Chapter 14 Genetics and evolution	Revision for and analysis of AP1	Chapter 14 Genetics and evolution	Chapter 14 Genetics and evolution Chapter 15 Adaptations, interdependence and competition	Chapter 16 Organising an ecosystem Chapter 17 Biodiversity and ecosystems	Revision	Revision	Revision	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 • hormones in human reproduction, hormonal and non-hormonal methods of contraception	• 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 • 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	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 and the starch and amylase required practical. 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	• The evidence for evolution • The uses of modern biotechnology including gene technology and The practical and ethical considerations of modern biotechnology	• The evidence for evolution • The uses of modern biotechnology including gene technology and The practical and ethical considerations of modern biotechnology • methods of identifying species and measuring distribution, frequency and abundance of species within a habitat Ecosystems • Biotic and abiotic factors which affect communities and the importance of interactions between organisms in a community	Ecosystems how materials cycle through abiotic and biotic components of ecosystems • 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.	Revision		GCSE Examinations	GCSE Examinations
	Substantive Knowledge	*The What!*	Describe 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. Explain 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	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.The menstrual cycle, the roles of oestrogen and progesterone, and how hormones and barrier methods can be used as contraception. The types of cell division and reproduction and inheritance including the structure of DNA and the genome	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		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	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 Adaaptation and competition within communities and feeding relationships	The first part of the unit introduces students to ecosystems, 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. decomposition. Students will then be looking at sustainability and our ever increasing population	Teachers will plan individual lessons dependent on the strengths and weaknesses of individual groups	Teachers will plan individual lessons dependent on the strengths and weaknesses of individual groups	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. Use of a variety of glassware and ICT to investigate the process of photosynthesis	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.	Construct and interpret frequency tables and diagrams, bar charts and histograms. Translate between graphical and numeric form. Plot two variables from experimental or other data. Use ratios, fractions and percentages. Understand simple probability. Understand and use the symbols: =, <, <<, >>, >, ∝, ~. Students will be controlling variables in the investigation into the effect of surface area on diffusion rate. calculation of surface area Calculate the rate of diffusion using Fick's law:	The use of diagrams in science Recognise and use expressions in decimal form. Use an appropriate number of significant figures. Understand and use the symbols: =, <, <<, >>, >, µ, ~. 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 Displaying continuous and discrete data using a bar chart	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: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 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	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: ☑ heredity as the process by which genetic information is transmitted from one generation to the next Y10 chapter 2 Cell division and growth and differentiation ☑ a simple model of chromosomes, genes and DNA in heredity, including the part played	From KS3: ☑ heredity as the process by which genetic information is transmitted from one generation to the next ☑ a simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model	☑ differences between species ☑ the variati	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, multuiple choice questions and short answer questions. Core practical investigating the effect of light intensity on the rate of photosynthesis. Food tests - testing for	Students will complete a range of activities such as long answer examination questions, multuiple choice questions and short answer questions	Students will complete a range of activities such as long answer examination questions, multuiple choice questions and short answer questions AP1 mock examinations	Students will complete a range of activities such as long answer examination questions, multuiple choice questions and short answer questions AP1 mock examinations	Students will complete a range of activities such as long answer examination questions, multuiple choice questions and short answer questions	Students will complete a range of activities such as long answer examination questions, multuiple choice questions and short answer questions	Students will complete a range of activities such as long answer examination questions, multuiple choice questions and short answer questions AP3 Mock examinations	Students will complete a range of activities such as long answer examination questions, multuiple choice questions and short answer questions	Students will complete a range of activities such as long answer examination questions, multuiple choice questions and short answer questions	Students will complete a range of activities such as long answer examination questions, multuiple choice questions and short answer questions	GCSE Examinations
Personal Empowerment	Virtue		**Friendliness & Civility**	**Justice & Truthfulness**	**Courage**	**Generosity**	**Gratitude**	**Good Speech**	**Good Temper & Humour**	**Self-Mastery**		**Compassion**	**Good Sense**
	Link to Virtue	*The opportunity to reflect, think deeply and critically about an issue.*	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 on each results and determine if they are reaching their full potential.	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 need to aim high for their up and coming exams. Students will need to revise in their own time and ensure they are fully prepared for their GCSES	Students will need to aim high for their up and coming exams. Students will need to revise in their own time and ensure they are fully prepared for their GCSES	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 genetic crosses and from statistical data	Students will express creativity during this topic when they draw and annotate biological drawings and when they use modelling to actively demonstrate how substances cross membranes	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 cycles which ensure that we have enough carbon to manufacture carbohydrates for living organisms, nitrogen for making proteins and water for biological reactions. They will use good speech to verbalise what would happen if these systems were to break down.	Students will need to use good temper and good humour when they begin to revise for their terminal examinations	Self-mastery will be demonstrated while revising for the GCSE exams.	Self-mastery will be demonstrated while revising for the GCSE exams.	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 curent 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	al activity. Mutual respect in the run up to the mock examinations		Great Backyard Bird Count	Red Nose Day British Science Week World Engineering Day for Sustainable Development				GCSE Examinations