

## Curriculum Planning KS4 Biology

### Long Term Planning

Each curriculum subject should have the following clearly articulated.

#### Rationale

- Science is a fundamental part of our everyday lives. It helps to explain so much of the world around us and enables advances in many areas including health, communication, the environment and leisure.

#### Intent

#### Pedagogical Methodology

- The KS4 Biology curriculum is designed to suit the needs of all students at The Market Weighton school. Each topic has numeracy, literacy and practical activities designed to develop all students' knowledge and key skills.
- Every lesson incorporates metacognition strategies designed with the aim of developing students' long and short term memory in relation to retrieving key scientific knowledge.

#### Assessment

#### Foundation Learning

- Students in the foundation learning groups follow the KS4 curriculum which is bespoke and adapted to suit each student's individual needs and is taught by a specialist SEND science specialist teacher. Students in the foundation learning group have the same opportunities for literacy, numeracy and practical opportunities as students in mainstream education.

#### Long term planning grid

Year	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2

#### Medium Term Planning



Topic	Big Questions	Lesson	Key Knowledge and Skills / Assessment	Links to other subjects
Unit 1 Cells	<b><i>What is the difference between a light microscope and an electron microscope</i></b>	1 Light vs electron	Label a microscope use a light microscope to view a selection of cells describe the difference between an electron and light microscope Carry out calculations involving magnification, real size and image size	Maths for microscopy calculations
	<b><i>How is magnification calculated</i></b>	1b Magnification req practical	Label a microscope use a light microscope to view a selection of cells describe the difference between an electron and light microscope Carry out calculations involving magnification, real size and image size	Maths for microscopy calculations
	<b><i>What is the difference between plants and animal cells</i></b>	2 Animal and plant cells	Recall the structures of plant and animal cells State the functions of the structures of the plant and animal cells describe the similarities and differences between plants	English for describing and explaining



		and animal cells explain how the main subcellular structures are related to their functions	
<b><i>What is the structure and function of the different parts of a prokaryotic cell</i></b>	3 Prokaryotes	label a bacterial cell describe the function of each part of the bacterial cell summarise the similarities and differences between eukaryotic and prokaryotic cells demonstrate an understanding of the scale and size of cells and why bacteria cells were discovered much later	English for describing and explaining. Analyzing
<b><i>How are cells adapted to their functions</i></b>	4 Specialised cells	Recall the names of some specialised cells describe the functions of each specialised cell describe how the structure of different types of cell relate to their function explain how cell acquires different subcellular structures to enable it to carry out certain functions	English for describing and explaining
<b><i>What are stem cells used for</i></b>	5 Stem Cells	Recall the medical conditions that are treated with	English for describing and explaining



		stem cells, describe the advantages and disadvantages of using stem cells, summarise the risks associated with using stem cells, evaluate the ethical issues surrounding the use of stencils.	RE/PSHE for ethical issues surrounding stem cell use
<b><i>Warts is responsible for our physical characteristics</i></b>	6 Chromosomes	Recall where chromosomes are found, define the term mitosis, describe how cells divide in a series of stages called the cell cycle, recognise and describe situations in given contexts when mitosis is occurring.	English for describing and explaining
<b><i>How do cells replicate for growth and repair</i></b>	7 Mitosis	Recall where chromosomes are found, define the term mitosis, describe how cells divide in a series of stages called the cell cycle, recognise and describe situations in given contexts when mitosis is occurring.	Maths for calculations involving the cell cycle
<b><i>How do substances get in and out of cells</i></b>	9 Diffusion	Identify substances which diffuse, describe how substances get in and out of cells via diffusion, explain the	English for describing and explaining



		process of diffusion, explain the factors which affect the rate of diffusion.	
<b><i>What structure is best to exchange substances is efficiently</i></b>	9 Exchanging Materials	State the function of a partially permeable membrane, describe how diffusion occurs in multicellular organisms, explain how diffusion occurs along a concentration gradient, explain the factors which affect the rate of diffusion.	English for describing and explaining
<b><i>How does water move in and out of cells?</i></b>	10 Osmosis	Define how osmosis differs from diffusion and the factors that affect this in animal and plant cells.	English: write statements to support abstract picture evidence.
<b><i>What is the sugar concentration of potatoes</i></b>	10b Osmosis practical	Define the terms hypotonic, hypertonic and isotonic, describe the difference between concentrated and dilute, explain the process of osmosis, used compound measures to calculate the rate of water uptake.	English for describing and explaining Maths for calculating water uptake and percentage change in mass
<b><i>How do substances move against a concentration gradient</i></b>	11 Active transport	State the substance which are moved into cells active transport,	English for describing and explaining



