Meadow Park Science Curriculum

Year Group	Autumn A	Autumn B	Spring A	Spring B	Summer A	Summer B
KS1	Focus: Animals including Humans	Focus: Seasons	Focus: Plants	Focus: Scientists	Focus: Everyday Materials	Focus:Living things and their habitats
	Key Skills: • Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals. • Identify and name a variety of common animals that are carnivores, herbivores and omnivores. • Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals, including pets). • Identify, name, draw and label the basic parts of the human body and say which part of the body is	Key Skills: • Observe changes across the four seasons. • Observe and describe weather associated with the seasons and how day length varies. • Gathering and recording data to help answer questions. • Use observations and ideas to suggest answers to questions.	Key Skills: • Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees. • Identify and describe the basic structure of a variety of common flowering plants, including trees. • Use simple equipment. • Perform simple experiments • Ask simple questions and recognise that they	Key Skills: • Explore and compare important discoveries in Science. • Research key scientific figures. • Identify possible careers within Science/STEM.	Key Skills: • Distinguish between an object and the material from which it is made. • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock. • Describe the simple physical properties of a variety of everyday materials. • Compare and group together a variety of everyday materials on the basis of their simple	Key Skills: • Explore and compare the differences between things that are living, dead, and things that have never been alive. • Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. • Identify and name a variety of plants and animals in their habitats, including

	associated with each sense. • Ask simple questions and recognise that they can be answered in different ways.		can be answered in different ways. • Use observations and ideas to suggest answers to questions.		physical properties. • Compare the suitability of a variety of everyday materials for particular uses. • Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	micro-habitats. • Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. • Use simple equipment • Use observations and ideas to suggest answers to questions.
Year 3	Focus: All Living Things	Focus: Animals Including Humans	Focus: Forces and Magnets	Focus: States of Matter	Focus: Rocks	Focus: Light
	Key Skills: • Set up simple practical enquiries, comparative and fair tests • Identify and describe the functions of the different parts of a plant • Explore the requirements for what plants need to grow	Key Skills: • Record findings using simple scientific language • Identify the nutrition that humans need and where it comes from • Identify that some animals have skeletons and muscles	Key Skills: • Report findings from scientific enquiry, both orally and written • Compare how things move on different surfaces • Describe the difference between	Key Skills: • Identify similarities and differences in scientific ideas • Compare and group materials together based on whether they are solid, liquid or gas	Key Skills: • Use straightforw ard scientific evidence to answer questions and support findings • Compare and group rocks on the basis of their appearanc e and	Key Skills: • Make systematic and careful observations • Recognise the role of light in allowing us to see • Demonstrate that light is reflected from different surfaces • Describe how

	• Explore the life cycle of a plant	for support, protection and movement	forces and magnetic forces • Compare and group together materials based on their magnetic attraction • Predict whether magnets will attract or repel each other		physical properties • Describe how fossils are formed • Recognise that soil is made from rocks and organic matter	shadows are formed and how the size of a shadow can change
Year 4	Focus: All Living Things	Focus: Animals Including Humans	Focus: Forces and Magnets	Focus: States of Matter	Focus: Rocks	Focus: Light
	Key Skills: • Set up simple practical enquiries, comparative and fair tests • Group living things in a variety of ways • Use classification keys to name a variety of living things in living and wider environments • Describe how environmental change can pose threats to	Key Skills: • Record findings using simple scientific language • Describe the function of the different parts of the human digestive system • Identify the different types of teeth in humans • Construct and interpret food chains to identify predators and	Key Skills: • Report findings from scientific enquiry, both orally and written • Explore the behaviours and everyday uses of magnets • Explore the strengths of different magnets and suggest creative uses for it	Key Skills: • Identify similarities and differences in scientific ideas • Compare and group materials together based on whether they are solid, liquid or gas • Observe that some materials change state when they are heated or cooled • Identify the role of	Key Skills: • Use straightforward scientific evidence to answer questions and support findings • Explore the different kinds of rocks and soils that can be found in our local environment	Key Skills: • Make systematic and careful observations • Describe the dangers that light can cause and how to prevent these from occurring • Identifying patterns when they distance from a light source moves closer to an object

