

Key Stage 4 – Year 10 – Triple Science Biology  
Curriculum Map for Students

Year 10 (Biology)						
Topic Overview	SB2 – Cells and Control (Paper 1)	SB3 – Genetics (Paper 1)	SB4 – Natural Selection and Genetic Modification (Paper 1)	SB5 - Health, Disease and the Development of Medicine (Paper 1)	SB6 – Plant Structures and their Functions (Paper 2)	
Focus	<p>Students build on their understanding of cell structure from Year 9 and study the process of mitosis to allow growth and repair. They look at the use of growth charts to measure child development and how plant growth occurs. They will compare adaptations of specialised cells and discover how stem cells can be used in medical treatments. All students then study the nervous system and how it allows the body to respond to stimuli. Students will learn to identify the main parts of the brain and different medical techniques for investigating brain function and treating brain tumours. They will learn how the eye works and how some eye defects can be corrected.</p>	<p>Students learn how the process of meiosis differs from mitosis, which they studied in the previous topic. Triple students will compare the processes of asexual and sexual reproduction. They will find out what DNA is made up of and how we inherit characteristics from our parents. Students will study the work of Gregor Mendel in discovering the basis of genetic inheritance. They will study codominance in the ABO blood groups and how sex-linked genetic disorders are inherited. All students will find out what a mutation is and how these can cause variation in characteristics. Students will study how DNA is used to synthesise proteins and how mutations can result in the function or amount of the protein produced. They will compare different types of variation. They will find out how the Human Genome Project has provided greater knowledge of human DNA and how it may be used in the future.</p>	<p>Students look at the evidence for human evolution. They will gain an understanding of Darwin's theory of evolution through natural selection and look at evidence for this process. Students will learn how Darwin's theory was developed using the example of the pentadactyl limb. Students will look at how living organisms are classified, including the more recent three domains system of classification. They will compare how humans have used both selective breeding and genetic engineering to create new breeds and varieties. Students will gain an understanding of the use of tissue culture in plant breeding and medical research. They will consider the benefits and risks of these processes. Higher students will find out how bacteria is genetically engineered to produce useful products. Triple students will study the use of genetic modification, fertilisers and biological control in agriculture to improve yield.</p>	<p>Students will study the definition of good health, as defined by the World Health Organisation and compare communicable and non-communicable diseases. They will look at some risk factors for non-communicable diseases such as poor diet, alcohol and smoking. All students study specific diseases including malaria and cholera. Students will learn about the life cycle of a virus and how the effect of different viruses can be studied in the lab. They will look at ways of preventing transmission. They will find out how the physical and chemical barriers of the human body provide a defence against pathogens. Students study how the specific immune system works and gain an understanding of the use of immunisation to prevent disease and the benefits of vaccination programmes to establish herd immunity. Students find out how antibiotics were discovered and how new medicines must be tested before they can be made available. They will use aseptic techniques to investigate the effects of different antibiotics. Students will gain an understanding of how monoclonal antibodies are produced and their uses in medical diagnoses. Students will study the defence mechanisms that plants have to defend against pathogens. They will find out different methods that can be used to identify and diagnose plant diseases.</p>	<p>Students will build on their KS3 knowledge of how plants make their own food and will learn more about photosynthesis and how different factors affect its rate. They will find out how the rate of water uptake by a plant is affected by different factors. Higher students will use the inverse square law to see how these factors affect rate. They will learn how the reactants for photosynthesis and the products made are transported by the plant. Students will understand how the structure of leaves is adapted for photosynthesis and gaseous exchange. Students build on their knowledge of cell structure from topic 1 by learning about specialised plants cells. Students will study the role of different plant hormones in plant growth and how these hormones can be used by plant growers.</p>	
Assessment	<p>End of topic assessment (50 marks, 10 marks recall, 10 marks previous topic spaced learning)</p> <p>Summer Year 10 Mock (Paper 1)</p>					

Key Stage 4 – Year 11 – Triple Science Biology  
Curriculum Map for Students

Year 11 (Biology)						
<b>Topic Overview</b>	<b>SB7 – Animal coordination, control and homeostasis (Paper 2)</b>	<b>SB8 – Exchange and transport in animals (Paper 2)</b>	<b>SB9 – Ecosystems and Material Cycles (Paper 2)</b>			
<b>Focus</b>	<p>In this topic students will learn about the different endocrine glands of the human body, the hormones they produce and how they affect their target organs. Higher students will additionally study the role of thyroxine and adrenalin and the use of negative feedback mechanisms. They will find out how the menstrual cycle is controlled by hormones and how hormones are used in contraception. Higher students will study the role of FSH, LH and progesterone in the cycle and also how hormones are used in fertility treatments. All students learn about the role of insulin in controlling blood glucose concentration and what diabetes is. Higher students will also learn about the role of glucagon.</p> <p><i>Students will look at the role of homeostasis in thermoregulation and osmoregulation, studying the structure and function of kidneys and compare the use of dialysis and organ transplants for kidney failure.</i></p>	<p>Students will study the human gaseous exchange system and the role of diffusion in the exchange of substances. <i>They will learn how Fick's Law shows the relationship between the variables that affect the rate of diffusion.</i> They will learn about the human circulatory system, the structure of the heart and the components of blood. They will learn about the different types of respiration and how to calculate cardiac output. They will look at factors which affect the rate of respiration.</p>	<p>In the final unit, students learn how ecosystems are organised and how communities are affected by abiotic and biotic factors. They will learn how to measure the abundance and distribution of organisms. <i>Students will calculate the efficiency of energy transfers between trophic levels.</i> They will gain an understanding of the relationships of parasitism and mutualism. They will consider how humans can affect ecosystems. <i>They will gain an understanding of the use of indicator species as evidence of pollution.</i> Students will learn to appreciate the benefits of maintaining biodiversity. <i>They will learn what is meant by food security and the factors that can affect this.</i> They will look at the carbon cycle, water cycle and nitrogen cycle. <i>They will study the role of microorganisms in decomposition and how the rate of decomposition can be increased or decreased.</i></p>			
<b>Assessment</b>	End of topic assessment (50 marks, 10 marks recall, 10 marks previous topic spaced learning)					
	Winter Year 11 Mock (Paper 1) Spring Year 11 Mock (Paper 2)					