			describe transport most molecules into cells, summarise the differences between the fusion osmosis and active transport, explain the need for a ATP in the net movement of ions	
Unit 2 Organisation	<b><i>How are multicellular organisms organised</i></b>	1 Principles of organisation	List cells tissues organs and organ systems in size order, describe a tissue as a group of cells with a similar structure and function, explain the role of some key organs in the digestive system, explain the role of some key organs in the digestive system and link to enzymes.	English for describing and explaining
	<b><i>How is the digestive system organised</i></b>	2 digestive system	label the digestive system, describe the function of the digestive system, explain the role of some key organs in the digestive system, explain the role of some key organs in the digestive system and link to enzymes.	English for describing and explaining DT Food



	<p><b><i>How can I test for various food groups</i></b></p>	<p>3 food test practical</p>	<p>I can name the reagents used to state test for starch and proteins, I can describe the test for sugar, I can explain how the tests for a variety of food groups can be scientifically carried out, I can explain why these tests are described as qualitative.</p>	<p>English for describing and explaining DT Food</p>
	<p><b><i>How do enzymes work and what affects their activity.</i></b></p>	<p>4 Enzyme basics</p>	<p>Define an enzyme, describe how enzymes work, explain how enzymes work within the digestive system, explain the factors that can affect enzyme function.</p>	<p>English for describing and explaining DT Food</p>
	<p><b><i>What are digestive enzymes and what affects them</i></b></p>	<p>5 Enzymes in digestion</p>	<p>Define an enzyme, describe how enzymes work, explain how enzymes work within the digestive system, explain the factors that can affect enzyme function.</p>	<p>English for describing and explaining DT Food</p>
	<p><b><i>What does PH do to enzymes</i></b></p>	<p>6 Enzymes required practical</p>	<p>Define an enzyme, describe how enzymes work, explain how enzymes work within the digestive system, explain the</p>	<p>English for describing and explaining</p>



		factors that can affect enzyme function.	
<b><i>What are the different blood vessels</i></b>	7 Blood vessels	Name three types of blood vessels, described three types of blood vessels, explain how the structures of the different vessels relate to their functions, compare and contrast the different blood vessels	English for describing and explaining PE
<b><i>How are lungs adapted for gas exchange</i></b>	8 Respiratory system	Identified the structures within the lungs, level diagrams of the respiratory system, describe the process of breathing, link far lungs and blood to explain how the system works as one.	English for describing and explaining PE
<b><i>What is the double circulatory system</i></b>	9 Heart	Recall three parts of the system, label the heart, described the role of the double circulatory system, explained the flow of blood through the double circulatory system	English for describing and explaining PE
<b><i>What are the components of blood</i></b>	10 Blood	Recall three blood vessels, describe key features of three types of blood	English for describing and explaining PE





			vessels and the blood, explain the function of the components of the blood, evaluate the importance of the components of the blood.	
	<b><i>What causes heart disease and how can it be treated</i></b>	11a CHD	Define coronary heart disease, describe what factors that affect coronary heart disease, explain the effects of the faulty heart valve, evaluate the methods of treatment for coronary heart disease. Are	English for describing and explaining PSHE for evaluation of treatment methods PE
	<b><i>How are faulty heart valves treated.</i></b>	11b Valves	State how the heart can become damaged, describe the consequences of faulty heart valves, describe the causes of heart disease and how to treat, evaluate the different ways to treat heart disease.	English for describing and explaining PE
	<b><i>How can lifestyle affect health</i></b>	12 Health Issues	Name a non-communicable disease, describe some factors that affect health and well-being, explain how lifestyle can affect health, evaluate lifestyles	English for describing and explaining PSHE evaluation of methods