	different animals	prey		evaporation and condensation in the water cycle		
Year 5	Focus: All Living things and their habitats	Focus: Animals including humans	Focus: Forces Working Scientifically	Focus: Properties and changes of materials Working Scientifically	Focus: Earth and Space	Focus: Scientists and Inventors Working Scientifically
	Key Skills: • Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird • I can describe the differences between different life cycles. • Describe the life process of reproduction in some plants and animals	Key Skills: • Develop the changes as humans develop to old age	Key Skills: • Explain that unsupported objects fall towards the Earth because of gravity • Identify the effects of air resistance, water resistance and friction • Recognise that some mechanisms allow a smaller force to have a greater effect • Reporting and presenting findings from enquiries in oral and written forms • Recording data and	Key Skills: • Compare and group everyday materials based on their properties • Know that some materials will dissolve in liquid to form a substance and how to recover a substance from a solution • Use knowledge of solids, liquids and gases to decide how mixtures might be separated • Give reasons for the particular uses of everyday materials • Demonstrate that dissolving, mixing and	Key Skills: • Describe the movement of the Earth and other planets • Describe the movement of the Moon • Describe the Sun, Earth and Moon as approximate spherical bodies • Use the idea of the Earth's rotation to explain day and night	Key Skills: • Identifying scientific evidence that has been used to refute ideas or arguments • Planning different types of scientific enquiries to answer questions • Taking measurements and recording data • Using test results to make predictions • Recording data and results of increasing complexity • I can control variables in an enquiry

			results of increasing complexity • I can plan different types of scientific enquiry • I can control variables in an enquiry	changes of state are reversible changes • Explain that some changes result in the formation of new materials • Planning different types of scientific enquiries to answer questions • Taking measurements and recording data • Using test results to make predictions • Recording data and results of increasing complexity • I can control variables in an enquiry		
Year 6	Focus: Light Working scientifically	Focus: Living things and their habitats Working scientifically	Focus: Animals including humans Working scientifically	Focus: Electricity Working scientifically	Focus: Evolution and inheritance Working scientifically	Focus: Scientists and inventors Working scientifically
	• Key Skills: • Recognise that light appears to travel in straight lines • Use the idea that light	• Key Skills: • Describe how living things are classified into broad groups according to common	• Key Skills: • Identify and name the main parts of the human circulatory	• Key Skills: • Associate the brightness of a lamp or the volume of a buzzer with the number and	• Key Skills: • Recognise that living things have changed over time and that	• Key Skills: • Report and present findings from enquiries, including causal

	travels in straight lines to explain that objects are seen because they give out or reflect light into the eye • Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes • Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them • Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where	observable characteristics and based on similarities and differences, including micro-**organisms**, plants and animals • Give reasons for classifying plants and animals based on specific characteristics • Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate	system, and describe the functions of the heart, blood vessels and blood • Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function • Describe the ways in which nutrients and water are transported within animals, including humans • Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar	voltage of cells used in the circuit • Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches • Use recognised symbols when representing a simple circuit in a diagram • Using test results to make predictions to set up further comparative and fair tests	fossils provide information about living things that inhabited the Earth millions of years ago • Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents • Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution • Reporting and presenting findings from enquiries, including	relationships, in oral and written forms such as displays and other presentations • Give reasons for classifying plants and animals based on specific characteristics • Identify scientific evidence that has been used to support or refute ideas or arguments • Record data using scatter graphs • Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago • Use recognised symbols when representing a simple circuit in

	necessary		and line graphs		conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations	a diagram • Identifying scientific evidence that has been used to support or refute ideas or arguments
Year 7	Focus: Forces and Motion	Focus: Energy changes and transfers	Focus: Organisation in living things	Focus: Reproduction and inheritance	Focus: Atoms, elements, compounds and mixtures	Focus: Chemical reactions
	Key Skills: * Identify contact and non-contact forces. * Draw diagrams to represent forces and to show resultant forces. * Carry out practical investigations to research factors affecting the forces of resistance and friction. * Carry out practical investigations into the effect of factors on motion. * Carry out practical investigations to research pressure in	Key Skills: * State each form of energy with examples. *Describe examples of energy changes using energy transfer diagrams. * Model how thermal energy is transferred through conduction, convection and radiation. * Carry out practical work to investigate conduction. * Carry out practical work to investigate convection.	Key Skills: * Model animal and plant cells and describe the function of each organelle. * Carry out a practical to prepare and observe onion and cheek cells under a microscope. * Compare specialised animal and plant cells. * Compare the cells, tissues and organs in the respiratory system. (Participate	Key Skills: * Compare the organs in the female and male reproduction system and their function. * Describe the process of fertilisation. * Describe the menstrual cycle * Describe how a baby develops at different stages throughout pregnancy. * Compare the reproductive organs in plants and outline the process of pollination,	Key Skills: * Define and give examples of atoms, molecules, elements, compounds and mixtures. * State that elements are found in the periodic table and research the discovery of the Periodic Table. * Describe the structure of the Periodic Table and explain the patterns in the chemical and physical behaviour	Key Skills: * Carry out practical investigations to compare chemical and physical reactions. * Use word equations to show how compounds are formed in chemical reactions. *Carry out practical investigations to investigate reactions between acids and metals/ acids and metal carbonates/ acids and metal oxides.

