Year 9: Combined Science	**Curriculum Intent:** Year 9 combined biology looks to build on the foundations from years 7 and 8 and work towards developing knowledge of similar areas as students begin to work towards their GCSE examinations: • Cell Level systems, scaling up, organism level systems, community level systems, genes and inheritance, and global challenges. The subject and procedural knowledge demands increase in this year, and students will be exposed to more complex ideas, models and explanations. Practical Activities (PAG) will be coupled with mathematical skills to build more procedural knowledge, focusing on areas such as data analysis and interpretation of graphs. The scientific knowledge developed through this year will provide the basis for further study in these areas as students enter year 10.					
	Autumn 1	**Autumn 2**	**Spring 1**	**Spring 2**	**Summer 1**	**Summer 2**
Key ideas and sequence of learning	**Biology module B1 - cell level systems** • Plant and animal cells • Bacterial Cells • Light Microscopes • Electron Microscopy • DNA Structure • Enzymes & enzyme reactions • Biological Molecules • Respiration	**Biology module B1 - - cell level systems** • Photosynthesis • Factors affecting photosynthesis • Limiting factors of photosynthesis **Biology module B2- scaling up** • Diffusion • Osmosis • Active transport • Mitosis • Cell differentiation	**Biology module B2- Scaling up** • Stem cells • Exchange and transport • Circulatory system • Heart and blood • Plant transport systems. • Transpiration stream • Factors affecting transpiration	**Biology Module 3 – Organism level systems** • Nervous system • Reflexes • Hormones and negative feedback recap • Menstrual cycle • Controlling reproduction • Using hormones to treat infertility • Controlling Blood Sugar levels	***Biology module B4- community level systems*** • Ecosystems • Abiotic and Biotic Factors • Competition and Interdependence • Nutrient cycling • Water cycle • Carbon cycle • Decomposition ***Module B6 – Global Challenges*** • Loss of Biodiversity • Increasing Biodiversity • Maintaining biodiversity	***Revision for end of year exams*** End of Year exams and review ***Module B6 – Global Challenges*** • Sampling **Module B5- Genes, inheritance and selection** • Variation • Sexual and asexual reproduction
Key Questions	1. What is inside a cell? 2. What happens inside a cell 3. How do we digest food? 4. How do cells release energy?	1. How do plants produce and store food? 2. Which factors have an impact on the rate of photosynthesis	1. What is the importance of stem cells? 2. How does the body transport oxygen? 3. How do plants transport water and what factors affect it?	1. What is the role of the nervous system and the hormone system in the human body? 2. What is the role of hormones in reproduction?	1. How are organisms organised into food chains? 2. How are nutrients recycled through the environment? 3. What is the difference between	1. How are organisms sampled in their habitat? 2. What is meant by variation? 3. What is the difference between sexual and asexual reproduction?

	5. What is the difference between aerobic and anaerobic respiration?	3. Which processes help to transport substances across membranes? 4. How do body cells multiply?		3. How can hormones be used to treat infertility and prevent contraception. 4. How does the body control blood sugar levels.	decomposers and detritivore? 4. What factors affect the rate of decomposition? 5. How does human activity impact on biodiversity?	
Vocabulary	• Cell membrane • Cell wall • Chloroplast • Cytoplasm • Eukaryotic cell • Flagellum • Mitochondria • Nucleus • Plasmid • Prokaryotic cell • Resolution • Magnification • Electron microscope • Vacuole • Active site • Bases • Chromosome • Complementary Base pairing • Denature • DNA • DNA base	• Chlorophyll • Endothermic • Limiting Factors • Photosynthesis • Light intensity • Active Transport • Concentration gradient • Diffusion • Osmosis • Concentration gradient • Water potential • Turgid • Plasmolysis • Flaccid • Lysis • Crenated • Cell • Cyle • DNA replication • Mitosis	• Specialised • Acrosome • Biconcave • Haemoglobin • Ciliated • Palisade cell • Platelets • Meristem • Differentiation • Meristems • Mitosis • Alveoli • Artery • Atria • Capillary • Diffusion distance • Double Circulatory System • Exchange Surface • Heart • Lumen • Xylem • Phloem	• Stimulus • Receptors • Effectors • Sensory neurones • Motor neurones • Relay neurons • Endocrine glands • Target organs • Hypothalamus • Thyroid Gland • Thyroxine. • Homeostasis. • Adrenaline • Ovulation • Follicle-stimulating hormone • Oestrogen • Luteinising hormone • Progesterone • Contraception • Fertility •In Vitro Fertilisation	• Abiotic Factors • Biomass • Biotic Factors • Carbon Cycle • Community • Competition • Consumers • Decomposers • Detritivores • Ecosystem • Egestion • Excretion • Habitat • Interdependence • Mutualism • Parasitism • Population • Predation • Producers	• Alleles • Asexual reproduction • Cancer • Clone • Continuous variation • Diploid cells • Discontinuous Variation • Dominant allele • Environmental Variation • Fertilisation • Gametes • Sex Cells • Sexual reproduction • Variation • Zygote • Alleles • Asexual reproduction

	• Polymer • Monomer • Enzyme • Active site • Gene • Metabolic rate • Aerobic Respiration • Anaerobic Respiration • Metabolic rate • Oxygen debt • ATP • Exothermic • Fermentation	• Chromosomes	• Translocation • Vascular Bundle • Potometer • Vein • Ventricle • Transpiration			
Practical Skills	• Using Bioviewers to identify cells • Light Microscopy • Modelling DNA • Extracting DNA • Investigating Enzyme activity • Food Tests	• Testing for Starch in plants • Investigate factors affecting photosynthesis • Investigate osmosis • Modelling Mitosis	• Diffusion through indicator cubes • Heart dissection • Movement water through xylem in celery. • Demonstrate stomata on leaves. • Investigate transpiration rate	• Investigate reaction speed	• Measuring abiotic factors • Investigate decomposition	• Sampling techniques • Asexual reproduction in plants • Investigate variation