			and suggest improvements	
	<b><i>What is cancer and what are the risk factors?</i></b>	13 Cancer		
	<b><i>What are the tissues and organs in leaf</i></b>	15 Leaf structure	Describe how cancer is formed, describe the two types of tumour, describe the meaning of the term malignant, link cancer to risk factors associated with lifestyle choices and use data provided as evidence.	English for describing and explaining PSHE for lifestyle links
	<b><i>How are substances transferred around the plant</i></b>	16 Xylem and phloem	<b>Recall parts of the leaf, describe the tissues in the leaf, explain how the structure of the leaf relates to its function, explain how of the stomata opening and closing is related to photosynthesis</b>	English for describing and explaining
	<b><i>What is the process of transpiration</i></b>	17 Transpiration	List the plants organs, label cross-section of a leaf, describe how the structure of the cells xylem and phloem are adapted to their functions, explain how the main subcellular structures are related to their functions.	English for describing and explaining



	<b>What are stomata and how do they prevent water loss</b>	18 Stomata	Recall the gases exchanged on plants, describe what is meant by transpiration, explain the effect of changing temperature humidity movement of light intensity on the rate of transpiration, explain how plants compromise the need to carbon dioxide and water loss.	
				<b>LQ What are microbes and how do some cause disease</b>
Unit 3 Infection and Response	<b>What are some communicable diseases caused by?</b>	2 Communicable Diseases	State the main types of pathogens, define the term pathogen, describe how pathogens cause disease, compare and contrast different types of pathogens.	English for describing and explaining History DT Food
	<b>How do diseases spread and how can we prevent it?</b>	3 Transmission	Name some communicable diseases, Define the term communicable disease, Describe the symptoms, explain how they can be treated.	English for describing and explaining History
	<b>What is the first line of defence to pathogens?</b>	4 Body defences	Know what a disease causing microbe is, Describe ways in	English for describing and explaining History



		which diseases spread, Explain ways in which to prevent spread of diseases, Explain a case study example of how a disease spreads and how to prevent it	DT Food
<b><i>How do white blood cells protect the body from disease?</i></b>	5 Defences working together	List the specific defence systems, Describe the role of the white blood cells in the defence against disease. Explain how each white blood cell defends against disease, Explain how the 3 stages of defense work together	English for describing and explaining
<b><i>How does bacteria become resistant to antibiotics?</i></b>	6 Antibiotics and painkillers	List the specific defence systems, Describe the role of the white blood cells in the defence against disease. Explain how each white blood cell defends against disease, Explain how the 3 stages of defense work together	English for describing and explaining
<b><i>How do vaccines work?</i></b>	7 Vaccinations	State the use of painkillers, Describe the use of antibiotics, Explain how bacteria become resistant to antibiotics, Explain the issues with bacteria becoming	English for describing and explaining



			resistant to antibiotics	
	<b><i>What are the differences between bacterial infections</i></b>	8a Bacteria	Describing how bacteria spread & infect and the role of antibiotics	English. Extracting information from text
	<b><i>What are the differences between viral infections</i></b>	8b Viruses	Describing the work of Ignaz Semellweig & linking his discoveries to drawing conclusions from graphs & data	English – Evaluating the historical context of early discoveries
	<b><i>What are the differences between fungal &amp; protist infections</i></b>	8c Fungi & protists	Describe infections of both fungal & protist origin. Evaluate the treatments via an extended writing question.	English extracting information from text & extended writing
	<b><i>How do work out which the best antiseptic is?</i></b>	8d Antiseptic Required Practical	State the reason for having a vaccination, Describe how a vaccination works, Explain how a vaccination prevents the spreading of disease, Evaluate the pros and con of vaccinations	English for describing and explaining PSHE for evaluation of the pros and cons of vaccination History
	<b><i>How are drugs tested?</i></b>	9 Drug Testing	Describe an antiseptic, I can describe how to work aseptically, I can calculate the zone of inhibition, I can evaluate the experiment and suggest improvements	English for describing and explaining Maths for calculating the zone of inhibition (area)
	<b><i>How are monoclonal antibodies used?</i></b>	10 Uses of Monoclonal	Define the term 'monoclonal antibodies',	English for describing and explaining