	solids and liquids.	* Carry out practical work to investigate radiation. * Carry out practical work to investigate methods of reducing the transfer of thermal energy.	in a lung dissection.) * Compare the cells, tissues and organs in the circulatory system. (Participate in a heart dissection.) * Compare the cells, tissues and organs in the digestive system.	fertilisation and dispersion in plants. * Apply knowledge of fertilisation to explain how this leads to genetic variation in humans. * Model how factors such as eye colour are inherited in humans.	of elements in specific groups. * Carry out practical investigations to demonstrate the separation of mixtures. (Filtration/ evaporation/ Chromatography.) * Carry out practical investigations to investigate factors affecting solubility.	* Compare the chemical tests for oxygen, carbon dioxide and oxygen. * Carry out practical investigations to investigate exothermic and endothermic reactions.
Year 8	Focus: Forces and Motion	Focus: Energy changes and transfers	Focus: Organisation in living things	Focus: Reproduction and inheritance	Focus: Atoms, elements, compounds and mixtures	Focus: Chemical reactions
	Key Skills: * Identify contact and non-contact forces. * Draw diagrams to represent forces and to show resultant forces. * Carry out practical investigations to research factors affecting the forces of resistance and friction. (Collect repeat sets of data and calculate averages/ identify anomalies) * Compare how results are valid and reliable as well as comparing the	Key Skills: * State each form of energy with examples. *Describe examples of energy changes using Sankey diagrams and compare useful and wasted forms of energy for different appliances. * Use equations to calculate efficiency. * Model how thermal energy is transferred through conduction, convection and radiation. * Carry out practical work to investigate	Key Skills: * Model animal and plant cells and describe the function of each organelle. * Model the structure of bacteria, fungi and viruses and compare with plant and animal cells. * Carry out a practical to prepare and observe onion and cheek cells under a microscope. * Compare specialised animal and plant cells.	Key Skills: RECAP * Compare the organs in the female and male reproduction system and their function. * Describe the process of fertilisation. (Research causes of infertility and treatment.) * Describe the menstrual cycle (Link each stage to changes in hormones.) * Describe how a baby develops at different stages throughout	Key Skills: RECAP * Define and give examples of atoms, molecules, elements, compounds and mixtures. * Model the structure of atoms. * Interpret chemical formulae to identify elements, compounds and mixtures. * State that elements are found in the periodic table and research the discovery of the	Key Skills: RECAP * Carry out practical investigations to compare chemical and physical reactions. * Use word equations to show how compounds are formed in chemical reactions. (Use symbol equations to represent chemical reactions.) *Carry out practical investigations to investigate reactions between acids and metals/ acids and metal carbonates/

