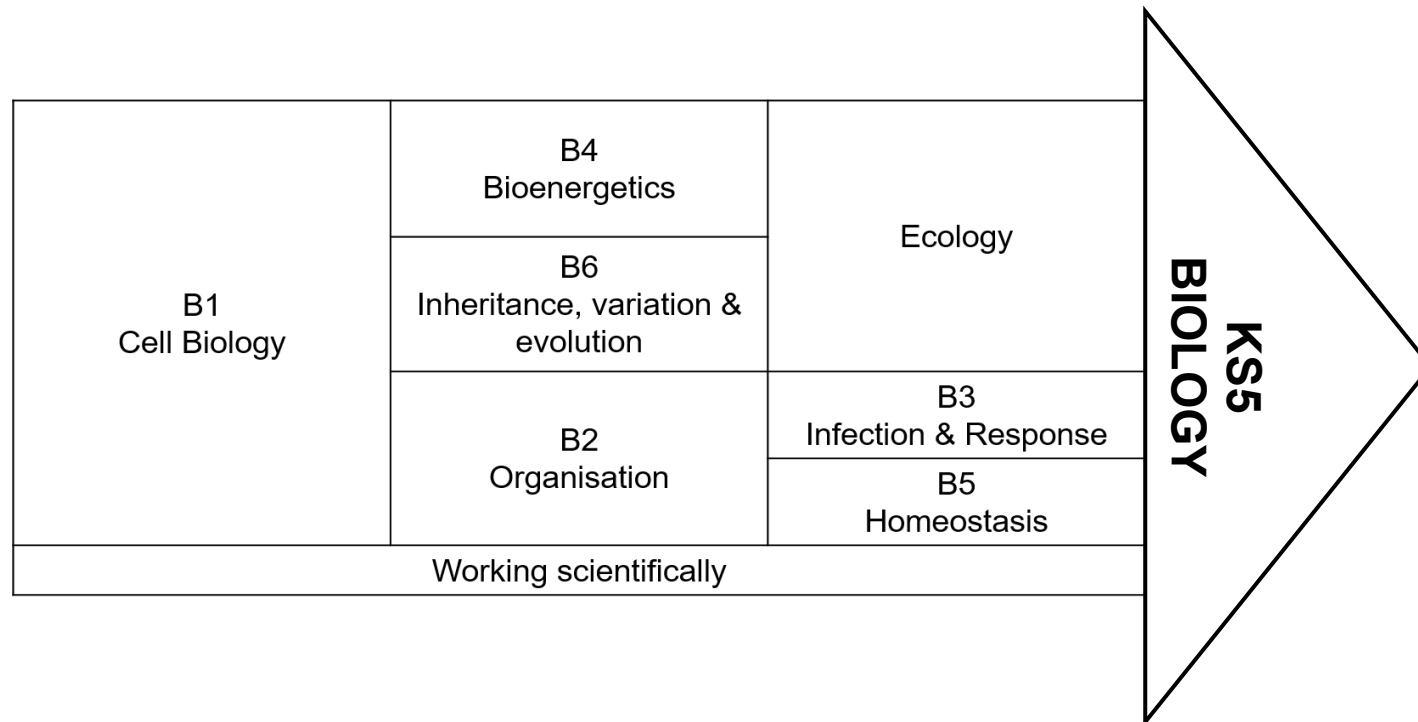


KS4 Biology – Curriculum overview



The above arrow shows the progression of biology topics across Key Stage 4. It shows how substantive knowledge is built upon in a sequential nature to prepare learners for KS5 biology. Running alongside and integrated throughout is the thread of working scientifically whereby students develop their knowledge of scientific methods, apparatus and data analysis.