		Antibodies HT BIO	Describe how monoclonal antibodies are used to treat diseases e.g. cancer, Explain how monoclonal antibodies are made.	
	<b><i>What are the different plant defences?</i></b>	11 Plant Diseases BIO	Describe how a pregnancy test works, Describe other uses for monoclonal antibodies, Evaluate the advantages and disadvantages of using monoclonal antibodies	English for describing and explaining PSHE for ethics Health and Social Care
	<b><i>how are plants adapted to defend against disease?</i></b>	12 Plant Defences BIO	Describe the different caused of plant disease, Describe symptoms of diseased plants, Describe how to identify plant diseases, Explain how diseased plants are identified	English for describing and explaining
	<b><i>How are plants organized?</i></b>	1a Plant tissues & organisation	Identify structures of the plant. Relate & explain how structure relates to function in the leaf & cells	English for describing and explaining
Bioenergetics Unit 4	<b><i>How do plants make their own energy?</i></b>	1b photosynthesis	Identify the reactants & products of photosynthesis. Write the word equation for	English for describing and explaining



			photosynthesis. Write the symbol equation for photosynthesis. Write a balanced symbol equation for photosynthesis.	
	<b><i>What do plants use glucose for?</i></b>	1c Products of photosynthesis	Identify different tissues and organs in plants and state their functions Explain the functions of the different cells in a leaf; identify the different cells found in the leaf. Critically evaluate the structure of different cells related to their function.	English for describing and explaining  Practical skills: testing leaves for starch
	<b><i>What factors affect the rate of photosynthesis?</i></b>	2 Limiting Factors	Identify four factors which can affect the rate of photosynthesis in plants Interpret data showing how factors affect the rate of photosynthesis Plan a method which will measure the effect of light intensity on the rate of photosynthesis	English for describing and explaining  Maths interpreting data & drawing graphs.
	<b><i>How can we investigate how photosynthesis responds to light?</i></b>	2b Rate of Photosynthesis RP	Recall the 4 factors that affect the rate of photosynthesis. Describe a	Maths graph drawing and interpretation



			practical experiment to investigate the factors affecting the rate of photosynthesis. Describe the effect on the rate of photosynthesis by different factors, interpret graphs to explain the changes in rate, including for multiple factors	
<b><i>How are the conditions in a greenhouse managed for optimum growth?</i></b>	3 Making the most of photosynthesis HT		Describe the factors that can affect the rate of photosynthesis, Describe how conditions are artificially manipulated to grow flowers, Analyse data to evaluate the cost effectiveness of artificially manipulating conditions.	English for describing and explaining Maths graph drawing and interpretation
<b><i>What is the reactants and products of aerobic respiration?</i></b>	4 Aerobic respiration		Recall where respiration occurs, Write word equations for aerobic respiration, Describe a practical experiment to investigate the factors affecting the rate of respiration, Write balanced symbol equations for respiration	Maths balancing equations English for describing and explaining PE





	<b><i>How is energy produced without oxygen?</i></b>	5 Anaerobic Respiration	Recall where anaerobic respiration occurs, Write word equations for anaerobic respiration, Explain the term oxygen debt, Compare the aerobic and anaerobic respiration processes.	English for describing and explaining PE
	<b><i>What happens to heart rate, breathing rate and volume when we exercise?</i></b>	6 Response to exercise	Recall the effects of exercise, Describe what happens to heart rate, breathing rate and breathing volume when we exercise, Explain the consequences of the lack of oxygen during exercise, Explain the causes of a 'cramp' or 'stitch' after exercise	English for describing and explaining  Maths graph drawing and interpretation  PE
	<b><i>What is metabolism is and what reactions does it involve?</i></b>	7 Metabolism	Define the term metabolism, Describe the uses of sugars, amino acids, fatty acids and glycerol. Describe the factors which affect the rate of metabolism, Explain the effects of a slower or faster metabolism	English for describing and explaining PE DT Food
	HOMEOSTASIS			