	independent/dependent and controlled variables. * Carry out practical investigations into the effect of factors on motion. (Use equations to calculate speed/distance/time) * Interpret distance /time graphs. * Carry out practical investigations to research pressure in solids and liquids. (Use equations to calculate pressure and density)	conduction, convection and radiation. * Carry out practical work to investigate methods of reducing the transfer of thermal energy. (Collect repeat sets of data and calculate averages/ identify anomalies) * Compare how results are valid and reliable as well as comparing the independent/dependent and controlled variables. *Apply knowledge to compare methods of reducing heat loss in homes through conduction, convection and radiation.	(Describe stem cells and research their use in medical treatments.) * Compare the cells, tissues and organs in the respiratory system. (Participate in a lung dissection.) * Use the term diffusion to explain how gases pass from the alveoli to the red blood cells and vice versa. * Compare the cells, tissues and organs in the circulatory system. (Participate in a heart dissection.) * Research risk factors associated with diseases such as arteriosclerosis and the available treatments.) * Compare the cells, tissues and organs in the digestive system. (Compare how enzymes function to enable digestion.)	pregnancy. * Compare the reproductive organs in plants and outline the process of pollination, fertilisation and dispersion in plants. * Compare sexual and asexual reproduction in plants/ * Apply knowledge of fertilisation to explain how this leads to genetic variation in humans. * Model how factors such as eye colour are inherited in humans. * Model the structure of DNA	Periodic Table. * Describe the structure of the Periodic Table and explain the patterns in the chemical and physical behaviour of elements in specific groups. (Use the periodic table to predict trends in reactivity of elements.) * Carry out practical investigations to demonstrate the separation of mixtures. (Filtration/ evaporation/ Chromatography/ distillation and fractional distillation.) * Carry out practical investigations to investigate factors affecting solubility. * Use data to identify pure and impure substances.	acids and metal oxides. * Investigate the conservation of mass in chemical reactions. * Compare the chemical tests for oxygen, carbon dioxide and oxygen. * Carry out practical investigations to investigate exothermic and endothermic reactions. * Carry out practical investigations to investigate displacement reactions.
Year 9	Focus: Forces and Motion	Focus: Energy changes and transfers	Focus: Organisation in living things	Focus: Reproduction and inheritance	Focus: Atoms, elements, compounds and	Focus: Chemical reactions

					mixtures	
	Key Skills: RECAP * Identify contact and non-contact forces. * Draw diagrams to represent forces and to show resultant forces. * Describe forces in terms of 'work done' and use equations to calculate work done. * Carry out practical investigations to research Hooke's law. (Collect repeat sets of data and calculate averages/ identify anomalies) * Compare how results are valid and reliable as well as comparing the independent/dependent and controlled variables. * Carry out practical investigations to research moments and lever. * Use equations to compare moments and the relationship between levers/work done.	Key Skills: RECAP State each form of energy with examples. *Describe examples of energy changes using Sankey diagrams and compare useful and wasted forms of energy for different appliances. * Use equations to calculate efficiency. (Use equations/Sankey diagrams to calculate efficiency, useful energy and total energy.) * Describe energy transfers in terms of changes in the energy stores of objects. * Evaluate the energy transfers that occur in falling objects or moving machines. RECAP * Model how thermal energy is transferred through conduction, convection and radiation. * Carry out practical work to investigate	Key Skills: RECAP * Model animal and plant cells and describe the function of each organelle. * Model the structure of bacteria, fungi and viruses and compare with plant and animal cells. (Understand the terms prokaryote and eukaryote.) * Carry out a practical to prepare and observe onion and cheek cells under a microscope. (Calculate the magnification of each image.) * Compare the organelles that are visible using a light microscope and an electron microscope. RECAP * Compare specialised animal and plant cells. (Describe stem cells	Key Skills: RECAP * Compare the organs in the female and male reproduction system and their function. * Describe the process of fertilisation. (Research causes of infertility and treatment.) * Compare how contraception can be used to prevent fertilisation/implantation. * Describe the menstrual cycle (Link each stage to changes in hormones using specific names.) * Compare the reproductive organs in plants and outline the process of pollination, fertilisation and dispersion in plants. * Compare sexual and asexual reproduction in plants. * Research the use of genetic modification in the production of	Key Skills: RECAP * Define and give examples of atoms, molecules, elements, compounds and mixtures. * Model the structure of atoms/ state the name of the subatomic particles/ compare key features of each sub atomic particle. (Research the history in the discovery of atoms.) * Interpret chemical formulae to identify elements, compounds and mixtures. * State that elements are found in the periodic table and research the discovery of the Periodic Table. * Describe the structure of the Periodic Table and explain the patterns in the chemical and physical behaviour	Key Skills: RECAP * Signs of chemical and physical reactions. * Use word equations to show how compounds are formed in chemical reactions. (Use symbol equations to represent chemical reactions.) * Balance symbol equations. *Carry out practical investigations to investigate reactions between acids and metals/ acids and metal carbonates/ acids and metal oxides. (Represent all using word and balanced symbol equations.) * Investigate the conservation of mass in chemical reactions. * Compare the chemical tests for oxygen, carbon dioxide and oxygen. * Carry out practical investigations to investigate exothermic

