Biology Curriculum Overview - Year 12 - Teacher B

	Unit	Details
Autumn One Autumn Two	**Cells**	In this topic, pupils will delve into the structure and function of cells. They will explore the basic components of cells, including the plasma membrane, cytoplasm, and nucleus. Pupils will learn about the diverse organelles found within cells, such as mitochondria, endoplasmic reticulum, and Golgi apparatus, and their specialised roles in cellular processes. Pupils will gain insights into the cell membrane and its significance in controlling the movement of substances into and out of the cell. They will learn about the selective permeability of the membrane and the mechanisms of active and passive transport. The topic also covers cell division and its importance in growth, repair, and reproduction. Pupils will study the processes of mitosis and meiosis, understanding how cells divide and distribute genetic material. They will explore the stages of cell division and the significance of each stage in maintaining chromosome number and genetic diversity. Pupils will delve into the structure and function of the immune system. They will learn about the different components of the immune system, including white blood cells, antibodies, and lymphoid organs, and understand their specialised roles in immune responses.
Spring One Spring Two	**Organisms exchange substances with their environment**	In this topic, pupils will delve into the process of gas exchange. They will explore the structures and adaptations involved in the exchange of respiratory gases, such as oxygen and carbon dioxide, in different organisms. Pupils will study the specialised respiratory surfaces, such as lungs in mammals, gills in fish, and tracheal systems in insects, and understand how these structures optimise gas exchange to meet the organism's metabolic needs. Furthermore, pupils will learn about the mechanisms of transport within organisms. They will explore the role of the circulatory system in distributing essential substances, including oxygen, nutrients, and hormones, to cells throughout the body. They will also examine the structure and function of blood vessels, the heart, and the components of blood. The topic also covers the absorption of nutrients by organisms. Pupils will study the structure and function of the digestive system, including adaptations that increase the surface area for efficient nutrient absorption. They will explore the processes of digestion and the importance of enzymes in breaking down complex molecules into smaller, absorbable units. Moreover, pupils will explore the excretory system and the elimination of waste products. They will understand how different organisms remove metabolic waste, such as nitrogenous compounds, and maintain proper osmoregulation. Pupils will study the structure and function of organs like the kidneys and the role of filtration, re-absorption, and secretion in waste removal.
Summer One Summer Two	**Mass transport**	In this topic, pupils will delve into the transport systems of plants. They will explore the structure and function of xylem and phloem, the specialised tissues responsible for the movement of water, minerals, and organic molecules in plants. Pupils will understand how the cohesion-tension theory and transpiration drive the upward movement of water from the roots to the leaves. Furthermore, pupils will explore the circulatory system in animals. They will study the structure and function of the heart, blood vessels, and blood, and understand how these components work together to ensure the efficient transport of substances throughout the body. Pupils will learn about the double circulatory system in mammals, the role of the heart in pumping blood, and the different types of blood vessels. The topic also covers the mechanisms of gas transport in animals. Pupils will explore the specialised respiratory pigments, such as haemoglobin, and their role in oxygen and carbon dioxide transport. They will understand the process of oxygen uptake in the lungs and its delivery to tissues, as well as the removal of carbon dioxide through respiration.