KS4 Biology – Curriculum intent

Intent		What new knowledge/content do we introduce?			
By the end of KS4 students are able to...		Year 10	Year 11	Choices	How does this curriculum incorporate the National Curriculum and go beyond? How does going beyond the NC ensure challenge?
<p>Understand structure and functioning of cells, their division and their role in systems of the body.</p> <p>Explain essential chemical reactions necessary for life on Earth and their role in the recycling of molecules.</p> <p>Explain the key process of natural selection and the role of biodiversity in the natural world.</p> <p>Be able to use safely conduct investigations and analyse data to make sense of the natural world.</p>	Autumn	<p>Organisation</p> <ul style="list-style-type: none"> • Organisational hierarchy of organisms • Structure and function of enzymes in relation to digestion • Food tests and nutrition • Circulatory system – including heart structure, heart disease and blood vessels • Structure and function of respiratory system • Cancer • Plant organisation 	<p>Ecology</p> <ul style="list-style-type: none"> • Water cycle and carbon cycle • Triple: Decay cycle and decay organisms • Effect of human activity on biodiversity and conservation efforts. 	<p>Homeostasis has been moved to the end of the scheme of learning as opposed to its chronological place as the fifth topic. The reasoning behind this decision is twofold. Firstly, the content requires substantive knowledge of specialised cells, blood, hormones and systems of the body. Secondly, much of the content is complicated and poses the highest challenge upon learners. Consequently, moving this topic to the end of the scheme allows students to have gained prior knowledge to support their learning and increases the likelihood of students successfully accessing the content.</p>	<p>KS4 biology goes beyond the national curriculum by providing opportunity for additional challenge and extension within each scheme of work. This often bridges the content between GCSE and A-level biology and permits students the opportunity to discover the depth of A-level Biology and uncover potential career pathways within the scientific fields. Further, there are also opportunities to enrich learning beyond the curriculum through the use of trips in the local area (e.g. treasure trails around Cambridge) or visiting guest speakers. There are also after-school sessions run</p>
		<p>Infection & response</p> <ul style="list-style-type: none"> • Types of pathogen and the diseases they cause – including knowing transmission, symptoms and treatment/preventions. • Human immune system including non-specific and specific defences. 	<p>Homeostasis & response</p> <ul style="list-style-type: none"> • The purpose of homeostasis • Triple: controlling body temperature and water balance. • Types of neurone and the nervous system • The nervous system and reaction time • Triple: reflex actions and the eye • Hormonal control including diabetes and reproduction • Contraception and infertility • Triple: plant hormones and germination 		

	Spring	Infection & Response <ul style="list-style-type: none"> • Role of vaccinations, antibiotics and painkillers. • Drug trials and clinical testing. • Triple: production and uses of monoclonal antibodies • Triple: Plant diseases and defences 	Paper 1 and 2 revision Focusing on drawing ideas together from across Years 7-11, making scientific links & understanding the results and conclusions from scientific investigations		weekly for students to learn, revisit or further their understanding of a particular area of science.
		Inheritance, variation & evolution <ul style="list-style-type: none"> • Structure of DNA (Triple: protein synthesis) • Reproduction, sex determination and meiosis • Triple: genetic engineering and cloning) 			
	Summer	Inheritance, variation & evolution <ul style="list-style-type: none"> • Genetic variation and inherited diseases • Selective breeding and evolution • Triple: evidence for evolution 	GCSE external examinations		
		Ecology <ul style="list-style-type: none"> • Populations, communities and ecosystems • Classification systems and types of adaptation • Distribution of organisms and fieldwork 	GCSE external examinations		

	<p>Rationale for this sequence</p>	<p>Organisation builds upon the substantive knowledge of cell biology and bioenergetics of Year 9 by learning how cells form multi-cellular systems in both plants and animals. Students have learned the chemical reactions within cells (e.g. respiration and photosynthesis) and now link them to wider processes within the body (e.g. breathing oxygen and carbon dioxide). Students are introduced to the role of blood and enzymes and to non-communicable diseases such as CHD and cancer.</p> <p>Infection and response builds upon the content within organisation by introducing communicable diseases and learning the transmissions of pathogens. It furthers knowledge of blood cells by looking at the specific actions of white blood cells and the role of vaccines.</p> <p>Inheritance, variation and evolution continues the theme of disease by introducing the concept of inherited diseases. To ensure this is understood, students first learn about the role of DNA, genes and inheritance. From this, they are able to explain patterns of inheritance in genetic diseases, as well as the importance of variation and inheritance to evolution.</p> <p>Ecology requires students to apply the population-level thinking in the previous topic and consider population dynamics. It's exploration of adaptations is underpinned by knowledge of variation, inheritance and evolution of the previous topic. This topic also involves fieldwork, and thus the summer term enables this to happen reliably.</p>	<p>Homeostasis is the last topic in our KS4 Biology. It involves challenging content on reproduction and the menstrual cycle, homeostasis and the nervous system, both of which are underpinned by prior learning of Year 10. Owing to the challenging nature of this topic, it is taught at the end of the scheme as students will have completed sufficient learning to fully access the substantive knowledge and the context of the processes.</p> <p>The focus is then be on preparing the students for their GCSE examinations in the Summer. All of the subject content will be reviewed and the key skills will be practiced. A variety of structured revision activities will be used to allow students to identify areas for development and subsequently improve their substantive and disciplinary knowledge.</p>		
	<p>How does the KS4 Curriculum build on previous</p>	<p>It is important to consider that we cannot assume the KS3 science curriculum has been effectively delivered; Covid-19 remote learning implications are evident in student's cumulative disfluency.</p>			

	learning at KS3?	Therefore the KS4 curriculum largely revisits, and then builds upon, many of the basic tenets of biology established in KS3. This is achieved by an increase in both depth and breadth as well as more complicated practical work.	
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