	* Carry out practical investigations into the effect of air resistance and friction on motion. (Use equations to calculate speed/distance/time/ velocity) * Interpret distance /time graphs. * Construct velocity graphs. Use graphs to interpolate and extrapolate information. * Carry out practical investigations to research pressure in solids and liquids. (Use equations to calculate pressure and density)	conduction, convection and radiation. * Carry out practical work to investigate methods of reducing the transfer of thermal energy. (Collect repeat sets of data and calculate averages/ identify anomalies) * Compare how results are valid and reliable as well as comparing the independent/dependent and controlled variables. *Apply knowledge to compare methods of reducing heat loss in homes through conduction, convection and radiation.	and research their use in medical treatments.) * Compare the cells, tissues and organs in the respiratory system. (Research adaptations of gas exchange surfaces in living things.) (Participate in a lung dissection.) * Use the term diffusion to explain how gases pass from the alveoli to the red blood cells and vice versa. * Compare the cells, tissues and organs in the circulatory system. (Participate in a heart dissection.) * Research the adaptations of the villi for the exchange of digested food molecules. * Use the terms diffusion and active transport to explain how glucose passes from the villi and into the blood.	crops and the use of genetic engineering in the production of insulin. * Apply knowledge of fertilisation to explain how this leads to genetic variation in humans. * Model how factors such as eye colour are inherited in humans. (Use terminology such as phenotype, genotype, recessive, dominant, heterozygous and homozygous when describing inheritance.) * Model the structure of DNA (Use key terminology to explain the structure of DNA) * Research the inheritance of genetic diseases such as Cystic Fibrosis.	of elements in specific groups. (Use the periodic table to predict trends in reactivity of elements.) * Understand how to use atomic mass numbers and atomic numbers of the elements in the periodic table to gain information about electron arrangements and to predict the behaviour of elements. * Carry out practical investigations to demonstrate the separation of rock salt (Students will need to apply knowledge on the following separation techniques; filtration/ evaporation/ Chromatography/ distillation and fractional distillation.) * Carry out practical investigations to investigate factors affecting solubility.	and endothermic reactions. (Explain in terms of bonds breaking and being created.) * Carry out practical investigations to investigate displacement reactions. * Carry out practical tasks to investigate (and then explain) how different factors affect the rate of chemical reactions.)

			* Research risk factors associated with diseases such as arteriosclerosis and the available treatments.)		* Use data to identify pure and impure substances. * Calculate Rf values of pigments when carrying out chromatography.	
Year 10 BTEC GCSE BIOLOGY	Focus: UNIT 4: Biology and Our Environment (Internally assessed coursework) UNIT 4.1 - Cell Biology	Focus: UNIT 4: Biology and Our Environment (Internally assessed coursework) UNIT 4.1 UNIT 4.2 - Organisation	Focus: UNIT 4: Biology and Our Environment (Internally assessed coursework) UNIT 4.2 UNIT 4.3 - Infection and response	Focus: Unit 3: Energy and Our Universe (Internally assessed coursework) UNIT 4.3 UNIT 4.4 - Bioenergetics	Focus: Unit 3: Energy and Our Universe (Internally assessed coursework) UNIT 4.4 UNIT 4.5 - Homeostasis and response	Focus: Unit 3: Energy and Our Universe (Internally assessed coursework) UNIT 4.5 - Homeostasis and response
BTEC	Key Skills: Unit 4a: Is survival in the genes? P1 - Describe the role of genes and the environment in variation P2 - Describe how characteristics are used to classify organisms. P3 - Describe the different ways in which organisms show interdependence. M1 - Explain the role of genes and the environment in evolution. M2 - Discuss the factors that affect the relationship between	Key Skills: Unit 4B: How polluted is the environment? P4 - Describe the impact that different human activities have on ecosystems. P5 - Describe how living and non-living indicators can be used to measure levels of pollutants. P6 - Describe the different methods used to help reduce the impact of human activities on ecosystems. M3 - Analyse the effects of pollutants on ecosystems. M4 - Discuss the	Key Skills: Unit 4C: Prevention or cure? P7 - Describe how pathogens affect human health. P8 - Describe two different treatment regimes: one used to prevent a disease and one used to treat a disease. P9 - Describe how lifestyle choices can affect human health. M5 - Explain how bacteria can become resistant to antibiotics. M6 - Explain the use of pedigree analysis.	Key Skills: Unit 3C: The final frontier P8 - Describe the structure of the Universe and our Solar System. P9 - Describe the suitability of different methods for observing the Universe. P10 - Identify evidence that shows the dynamic nature of the Universe. M6 - Describe how the Universe and the Solar System were formed. M7 - Explain how evidence shows that the Universe is	Key Skills: Unit 3a: Ionising radiation P1 - Describe half-life in terms of radioactive decay. P2 - Describe the different types of ionising radiation. P3 - Describe the problems associated with the use of radioactive isotopes. P4 - Describe how controllable nuclear fission and fusion reactions are M1 - Use graphs to explain radioactive decay and half-life. M2 - Compare the benefits and	Key Skills: Unit 3b: Green electricity P5 - Describe methods of producing a.c. and d.c. electricity. P6 - Use V = IR to predict values in electric circuit investigations. P7 - Describe how electricity is transmitted to the home or industry. M4 - Compare the efficiency and environmental impact of electricity generated by different sources. M5 - Assess, in qualitative terms, ways

