

2023-24 Year 10 Curriculum and Assessment Plan for Separate Biology

The curriculum and assessment of pupils at this stage of education has been carefully designed to enable students to access a deeper understanding of Biological processes that underpin life on this planet					
<p>Half Term 1:</p> <p>All pupils will know: The Culturing microorganisms component from the cells topic and begin the Organisation topic as outlined on pages 19, and 23-30 GCSE Biology Specification Specification for first teaching in 2016 (aqa.org.uk)</p> <p>All pupils will be assessed: By short recall activities, electronic automatically marked homework's and longer answer short tests focussed on the topics. There will also be a longer exam as part of the data gathering for the whole year group twice a year</p> <p>Impact - Why do we teach this? In this section we will learn about the human digestive system which provides the body with nutrients and the respiratory system that provides it with oxygen and removes carbon dioxide. In each case they provide dissolved materials that need to be moved quickly around the body in the blood by the circulatory system. Damage to any of these systems can be debilitating if not fatal. Although there has been huge progress in surgical techniques, especially with regard to coronary heart disease, many interventions would not be necessary if individuals reduced their risks through improved diet and lifestyle. We will also learn how the plant's transport system is dependent on environmental conditions to ensure that leaf cells are provided with the water and carbon dioxide that they need for photosynthesis.</p>	<p>Subject specific skills being developed:</p> <ul style="list-style-type: none"> Calculate the number of bacteria in a population after a certain time if given the mean division time Calculate cross-sectional areas of colonies or clear areas around colonies using πr^2. 	<p>Half Term 2:</p> <p>All pupils will know: The Organisation topic as outlined on pages 23-30 GCSE Biology Specification Specification for first teaching in 2016 (aqa.org.uk) Students may begin the following topic infection and response in this term also</p> <p>The Infection and Response topic as outlined on pages 30-36 of the GCSE Biology Specification Specification for first teaching in 2016 (aqa.org.uk)</p> <p>All pupils will be assessed: By short recall activities, electronic automatically marked homework's and longer answer short tests focussed on the topics. There will also be a longer exam as part of the data gathering for the whole year group twice a year</p> <p>Impact - Why do we teach this? In this section we will learn about the human digestive system which provides the body with nutrients and the respiratory system that provides it with oxygen and removes carbon dioxide. In each case they provide dissolved materials that need to be moved quickly around the body in the blood by the circulatory system. Damage to any of these systems can be debilitating if not fatal. Although there has been huge progress in surgical techniques, especially with regard to coronary heart disease, many interventions would not be necessary if individuals reduced their risks through improved diet and lifestyle. We will also learn how the plant's transport system is dependent on environmental conditions to ensure that leaf cells are provided with the water and carbon dioxide that they need for photosynthesis.</p> <p>Pathogens are microorganisms such as viruses and bacteria that cause infectious diseases in animals and plants. They depend on their host to provide the conditions and nutrients that they need to grow and reproduce. They frequently produce toxins that damage tissues and make us feel ill. This section will explore how we can avoid diseases by reducing contact with them, as well as how the body uses barriers against pathogens. Once inside the body our immune system is triggered which is usually strong enough to destroy the pathogen and prevent disease. When at risk from unusual or dangerous diseases our body's natural system can be enhanced by the use of vaccination. Since the 1940s a range of antibiotics have been developed which have proved successful against a number of lethal</p>	<p>Subject specific skills being developed:</p> <ul style="list-style-type: none"> translate information between graphical and numerical form plot and draw appropriate graphs, selecting appropriate scales for axes extract and interpret information from graphs, charts and tables. Measure the rate of transpiration by the uptake of water. Investigate the distribution of stomata and guard cells. Process data from investigations involving stomata and transpiration rates to find arithmetic means, understand the principles of sampling and calculate surface areas and volumes. 	<p>Half Term 3:</p> <p>All pupils will know: The Infection and Response topic will be completed (for reference see HT 3 as outlined on pages 30-36 of the GCSE Biology Specification Specification for first teaching in 2016 (aqa.org.uk) The Bioenergetics Topic will be started as outlined on pages 37-40 of the GCSE Biology Specification Specification for first teaching in 2016 (aqa.org.uk)</p> <p>All pupils will be assessed: By short recall activities, electronic automatically marked homework's and longer answer short tests focussed on the topics. There will also be a longer exam as part of the data gathering for the whole year group twice a year</p> <p>Impact - Why do we teach this? In this section we 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. This process will supply energy but also causes the build-up of lactic acid in muscles which causes fatigue</p>	<p>Subject specific skills being developed:</p> <ul style="list-style-type: none"> Solve simple algebraic equations. Investigations into the effect of exercise on the body Use data to relate limiting factors to the cost effectiveness of adding heat, light or carbon dioxide to greenhouses. Tests to identify starch, glucose and proteins using simple qualitative reagents.
	<p>Reading Skills needed for this unit: Key Vocabulary:</p>		<p>Reading Skills needed for this unit: Key Vocabulary: Pathogen, bacteria, virus, fungi, antibody, antigen, antibiotics, phagocytosis</p>		<p>Reading Skills needed for this unit: Key Vocabulary:</p>
	<p>Opportunity for cross-curricular skill development</p> <ul style="list-style-type: none"> PE GCSE – heart rate, heart structure, diet, lifestyle Maths: data analysis graph analysis 		<p>Opportunity for cross-curricular skill development</p> <ul style="list-style-type: none"> PE GCSE – heart rate, heart structure, diet, lifestyle Maths: data analysis graph analysis PSHE – disease and lifestyle, STD's 		<p>Opportunity for cross-curricular skill development</p> <ul style="list-style-type: none">