	<p><b><i>How does the body maintain heat, carbon dioxide, temperature and water balance?</i></b></p>	<p>1 Homeostasis</p>	<p>Explain what homeostasis is and why it is important Describe examples of conditions that need to be controlled Describe the main roles of the nervous and endocrine systems and outline the main components of a control system</p>	<p>English for describing and explaining</p>
	<p><b><i>How does the body respond to stimulus?</i></b></p>	<p>2 Nervous System</p>	<p>Identify how an organism is able to detect stimuli in their environment Describe the functions of the main structures in the nervous system. Explain the importance of being able to respond to environmental changes and coordinate behaviour</p>	<p>English for describing and explaining</p>
	<p><b><i>How does the body respond to stimulus?</i></b></p>	<p>2b Reflex</p>	<p>Identify human senses, Describe the role of the nervous system, Explain how the structure of the nervous system is adapted to its functions. Extract and interpret data from graphs, charts</p>	<p>English for describing and explaining Maths for data analysis PE</p>



			and tables, about the functioning of the nervous system	
<b><i>How does the body respond to stimulus?</i></b>	2c Reflex RP	Identify human senses, Describe the role of the nervous system, Explain how the structure of the nervous system is adapted to its functions. Extract and interpret data from graphs, charts and tables, about the functioning of the nervous system	English for describing and explaining Maths for data analysis	
<b><i>What is the role of the brain?</i></b>	3 The Brain	Identify human senses, Describe the role of the nervous system, Explain how the structure of the nervous system is adapted to its functions. Extract and interpret data from graphs, charts and tables, about the functioning of the nervous system	English for describing and explaining Maths for data analysis	
<b><i>how does the eye see?</i></b>	4a The Eye HT	Name three parts of the brain, Describe the role of three parts of the brain. Explain some of the difficulties of investigating brain function and treating brain damage and	English for describing and explaining  Health and Social care	



		disease. Evaluate the benefits and risks of procedures carried out on the brain and nervous system.	
<b><i>How does the eye focus</i></b>	4b Problems with the eye HT	Name 3 parts of the eye, Describe the role of the parts of the eye, Explain how the brain receives information about the image. Explain the iris reflex	English for describing and explaining
<b><i>How does are body react to increasing and decreasing temperature?</i></b>	5 Controlling Body Temp HT	Name 3 parts of the eye, Describe the role of the parts of the eye, Explain long and short sightedness is corrected, Evaluate eye treatment possibilities	English for describing and explaining
<b><i>What are the roles of each hormone in the endocrine system?</i></b>	6 The Endocrine System	Identify what the body maintains, Describe a control center, Describe what homeostasis is and why it is important, and I can give examples, Summarise the common features of all control systems	English for describing and explaining
<b><i>How does the human body regulate blood sugar?</i></b>	7 Blood Sugar Control	Identify the glands of the human endocrine system, Describe the composition of the human	English for describing and explaining



		endocrine system, Describe the role of the pituitary gland, Compare and contrast the nervous system and the endocrine system	
<b><i>What is the treatment for diabetes?</i></b>	7b Treating Diabetes	Describe the cause, effects, treatment and problems associated with type 1 & type 2 diabetes. Compare the causes and treatment of type 1 and type 2 diabetes Evaluate modern methods of treating diabetes	English for describing, explaining & evaluation of sources.
<b><i>Why do we need negative feedback systems?</i></b>	7c The role of Negative Feedback HT	Identify the glands that secrete adrenaline and thyroxine Describe the importance of negative feedback systems Explain the role of adrenaline and thyroxine in the body.	English for describing, explaining.
<b><i>How is the water balance of our cells controlled?</i></b>	8 Removing waste products. BIO HT	Recall the organs used in controlling blood sugar, Describe the role of the liver and pancreas in	English for describing and explaining



			controlling blood sugar, Explain how insulin controls blood glucose (sugar) levels in the body. Explain the consequences of high and low blood sugar	
	<b><i>What is the role of the kidneys?</i></b>	9 The Kidneys BIO HT	Name the hormone use to control water levels, Describe how it controls water levels, Explain how it can lower water levels, Explain how this is an example of negative feedback	English for describing and explaining
	<b><i>What are the primary &amp; secondary charteristic changes in puberty?</i></b>	10 Human reproduction	State the difference between primary and secondary sexual characteristics Describe secondary sexual characteristics of boys and girls. Explain the cause of these changes in boys and girls and their relevance in reproduction.	English for describing and explaining
	<b><i>What are the role of hormones in reproduction?</i></b>	10b The menstrual cycle	Identify the names of hormones needed in the menstrual cycle Describe the menstrual	English for describing and explaining



