Biology Curriculum Overview - Year 9 - Combined Higher

Unit	Details
Cell structure and transport	Pupils will learn about microscopy and cells, and will be able to explain how the development of microscopy techniques, particularly electron microscopy, has enabled scientists to investigate the sub-cellular structures. Pupils will build on their knowledge attained at KS3 during the *Cells, muscles and bones* year 7 topic and be able to differentiate between animal and plant cells, differentiate between eukaryotic and prokaryotic cells, and identify adaptations of specialised animal and plant cells. Pupils will also learn about the transport of material into and out of cells by diffusion, osmosis, and active transport and be able to explain how adaptations of exchange surfaces maximise these processes.
Cell division	Pupils will learn about the process of cell division and after finishing the chapter should be able to describe the three overall stages of the cell cycle. Pupils will develop an understanding of mitosis as a stage within the cell cycle, but do not need to know about the different phases of the mitosis stage. Along with cell division, pupils will study cell differentiation, and students should be able to make connections between cell differentiation and the specialised cells and adaptations they studied in *Cell structure and transport*. Pupils will also learn that stem cells are undifferentiated cells that have the potential to become a specialised cell within an organism and should be able to describe some potential uses of stem cells, as well as the disadvantages and objections to the use of stem cells, particularly in relation to medical treatments.
Organisation and the digestive system	Pupils will learn about the principles of organisation. Pupils will use their knowledge attained at KS3 during the *Cells, muscles and bones* year 7 topic as well as building on their knowledge of differentiation and specialisation of cells, they should be able to define a tissue, an organ, and an organ system. They will study the human digestive system as an organ system that breaks down large insoluble molecules such as carbohydrates, proteins and lipids so they can be absorbed into the bloodstream. They should link this with earlier work on diffusion and exchange surfaces in *Cell structure and transport*. By the end of the chapter, pupils should be familiar with enzyme action and understand that enzymes are proteins with a specific shape including the active site.
Organising animals and plants	Pupils will learn about the organisation of animals and plants. They should be able to recognise the components of blood, describe their functions, and summarise the process of blood clotting. They should recognise the three main types of blood vessels, link their structures with their functions, and understand the importance of a double circulatory system. In studying the heart, pupils should be able to describe the main structures of the human heart and their functions. Pupils will study breathing and gas exchange, and should recognise the main structures of the gas exchange system along with their functions. In studying plant tissues and organs, pupils should be familiar with the different plant tissues and their functions which they have come across before at KS3.
Communicable disease	Pupils will see how the concept of health is affected by communicable (infectious) diseases. They will look at the different pathogens that can cause communicable disease, including bacteria, viruses, and protists, and how these can be spread between organisms – both animals and plants. Pupils should be able describe the different pathogens, the symptoms and treatments of a range of different animal and plant diseases, and the different defence mechanisms of the human body and plants. They should also complete the required practical to grow bacteria in the laboratory to investigate the effect of disinfectants and antibiotics.