Key Stage 4 Curriculum

Triple Science Biology

In Year 10 Students will study:

THE WINSFORD ACADEMY

	Winter Term		Spring Term		Summer Term	
	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Content	**Cell Structure** Students will study the structure and function of the different organelles in prokaryotic and Eukaryotic cells. Students will then further develop this knowledge and understanding to explain how the structure of different types of cell relate to their function in a tissue, organs, organ systems and organisms. By studying the light and electron microscope the students will observe the structure of animal and plant cells under different magnifications. Students are required to grow uncontaminated cultures of microorganisms for investigating the action of disinfectants and antibiotics. They will study the growth of bacteria by binary fission and the factors that will affect their growth. Students will study stages of the cell cycle, including mitosis. Describe the structure of genetic material and understand the importance of stem cells. Cell transportation explains how substances may move into and out of cells across the cell membranes via diffusion, osmosis and active transport.		**Organisation** Students will study the different organ systems within the human and plant organism. The digestive system is an example of an organ system in which several organs work together to digest and absorb food. Students should know the structure and functioning of the human heart and lungs, including how lungs are adapted for gaseous exchange. The leaf is a plant organ. Students should be able to explain how the structures of plant tissues are related to their functions Students will also look at factors that affect the organ systems in the body by studying non-communicable diseases such as cancer, heart disease and diabetes.	**Infection & Response** In this unit learners focus on different pathogens that cause diseases in plants and animals (humans). Students will explain how communicable diseases are transmitted, treated, prevented and how they affect the organism. Students will investigate the importance of vaccination. How different types of drugs affect the body and how drugs are developed. Students will study how Monoclonal antibodies are produced from a single clone of cells. The antibodies are specific to one binding site on one protein antigen and so are able to target a specific chemical or cell in the body and therefore looking at its importance for fighting diseases such as certain cancers. Plants can be infected by a range of viral, bacterial and fungal pathogens a well as by insects. Students knowledge of plant diseases such as tobacco mosaic (virus) and Rose black spot (fungal) disease will also be a focus.	**Bioenergetics** In this section students will explore how plants harness the Sun's energy in photosynthesis in order to make food. This process liberates oxygen which has built up over millions of years in the Earth's atmosphere. Both animals and plants use this oxygen to oxidise food in a process called aerobic respiration which transfers the energy that the organism needs to perform its functions. Conversely, anaerobic respiration does not require oxygen to transfer energy. During vigorous exercise the human body is unable to supply the cells with sufficient oxygen and it switches to anaerobic respiration	

Homework	Past exam questions set through Teams Assignments. Units of revision and questions through Seneca Learning	Past exam questions set through Teams Assignments. Units of revision and questions through Seneca Learning	Past exam questions set through Teams Assignments. Units of revision and questions through Seneca Learning	Past exam questions set through Teams Assignments. Units of revision and questions through Seneca Learning
Wider			During this Half term students may be invited to attend The Big Bang Live Event	
Assessment	Students will be assessed at the end of the unit through past exam questions that form part of an end of topic test	Students will be assessed at the end of the unit through past exam questions that form part of an end of topic test	Students will be assessed at the end of the unit through past exam questions that form part of an end of topic test	Students will be assessed at the end of the unit through past exam questions that form part of an end of topic test

In Year 11 Students will study:

	Winter Term		Spring Term		Summer Term	
	Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Content	**Homeostasis & Response** Students will explore the structure and function of the nervous system and how it can bring about fast responses. How the structure of the nervous system is adapted to its functions. The nervous system enables humans to react to their surroundings and to coordinate their behaviour. Students will also explore the hormonal system which usually brings about much slower changes. Hormonal coordination is particularly important in reproduction since it controls the menstrual cycle. An understanding of the role of hormones in reproduction has allowed scientists to develop not only contraceptive drugs but also drugs which can increase fertility. Students with study the structure of the eye and how the brain controls complex behaviour. That It is made of billions of interconnected neurones and has different regions that carry out different functions.	**Inheritance, variation & evolution** In this section students will discover how gametes are produced by meiosis. How genetic mutations occur continuously and on rare occasions can affect the functioning of the animal or plant. Students will study the process of selective breeding & the importance of variation in plants and animals and how favourable characteristic can be advantageous for survival. Students describe DNA as a polymer made from four different nucleotides. Each consists of a common sugar and phosphate group with one of four different bases. Explain the potential benefits and risks of cloning in agriculture and in medicine and that some people have ethical objections. The theory of evolution by natural selection by studying Charles Darwin, result of observations on a round the world expedition	**Ecology** In order to continue to benefit from the world around us, humans need to engage with the environment in a sustainable way. In this section students will explore how humans are threatening biodiversity as well as the natural systems that support it. Students will also consider some actions we need to take to ensure our future health, prosperity and well-being. All species live in ecosystems composed of complex communities of animals and plants dependent on each other and that are adapted to particular conditions, both abiotic and biotic. These ecosystems provide essential services that support human life and continued development. Students describe some of the biological consequences of global warming. Levels of carbon dioxide and methane in the atmosphere are increasing, and contribute to 'global warming'. Students will look at interdependency within different habitats, Trophic levels and the catastrophic consequently of human activities on our planet. Students should be able to describe some of the biological factors affecting levels of food security. Food security is having enough food to feed a population.		Revision & GCSE Exams	

Homework	Past exam questions set through Teams Assignments. Units of revision and questions through Seneca Learning	Past exam questions set through Teams Assignments. Units of revision and questions through Seneca Learning	Past exam questions set through Teams Assignments. Units of revision and questions through Seneca Learning	Past exam questions set through Teams Assignments. Units of revision and questions through Seneca Learning	
Wider Curriculum Offer	Revision classes after school	Revision classes after school	Revision classes after school Programme of Saturday Revision	Revision classes after school Programme of Saturday Revision	
How you will be assessed	Students will be assessed at the end of the unit through past exam questions that form part of an end of topic test	Students will be assessed at the end of the unit through past exam questions that form part of an end of topic test	Students will be assessed at the end of the unit through past exam questions that form part of an end of topic test	Students will be assessed at the end of the unit through past exam questions that form part of an end of topic test	Students will be assessed at the end of the unit through past exam questions that form part of an end of topic test