			cycle, including the role of hormones Explain the interactions between hormones involved in the menstrual cycle	
	<b><i>What are the hormonal &amp; non-hormonal methods of contraception?</i></b>	10c Controlling fertility	Describe hormonal and non-hormonal methods of contraception. Explain how hormonal and non-hormonal contraceptives work. Evaluate the use of hormonal and non-hormonal methods of contraception	English for describing and explaining PSHE Health and Social Care
	<b><i>How does IVF help infertile couples have children?</i></b>	10d IVF HT	Describe the use of fertility drugs in women with low FSH levels. Use a model, e.g. a flow diagram to explain the process of In Vitro Fertilisation (IVF). Evaluate the use of fertility treatments	English for describing, explaining and evaluation. PSHE Health and Social Care
	<b><i>How is plant growth controlled?</i></b>	11 Plant Hormones & response BIO HT	Recall some methods of contraception, Describe how	English for describing and explaining PSHE



			fertility can be controlled., Describe the surgical methods of male and female sterilisation. Evaluate the different hormonal and non hormonal methods of contraception..	Health and Social Care
	<b><i>How is plant growth controlled?</i></b>	11b Plant Hormone Use BIO HT	<b>Name the chemical that controls plant growth, Describe how plants respond to light, Explain how plants growth is controlled, Explain how this is used commercially (HT)</b>	English for describing and explaining
	<b><i>How is plant growth controlled?</i></b>	11c Plant Hormone RP	<b>Name the chemical that controls plant growth, Describe how plants respond to light, Explain how plants growth is controlled, Explain how this is used commercially (HT)</b>	English for describing and explaining Practical skills.
6 INHERTANCE				
	<b><i>What is the difference between sexual and asexual reproduction?</i></b>	1 Types of reproduction	Define the term 'clone' Describe sexual reproduction in animals and plants Explain why sexual	English for describing and explaining





			reproduction produces variation in the offspring but asexual reproduction does not	
	<b><i>How are sex cells produced by meiosis?</i></b>	2 Meiosis	Name the male and female gametes, Describe the process of mitosis, Explain how meiosis leads to genetic variation in the offspring, Compare and contrast mitosis and meiosis asexual and sexual reproduction	English for describing and explaining
	<b><i>What is the structure of a chromosome?</i></b>	3a Chromosomes, gene and the genome	Name the male and female gametes, Describe the process of mitosis, Explain how meiosis leads to genetic variation in the offspring, Compare and contrast mitosis and meiosis asexual and sexual reproduction	English for describing and explaining
	<b><i>How does DNA control protein synthesis?</i></b>	4 Protein synthesis BIO	Recall the location of DNA, Define the term genome. Describe the structure of DNA, Explain how genes,	English for describing and explaining



		chromosomes and DNA are linked	
<b><i>How we are all different?</i></b>	5a Genetic Inheritance	Recall the structure of DNA, Describe the structure of chromosomes, DNA and genes., Explain that a gene is a small section of DNA that codes for a particular sequence of amino acids to make a specific protein. Explain the order of sequence to make a protein	English for describing and explaining
<b><i>How are some disorders inherited?</i></b>	6 Genetic diseases	List some characteristics, Distinguish characteristics as environmental or genetic, Describe the role of alleles in genetic characteristics, Explain the difference between genotype and phenotype	English for describing and explaining
<b><i>How does the work of Gregor Mendel fit into modern day genetics?</i></b>	6b History of genetics HT	Identify the important of Gregor Mendel's work in understanding in inheritance Describe the work of Gregor Mendel on monohybrid inheritance	English for describing and explaining Evaluation