GCSE BIOLOGY	different organisms. D1 - Evaluate the impact of genes and the environment on the survival or extinction of organisms. UNIT 4.1 * Define and give examples of prokaryotes and eukaryotes (use standard form to represent the sizes of each type of cell/be able to convert between units). * Compare the cell organelles within plant and animal cells including ribosomes and mitochondria. * REQUIRED PRACTICAL Prepare/view plant and animal cells under a light microscope.	advantages and disadvantages of methods used to reduce the impact of human activity on ecosystems. D2 - Explain the long-term effects of pollutants on living organisms and ecosystems. D3 - Evaluate the success of methods to reduce the impact of human activity on an ecosystem, for a given scenario. UNIT 4.1 *Investigate transport into and out of cells by; 1) Diffusion (describe the process/investigate the factors that affect the rate of diffusion/ calculate surface area: rations/ compare diffusion in the small intestine, alveoli, gills, root hair cells and leaves.) 2) Osmosis (describe the process in cells and give example where	M7 - Discuss the advantages and disadvantages of vaccination programmes. D4 - Evaluate the use of antibiotics, pedigree analysis and vaccination programmes in the treatment and prevention of childhood illnesses. UNIT 4.2 * Circulatory system - Describe the structure and function of parts of the heart (locate the pace maker cells/ explain why the heart is a double pump) - Describe the structure/ function/ and adaptations of blood vessels as well as blood (calculate blood flow). - Compare the risk	changing. D5 - Evaluate the evidence leading to the Big Bang theory of how the Universe was formed. UNIT 4.3 * Defence systems; - Compare physical and chemical defence mechanisms. - Compare non-specific defences (phagocytosis) - Compare specific defences (antibody and antitoxin production by lymphocytes). - Outline the process and purpose of vaccinations (interpret data on the use of vaccinations). - Compare the use of antibiotics and painkillers I the treatment of diseases.	drawbacks of using radioactive isotopes in the home or workplace. M3 - Describe the environmental impact of radioactive material from nuclear fission reactors released into the environment. D1 - Calculate the half-life of radioactive isotopes. D2 - Justify the selection of a radioactive isotope for a given use within the home or workplace. D3 - Evaluate the environmental impacts of a nuclear fission reactor accident, in terms of half-life. UNIT 4.4 * Respiration - Identify it as exothermic. - Compare the word and symbol equations for the processes of anaerobic and aerobic respiration. (Compare the uses/ applications of both	to minimise energy losses when transmitting electricity. D4 - Assess, in quantitative terms, ways to minimise energy losses either when transmitting electricity or when transforming electricity into other forms for consumer applications. UNIT 4.5 * The brain - Identify the position and function of the cerebral cortex, cerebellum and medulla. HIGHER - Research damage that can occur to the brain and the effects this has on brain function. - Compare treatments and evaluate the difficulty that neuroscientists have learning about brain

