Biology Separate Science Curriculum Long Term Planning

Biology		Half Term 1	Half Term 2	Half Term 3	Half Term 4	Half Term 5	Half Term 6
Year 10	Big Idea	**Infection & Response:** How does our body defend against pathogens?	**Bioenergetics:** Why is glucose such an important molecule?	**Ecology:** how do living things interact with their environment and what can affect these interactions?	**Ecology Continued:**	**Homeostasis:** How do humans respond to changes in both their internal and external environment?	**Homeostasis Continued:**
	Key knowledge and skills	**Infection & Response:** • Understanding that pathogens (such as bacteria, viruses, protists and fungi) are the cause of all communicable diseases. • Understanding how pathogens can spread from person to person and how this can be reduced. • Understanding the causes, symptoms, spread and treatment and/or prevention of measles, HIV, TMV, salmonella, gonorrhoea, rose black spot and malaria. • Understanding how the human body can defend itself against	**Bioenergetics**: • Understanding the process and purpose of photosynthesis • Investigating how light intensity affects the rate of photosynthesis • Understand how limiting factors influence the productivity of plants • Understanding the process and purpose of aerobic and anaerobic respiration • Understanding the different ways in which plants use glucose • Understanding how the human body responds to exercise in terms of breathing and respiration.	**Ecology**: • Understanding the terms community, population and ecosystem • Using predator-prey cycles to explain population numbers within an ecosystem • Describing the different resources that plants and animals compete for • Explaining how animals and plants are adapted to survive in the environment they live in, linking this to the three different categories of adaptation (including organisms which live in extreme environments)		**Homeostasis**: • Describing and explaining the concept of Homeostasis, including why it is important and what particular conditions in the human body need to be carefully controlled • Explaining the basic features of internal control systems • Explaining how the nervous system allows humans to respond to changes in the external environment, including how reflexes work • Explaining the different features of the human endocrine system and how it uses hormones and glands to control internal conditions	

		pathogens, including the role that white blood cells play in forming the second line of defence against infectious diseases. • Understanding the concept of immunity and explaining how a vaccine can make someone immune to a disease. • Understanding the difference between painkillers and antibiotics as treatments. • Understanding the process and purpose of drug testing to ensure that medication is effective and safe to use. • Understanding how monoclonal antibodies are produced and describe what they are used for. • Understanding how plants defend themselves against being damaged.	• Understand why metabolic reactions are essential for life in plants and animals.	• Understanding the process of sampling and field work to determine the distribution of organisms across a particular habitat • Describing and explaining what Biodiversity is and why it is important for the maintenance of healthy ecosystems. • Explaining the different ways in which human are reducing global biodiversity, including; waste management, land use, deforestation and destruction of peat bogs. • Explaining the different strategies that scientists are undertaking to try and protect global biodiversity. • Understanding which factors effect the rate of decay. • Linking feeding relationships to pyramids of biomass, and trophic levels.		• Explaining the role of the pancreas in the maintenance of blood glucose concentration, with a focus on type 1 and type 2 diabetes • Describing and explaining the role of different hormones in human reproduction, particularly looking at the hormones involved in the regulation of the female menstrual cycle • Describing and explaining the different approaches to contraception • Explaining how hormones can be used to treat infertility, including the stages of IVF • Explaining how the levels of hormones in the human body are controlled by a process called negative feedback • Understanding how our body monitors and maintains body temperature • Describing how levels of water and nitrogen in the body are balanced.	

				• Understanding the main sustainable food production techniques including better farming techniques, fisheries and fusarium. • Understanding how biotechnology is being used to increase food security.		• Understanding the function of the kidney and how kidney dialysis works. • Understanding how plant hormones can be used in horticulture and agriculture.	
	End Point	They will describe how pathogens spread, how the body defends itself, and explain immunity, vaccination and the safe development and use of medicines.	Pupils will explain photosynthesis and respiration, including responses to exercise and uses of glucose.	Pupils will analyse ecosystems, explaining interactions, adaptations and biodiversity, and evaluate human impacts alongside strategies to conserve and protect the environment.		Pupils will be able to explain the importance of homeostasis and identify the conditions the body must regulate. They will describe how control systems maintain stable internal conditions through the nervous and endocrine systems, including reflex actions and hormonal responses. Pupils will explain the role of the pancreas in controlling blood glucose levels and compare type 1 and type 2 diabetes. They will describe hormonal control of the menstrual cycle and evaluate different methods of contraception. Higher Tier pupils will explain hormone treatments for infertility, including IVF, and understand negative feedback in hormone regulation.	