		Explain how Gregor Mendel's work fits in with modern ideas of genetics	
<b><i>How can we measure variation?</i></b>	7 Variation	Recall the symptoms of cystic fibrosis, Describe the difference between dominant and recessive alleles, Complete a Punnett square diagram for cystic fibrosis, Huntingdon's and polydactyl, Explain the ethical issues surrounding embryo screening	English for describing and explaining Maths: completing diagrams to show variation.
<b><i>How do you produce a desired animal or plant?</i></b>	8 Selective Breeding	List genetic and environmental variation, Describe how variation is caused by inherited and environmental factors , Explain that variation can be continuous and discontinuous , Select appropriate methods to display data	English for describing and explaining Maths for graph drawing
<b><i>How we can alter the DNA of living organisms?</i></b>	9 Genetic Engineering	State the reasons for selective breeding, Describe the process of	English for describing and explaining



		selective breeding, Explain the impact of selective breeding of food plants and domesticated animals. Evaluate the ethical issues surrounding selective breeding.	
<b><i>How can you clone plants and animals?</i></b>	10 Cloning BIO HT	Recall the location of DNA in a bacterial cell, Describe how plants and animals are genetically engineered, Explain why plants and animals are genetically engineered, Evaluate the use of genetic engineering for medical uses	English for describing and explaining PSHE
<b><i>How have we developed from a common ancestor?</i></b>	11a Theory of Evolution by natural selection	Describe how to take a cutting, Explain the differences between cuttings and tissue culture, Explain the advantages and disadvantages of plant cloning, Evaluate the use of cloning	English for describing and explaining
<b><i>What is the theory of how life began?</i></b>	11b Evidence of evolution fossils	Define the term mutation, Describe what is meant by evolution,	English for describing and explaining



		Describe the process of natural selection. Explain how the process of natural selection may result in the formation of a new species	
<b><i>What is the theory of how life began?</i></b>	11c Antibiotic resistance	Define the term mutation, Describe what is meant by evolution, Describe the process of natural selection. Explain how the process of natural selection may result in the formation of a new species	English for describing and explaining
<b><i>What were Larmark's &amp; Dawin's theories?</i></b>	11d Theories of evolution HT	Identify the main points in the theories of Lamarck and Darwin on evolution Describe the flaws in Lamarck's theory of evolution Explain some of the evidence for evolution discovered by Darwin	English, describe & evaluate. Historical context
<b><i>How do new species form?</i></b>	12 Speciation HT BIO	Define the term mutation, Describe what is meant by evolution, Describe the process of natural selection. Explain	English for describing and explaining



		how the process of natural selection may result in the formation of a new species	
<i>How can species become extinct?</i>	13 Extinction	<b>What is a species, Describe the way new species form, Explain how isolation can occur, Explain speciation linking key terms</b>	English for describing and explaining
<i>How are living organisms classified?</i>	14 Classification	<b>Define extinction, Describe the causes of extinction, Analyse the reasons for extinction, Evaluate the impact of man on the extinction of the Javan Tiger</b>	English for describing and explaining
<i>How are living things organized?</i>	14b New classification systems Bio	<b>Identify where 'domain' stands in the modern classification system Describe how new technology has lead to changes in how scientists classify organisms Explain how scientists use evolutionary trees</b>	
7 ECOLOGY			
<i>How do organisms in a community interact?</i>	1 Communities	Understand and use the terms ecosyste	English for describing and explaining



			m, community, com petition, habitat, interdep endence. Describe a stable community as one where all the species and environmen tal factors are in balance, so population sizes remain fairly constant. Give an example of a stable community. Explain the factors that affect plants and animals in their habitat	
	<b><i>How do organisms compete to survive?</i></b>	2 Competition	Identify why animals compete Describe the factors that organisms compete for within a habitat Explain what makes a successful com petitor in animals and plants	English for describing and explaining
	<b><i>How are organisms adapted to suit their environment?</i></b>	3 Adaptation types	List the abiotic and biotic factors in a community, Describe how abiotic and biotic factors can affect a community, Interpret data relating to the	English for describing and explaining



			effect of abiotic and biotic factors on organisms within a community. Explain how a change in an abiotic and biotic factor would affect a given community	
	<b><i>How do you sample organisms randomly &amp; in a transect?</i></b>	4 Distribution of organisms (RP)	Recall sampling techniques, Describe how you can measure the distribution and abundance of organisms in an ecosystem. Use the sampling data to produce a graph and then write a conclusion. Evaluate sampling techniques	English for describing and explaining Practical skills. Maths: working out area & distribution.
	<b><i>How is energy transferred from organism to organism?</i></b>	5 Feeding relationships	Identify producers, primary, secondary and tertiary consumers in a food chain. Interpret and explain population curves Explain what a food chain shows.	English for describing and explaining Maths: transfer of units of energy.
	<b><i>How is carbon recycled in the environment?</i></b>	6 Carbon cycle	Define the words; herbivore, carnivore, producer, trophic level, decomposer and	English for describing and explaining Maths for graphs and calculating,