	(Calculate magnification/ resolution/ use standard form to represent actual sizes/ calculate ratios and scales). * Research the history of light microscopes and the development of electron microscopes (compare magnification and resolution). * Compare specialisation in animal and plant cells and relate their differentiated features to their function within tissues/organs and organ systems. * Describe stem cells; give examples of where they are found within plants and humans, their functions, how they can be used in therapeutic cloning and a comparison of the moral and ethical implications of their use. * Demonstrate aseptic techniques needed to grow cultures of micro-organisms without contamination. (calculate the cross-sectional area/	osmosis occurs.) REQUIRED PRACTICAL Investigate the effect of sugar concentration on osmosis in potato cylinders. (Calculate %gain in water and % loss in water.) 3) Active transport (describe the process and give examples of why active transport is needed in the small intestine.) UNIT 4.2 *Recap the order of hierarchy within living things and give examples of cells, tissues, organs, organ systems and organisms. *DIGESTIVE SYSTEM - Identify the structure of the organs in the digestive system as well as the function of each organ including the enzymes which are produced in each organ and the function that they have. - Describe the structure and function of enzymes (lock and key hypothesis) - REQUIRED PRACTICAL Investigate the effect of pH on amylase activity. - REQUIRED PRACTICAL	factors of coronary heart disease and faulty heart valves (interpret and analyse data). - Evaluate the treatment options available for heart related diseases such as statins, stents, mechanical devices and transplants. * Plants cells, tissues, organs and organ systems. - Give examples of cells, tissues and organs within plants and compare their structure/ function and adaptations. (Include xylem, phloem, stomata/ guard cells/ root hair cells * Investigate transpiration; describe the process and investigate factors affecting the rate of transpiration. (Calculate averages/plot graphs/ analyse data.) UNIT 4.3 * Define health and disease (interpret epidemiological	* Research the history of the discovery and development of drugs. * Outline the process involved to produce new drugs including the importance of 'double-blind trials.' (HIGHER) * Research monoclonal antibiotics (outline the process and applications). * Compare diseases found within plants and the chemical and physical defence mechanisms that plants have. UNIT 4.4 * Photosynthesis - Be able to write the word and chemical symbol equations for photosynthesis (and identify it as an endothermic reaction.) Also compare the uses of glucose. - Compare the factors that affect the rate of photosynthesis (interpret graphs, plot data, translate between graphical and numeric data). - REQUIRED PRACTICAL Investigate the effect of light intensity on photosynthesis.	as a process within living things and also within industry). - Investigate the effect of exercise on energy demand within the body. - Compare what happens during aerobic and anaerobic respiration during different types/ lengths of exercise. HIGHER - Demonstrate knowledge of the 'oxygen debt' and the role that the liver has in breaking down lactic acid. * Define metabolism and compare examples and uses within the body. UNIT 4.5 * Homeostasis - Define homeostasis giving examples of conditions that need controlling. - Explain how automatic control systems operate. * Nervous system - Compare the structure and function of parts of the nervous system. - Understand the use	function and also the dangers involved in treating brain injuries. * The eye - Compare the structure and function of the eye. - Explain the processes of accommodation and adaption to light. - Compare myopia (short sighted) and hyperopia (long sighted). Compare the treatment in both conditions. - Explain how the nervous system controls the automatic response of the iris responding to bright light. * Describe how the nervous system controls the automatic response to increases/decreases of body temperature (include where the thermoregulatory centre is). HIGHER - Relate how each response leads to a decrease or increase in body temperature. * Human endocrine system - Identify the location of endocrine glands in

	number of bacteria per division.) * REQUIRED PRACTICAL * Investigate the effect of antibiotics or antiseptics on bacteria growth by measuring the zones of inhibition.	Demonstrate the use of chemical food tests to identify complex and simple food molecules.	data about diseases). * Communicable diseases: - Give examples of diseases caused by viruses, bacteria, fungi and protists in plants and animals. - Compare the symptoms and treatment. - Compare methods of transmission (contact/ non-contact) and ways to prevent the spread.	HIGHER - Interpret and explain graphs showing limiting factors - Compare how industries use knowledge of limiting factors to maximise food production.	of reflex arcs to represent automatic responses. (Include the function of synapses.) - Investigate factors that affect reaction times (interpret data o reaction times.) REQUIRED PRACTICAL Investigate the effect of caffeine on reaction times in humans.	the human body and explain their function. - Describe how the endocrine system controls the levels of glucose in the blood. - Compare the causes/ symptoms/ treatment of type 1 diabetes and type 2 diabetes. HIGHER - Understand the role that glucagon has in the control of blood glucose as well as insulin. - Describe negative feedback cycles. * Describe how water volume in the body and ions are controlled by the kidneys. HIGHER - Describe the process of deamination and the role ADH has in the control of water volume.
Year 11 BTEC GCSE BIOLOG	Focus: UNIT 1: Principles of Applied Science (Externally assessed exam unit) UNIT 4.5	Focus: UNIT 1: Principles of Applied Science (Externally assessed exam unit)	Focus: UNIT 2: Chemistry and Our Earth (Internally assessed coursework) UNIT 4.6	Focus: Revision/Exam practise of UNIT 1: Principles of Applied Science (Externally assessed exam unit) UNIT 2: Chemistry and Our Earth (Internally assessed coursework) UNIT 4.7 - Ecology	Focus: UNIT 2: Chemistry and Our Earth (Internally assessed coursework)	Focus: N/A N/A