Year 11	Big Idea	**Ecology:** how do living things interact with their environment and what can affect these interactions?	**Homeostasis:** How do humans respond to changes in both their internal and external environment?	**Inheritance, Variation and Evolution:** What mechanisms have produced the variety of life we see on Earth today?	**Revision**	**Revision**	
	Key Knowledge and skills	**Ecology:** • Understanding the terms community, population and ecosystem • Using predator-prey cycles to explain population numbers within an ecosystem • Describing the different resources that plants and animals compete for • Explaining how animals and plants are adapted to survive in the environment they live in, linking this to the three different categories of adaptation (including organisms which live in extreme environments) • Understanding the process of sampling and field work to determine the distribution of	**Homeostasis**: • Describing and explaining the concept of Homeostasis, including why it is important and what particular conditions in the human body need to be carefully controlled • Explaining the basic features of internal control systems • Explaining how the nervous system allows humans to respond to changes in the external environment, including how reflexes work • Explaining the different features of the human endocrine system and how it uses hormones and glands to control internal conditions	**Inheritance**, Variation & Evolution • Understanding the difference between sexual and asexual reproduction • Understanding the structure and function of DNA • Understanding how genetic information is passed from parent to offspring • Understanding the different types and causes of variation • Understanding the process of evolution through natural selection • Describing and explaining the evidence for evolution, including fossil formation • Describing and explaining the causes of extinction			

		organisms across a particular habitat • Describing and explaining what Biodiversity is and why it is important for the maintenance of healthy ecosystems. • Explaining the different ways in which human are reducing global biodiversity, including; waste management, land use, deforestation and destruction of peat bogs. • Explaining the different strategies that scientists are undertaking to try and protect global biodiversity. • Understanding which factors effect the rate of decay. • Linking feeding relationships to pyramids of biomass, and trophic levels. • Understanding the main sustainable food production techniques including better farming	• Explaining the role of the pancreas in the maintenance of blood glucose concentration, with a focus on type 1 and type 2 diabetes • Describing and explaining the role of different hormones in human reproduction, particularly looking at the hormones involved in the regulation of the female menstrual cycle • Describing and explaining the different approaches to contraception • Explaining how hormones can be used to treat infertility, including the stages of IVF • Explaining how the levels of hormones in the human body are controlled by a process called negative feedback • Understanding how our body monitors and maintains body temperature	• Understanding how different organisms can be classified • Understanding how our genes codes for certain characteristics. • Describing the different cloning techniques and analysing their benefits and risks. • Understanding how a new species arises through speciation.			

		techniques, fisheries and fusarium. • Understanding how biotechnology is being used to increase food security.	• Describing how levels of water and nitrogen in the body are balanced. • Understanding the function of the kidney and how kidney dialysis works. • Understanding how plant hormones can be used in horticulture and agriculture. •				
	End Point	Pupils will analyse ecosystems, explaining interactions, adaptations and biodiversity, and evaluate human impacts alongside strategies to conserve and protect the environment.	Pupils will be able to explain the importance of homeostasis and identify the conditions the body must regulate. They will describe how control systems maintain stable internal conditions through the nervous and endocrine systems, including reflex actions and hormonal responses. Pupils will explain the role of the pancreas in controlling blood glucose levels and compare type 1 and type 2 diabetes. They will describe hormonal control of the menstrual cycle and evaluate different methods of contraception. Higher Tier pupils will explain hormone treatments for infertility, including IVF,	Pupils will explain inheritance, variation and evolution, including DNA and classification, and evaluate evidence for evolutionary change.			

			and understand negative feedback in hormone regulation.				