		diseases caused by bacteria. Unfortunately many groups of bacteria have now become resistant to these antibiotics. The race is now on to develop a new set of antibiotics.			
<p>Half Term 4:</p> <p>All pupils will know: The Homeostasis topic as outlined on pages 41-50 of the GCSE Biology Specification Specification for first teaching in 2016 (aqa.org.uk)</p> <p>All pupils will be assessed: By short recall activities, electronic automatically marked homework's and longer answer short tests focussed on the topics. There will also be a longer exam as part of the data gathering for the whole year group twice a year</p> <p>Impact - Why do we teach this?</p> <p>Cells in the body can only survive within narrow physical and chemical limits. They require a constant temperature and pH as well as a constant supply of dissolved food and water. In order to do this the body requires control systems that constantly monitor and adjust the composition of the blood and tissues. These control systems include receptors which sense changes and effectors that bring about changes. In this section we will explore the structure and function of the nervous system and how it can bring about fast responses. We 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.</p>	<p>Subject specific skills being developed:</p> <ul style="list-style-type: none"> Evaluate the benefits and risks of procedures carried out on the brain and nervous system. Evaluate information around the relationship between obesity and diabetes, and make recommendations taking into account social and ethical issues. Students should be able to describe how kidney dialysis works. Understand how the everyday use of hormones as weed killers has an effect on biodiversity. Interpret and explain simple diagrams of negative feedback control. Evaluate from the perspective of patients and doctors the methods of treating infertility. Understand social and ethical issues associated with IVF treatments. Developments of microscopy techniques have enabled IVF treatments to develop. Explain everyday and technological applications of science; evaluate 	<p>All pupils will know: The Homeostasis topic as outlined on pages 41-50 of the GCSE Biology Specification Specification for first teaching in 2016 (aqa.org.uk)</p> <p>All pupils will be assessed: By short recall activities, electronic automatically marked homework's and longer answer short tests focussed on the topics. There will also be a longer exam as part of the data gathering for the whole year group twice a year</p> <p>Impact - Why do we teach this?</p> <p>Cells in the body can only survive within narrow physical and chemical limits. They require a constant temperature and pH as well as a constant supply of dissolved food and water. In order to do this the body requires control systems that constantly monitor and adjust the composition of the blood and tissues. These control systems include receptors which sense changes and effectors that bring about changes. In this section we will explore the structure and function of the nervous system and how it can bring about fast responses. We 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.</p>	<p>Subject specific skills being developed:</p> <ul style="list-style-type: none"> Evaluate the benefits and risks of procedures carried out on the brain and nervous system. Evaluate information around the relationship between obesity and diabetes, and make recommendations taking into account social and ethical issues. Students should be able to describe how kidney dialysis works. Understand how the everyday use of hormones as weed killers has an effect on biodiversity. Interpret and explain simple diagrams of negative feedback control. Evaluate from the perspective of patients and doctors the methods of treating infertility. Understand social and ethical issues associated with IVF treatments. Developments of microscopy techniques have enabled IVF treatments to develop. Explain everyday and technological applications of science; evaluate associated personal, social, economic and environmental implications; and make decisions based on the 	<p>Half Term 6:</p> <p>All pupils will know: The Inheritance topic as outlined on pages 50-64 of the GCSE Biology Specification Specification for first teaching in 2016 (aqa.org.uk)</p> <p>All pupils will be assessed: By short recall activities, electronic automatically marked homework's and longer answer short tests focussed on the topics. There will also be a longer exam as part of the data gathering for the whole year group twice a year</p> <p>Impact- Why do we teach this? In this section we will discover how the number of chromosomes are halved during meiosis and then combined with new genes from the sexual partner to produce unique offspring. Gene mutations occur continuously and on rare occasions can affect the functioning of the animal or plant. These mutations may be damaging and lead to a number of genetic disorders or death. Very rarely a new mutation can be beneficial and consequently, lead to increased fitness in the individual. Variation generated by mutations and sexual reproduction is the basis for natural selection; this is how species evolve. An understanding of these processes has allowed scientists to intervene through selective breeding to produce livestock with favoured characteristics. Once new varieties of plants or animals have been produced it is possible to clone individuals to produce larger numbers of identical individuals all carrying the favourable characteristic. Scientists have now discovered how to take genes from one species and introduce them in to the genome of another by a process called genetic engineering. In spite of the huge potential benefits that this technology can offer, genetic modification still remains highly controversial.</p>	<p>Subject specific skills being developed:</p> <ul style="list-style-type: none"> Interpret evolutionary trees. Understand how scientific methods and theories develop over time. Understand how scientific methods and theories develop over time. Appreciate why the fossil record is incomplete Extract and interpret information from charts, graphs and tables. Data is now available to support the theory of evolution Our current understanding of genetics has developed over time. The theory of speciation has developed over time. Students should appreciate that the theory of evolution by natural selection developed over time and from information gathered by many scientists. Explain the potential benefits and risks of cloning in agriculture and in medicine and that some people have ethical objections. Interpret information about genetic engineering techniques and to make informed

