Biology Curriculum Overview - Year 13 - Teacher A

	Unit	Details
Autumn One	**Energy transfer in and between organisms**	In this topic, pupils will delve into the concept of energy and its significance in biological systems. They will explore the role of adenosine triphosphate (ATP) as the primary energy currency in cells, understanding how ATP is generated through cellular respiration and how it powers various cellular processes. Pupils will study the processes of cellular respiration and photosynthesis, which are the key pathways for energy acquisition and conversion in organisms. They will explore the structure and function of cellular organelles involved in these processes, such as mitochondria and chloroplasts. Pupils will understand how energy-rich molecules, such as glucose, are broken down in cellular respiration to produce ATP, and how photosynthesis converts light energy into chemical energy in the form of glucose. Furthermore, pupils will explore the principles of energy flow and trophic levels in ecosystems. They will learn about food chains and food webs, understanding how energy is transferred from one organism to another within an ecological community. Pupils will study the concepts of producers, consumers, and decomposers, and the relationships between different trophic levels. The topic also covers the principles of energy efficiency and the ecological pyramids. Pupils will explore how energy is lost and transferred between trophic levels, leading to pyramid-like energy distributions. They will understand the significance of energy flow and the implications for the stability and productivity of ecosystems. Moreover, pupils will examine the concept of nutrient cycling and the role of decomposers in recycling energy and nutrients back into the ecosystem. They will learn about the processes of decay and decomposition, understanding how they contribute to the availability of essential nutrients for organisms.
Autumn Two	**Genetics and populations**	In this topic, pupils will delve into the principles of genetics and inheritance. They will explore the structure and function of DNA, the molecule that carries genetic information, and understand how genes are passed from one generation to the next. Pupils will learn about the mechanisms of DNA replication, transcription, and translation, and how these processes contribute to protein synthesis and the expression of traits. Furthermore, pupils will study the principles of genetic diversity and how it arises within populations. They will explore the concepts of alleles, genotypes, and phenotypes, and understand how genetic variation contributes to the adaptation and survival of species. Pupils will learn about the factors that influence genetic diversity, such as mutation, gene flow, genetic drift, and natural selection.
Spring One Spring Two	**Evolution and ecosystems**	The topic covers the mechanisms of evolution and the processes that drive evolutionary change. Pupils will explore the concepts of natural selection, genetic drift, gene flow, and mutation, and how these mechanisms lead to the development of new species over time. They will gain insights into the role of adaptation, speciation, and extinction in shaping the diversity of life on Earth. Moreover, pupils will examine the principles of population genetics and the study of allele frequencies within populations. They will understand how factors such as selection pressure, genetic drift, and gene flow can influence the genetic composition of populations over time. Pupils will explore the Hardy-Weinberg equilibrium and its significance in understanding genetic variation and evolutionary processes. The topic also encompasses the study of ecosystems and their dynamics. Pupils will explore the interactions between organisms and their environment, including the flow of energy and matter through food chains and food webs. They will understand the principles of nutrient cycling, community interactions, and the factors that influence ecosystem stability and productivity.