			consumer, Describe the differences between the trophic levels of organisms within an ecosystem, Interpret the interactions between the different trophic levels, Analyse food chains and comment the amount of energy transferred	mean,median and mode
	<b><i>How is water recycled in the environment?</i></b>	7 Water cycle	List sources of carbon, Draw and label the carbon cycle, Describe the carbon cycle, Explain the role of microorganisms in cycling materials through an ecosystem	English for describing and explaining Maths for graphs and calculating, mean,median and mode
	<b><i>How can we increase the rate of decay?</i></b>	8 Decay RP BIO	Recall materials which can be recycled in an ecosystem, Describe why water is important, Describe the main steps in the water cycle, Explain the importance of the water cycle to living organisms	English for describing and explaining
	<b><i>How do organisms tell us how polluted an ecosystem is?</i></b>	9 Water pollution BIO	List the factors that affect rate of decay, Describe the method for the change of pH in milk, Explain	English for describing and explaining Geography



			how the factors increase the rate of decay, Explain how the results could be made more accurate	
	<b><i>How can the biodiversity of an ecosystem be threatened?</i></b>	10 Human population explosion	State the definition of biodiversity Describe the changes in the global human population Explain some of the effects of the growth in human population on the Earth and its resources	English for describing and explaining Geography
	<b><i>How is pollution affecting the ecosystem?</i></b>	11a Air Pollution	List types of pollution, Describe different types of pollution, Explain how pollution can reduce diversity, Explain how the rapid increase in the population of humans produces more waste	English for describing and explaining Geography DT food
	<b><i>How is pollution affecting the ecosystem?</i></b>	11b Land use & deforestation	State what is meant by the term 'deforestation' Describe why biodiversity matters Explain the environmental effects of destroying peat bogs	English for describing and explaining
	<b><i>What are the causes and effects of global warming?</i></b>	12 Global warming	List types of pollution, Describe different	English for describing and explaining



			types of pollution, Explain how pollution can reduce diversity, Explain how the rapid increase in the population of humans produces more waste	PSHE Geography
	<b><i>How can we conserve the endangered species?</i></b>	13 maintaining diversity	List the greenhouse gases, Describe the consequences of burning fuel and deforestation, Describe some of the biological consequences of global warming. Evaluate the distribution of species from effects of global warming	English for describing and explaining PSHE Geography
	<b><i>How do you construct a pyramid of biomass and analyse it?</i></b>	14 Trophic levels BIO	State what a trophic level represents State what biomass is and how it can be measured Interpret & construct accurate pyramids of biomass using appropriate data	English for describing and explaining PSHE Geography
	<b><i>How do you construct a pyramid of biomass and analyse it?</i></b>	14a Transfers of biomass	<b>Describe why not all sunlight is absorbed by plants</b> <b>Describe some of the processes which lead to a loss of biomass from</b>	English, describing & explaining.



			<p>one stage to the next</p> <p>Explain why much of the light that comes from the Sun and lands on plants is not being used in making biomass in animals</p>	
	<p><i>How can we obtain food more sustainably?</i></p>	<p>15</p> <p>Food security</p> <p>BIO</p>	<p>State reasons for intensive farming, Explain some ethical objections to some modern intensive farming methods.</p> <p>Interpret population and food production statistics to evaluate food security.</p> <p>Evaluate the advantages and disadvantages of modern farming techniques</p>	<p>English for describing and explaining</p> <p>PSHE</p> <p>Geography</p> <p>Food</p>

### Short Term Planning

Individual lesson resources and assessments to include high quality texts and images. Lessons should promote the explicit teaching of vocabulary and give opportunities to speak, read and write extensively using high-level subject vocabulary. Core numeracy skills should be incorporated into lessons where they can be covered in a real world context.

Opportunities should be created to support the wider curriculum:

- PSHE / RSE



- Careers
- Citizenship and British Values
- Financial Education

Planning should be shared across the department.  
Teachers can adapt lessons to match needs to students.