	<p>associated personal, social, economic and environmental implications; and make decisions based on the evaluation of evidence and arguments.</p> <ul style="list-style-type: none"> Show why issues around contraception cannot be answered by science alone. 		<p>evaluation of evidence and arguments.</p> <ul style="list-style-type: none"> Show why issues around contraception cannot be answered by science alone. 		<p>judgements about issues concerning cloning and genetic engineering, including GM crops.</p> <ul style="list-style-type: none"> Explain the benefits and risks of selective breeding given appropriate information and consider related ethical issues. Use the theory of evolution by natural selection in an explanation. Appreciate that embryo screening and gene therapy may alleviate suffering but consider the ethical issues which arise. Modelling insertions and deletions in chromosomes to illustrate mutations. Interpret a diagram of DNA structure but will not be required to reproduce it. Historical developments of our understanding of the causes and prevention of malaria Modelling behaviour of chromosomes during meiosis.
	<p>Reading Skills needed for this unit: Key Vocabulary: hormone, menstrual cycle, oestrogen, FSH, LH, reflex arc, gland, gluco-regulation, insulin, pancreas, glucagon, glycogen, glucose, kidney,</p>		<p>Reading Skills needed for this unit: Key Vocabulary: hormone, menstrual cycle, oestrogen, FSH, LH, reflex arc, gland, gluco-regulation, insulin, pancreas, glucagon, glycogen, glucose, kidney,</p>		<p>Reading Skills needed for this unit: Key Vocabulary: Mitosis, DNA, chromosome, helix, meiosis, stem cell, evolution, selective breeding, cloning, sex determination, heterozygous, genotype, homozygous, phenotype, gametes, embryo, fertilisation,</p>

	<p>Opportunity for cross-curricular skill development</p> <ul style="list-style-type: none"> • PSHE contraception, infertility, adolescence, 		<p>Opportunity for cross-curricular skill development</p> <ul style="list-style-type: none"> • PSHE contraception, infertility, adolescence, 		<p>Opportunity for cross-curricular skill development</p> <ul style="list-style-type: none"> • PSHE family trees inherited disorder
<p>Ensuring this curriculum meets the needs of all pupils: this curriculum has been designed to ensure pupils from all starting points will develop the key curriculum skills and knowledge identified. The curriculum design ensures that each unit forms part of the overall learning journey and there are opportunities for revisiting skills and linking together key pieces of knowledge. Whole Academy policies and practices are followed to tailor the delivery of the curriculum for individuals and groups of students. For example SEND students have individual learning profiles that outline needs/strategies to be used, Whole group RIPs are in place to identify key teaching strategies that will be used with individual teaching groups. Ongoing formative assessment and clear summative assessment points allow individual staff and departments to identify misconception and adjust curriculum appropriately.</p>					
<p>Enrichment opportunities:</p> <ul style="list-style-type: none"> • School resources (rsb.org.uk) 					
<p>Career opportunities/ links:</p> <p>Careers (rsb.org.uk)</p>					