Y	UNIT 4.6 - Inheritance, variation and evolution	RECAP/REVISION OF UNITS 4.1 - 4.6 (MOCK EXAMS)	UNIT 4.7 - Ecology		RECAP/ REVISION/ EXAM PRACTISE FOR UNITS 4.1-4.7	
BTEC GCSE BIOLOGY	Key Skills: Unit 1: Biology * Comparing the structure of animal and plant cells. * Comparing specialised plant and animal cells. * Modelling the structure of DNA * Predicting genotypes and phenotypes. * Comparing parts of the nervous system. * Comparing parts of the endocrine system. * Comparing mechanisms of homeostasis. Unit 1: Chemistry * Modelling atomic structure. * Comparing atomic mass and atomic number. * Comparing elements, compounds and mixtures and using chemical formulae to represent them. * Comparing groups and periods in the Periodic Table.	Key Skills: Unit 1: Chemistry * Investigating chemical reactions. * Representing chemical reactions with word equations and balanced symbol equations. Unit 1: Physics * Comparing forms of energy and describing energy transfers. * Calculating efficiency/ work done/ power. * Interpreting wave diagrams. * Calculating wave frequency and speed. * Modelling the EM spectrum. * Comparing characteristics of the waves in the EM spectrum. * Comparing renewable and non-renewable energy resources. MOCK EXAM	Key Skills: Unit 2C: Controlling industrial conditions P6 - Describe the factors that can affect the rates of chemical reactions. P7 - Identify the number and types of atoms in balanced chemical equations. M5 - Explain how different factors affect the rate of industrial reactions. M6 - Explain the terms 'yield' and 'atom economy' in relation to specific chemical reactions. D4 - Analyse how different factors affect the rate and yield of an industrial reaction. Unit 2D: Affecting the environment P8 - Describe the human activities that affect the Earth and its environment. P9 - Describe natural factors that have changed the surface and atmosphere of the	Key Skills: Revision/Exam practise of Unit 1 (Biology/ Chemistry and Physics) Unit 2B: Useful chemical products P4 - Describe how chemical substances are used based on their physical properties. P5 - Describe how chemical substances are used based on their chemical properties. M4 - Explain how physical and chemical properties of chemical substances make them suitable for their uses. D3 - Assess the suitability of different types of substance for a specified use.	Key Skills: Unit 2A: Chemical reactivity and bonding P1 - Describe the physical and chemical properties of group 1 and 7 elements. P2 - Compare properties of ionic and covalent substances. P3 - Draw dot-and-cross diagrams of simple ionic and covalent substances. M1 - Describe trends in the physical and chemical properties of group 1 and 7 elements. M2 - Explain the properties of ionic and covalent substances. M3 - Describe the formation of ionic and covalent substances. D1 - Explain the trends in chemical properties of group 1 and 7 elements in terms of electronic	Key Skills: N/A N/A

	UNIT 4.5 * Human reproduction - Outline the stages in the menstrual cycle and explain the roles of oestrogen and progesterone in the cycle. - HIGHER Compare the roles of FSH and LH within the menstrual cycle and how they control other hormones/events. * Contraception - Compare the hormonal and non-hormonal methods of controlling fertility. HIGHER - Compare how hormones are used to treat infertility (in IVF). Compare the advantages and disadvantages as well as any moral or ethical implications. HIGHER - Compare the roles of thyroxin and adrenaline. * Plant hormones - Compare how	UNIT 4.6 * Inheritance - Model the structure of DNA - Define genome and compare the importance of the information. - A basic understanding is needed of protein synthesis and how incorrect sequencing can lead to mutations. - Demonstrate an understanding of how phenotypes are controlled by genotypes and demonstrate the use of Punnett squares to predict the chances of inheriting certain genotypes. * Inherited disorders - Compare the symptoms of inherited disorders such as polydactyl and Cystic Fibrosis. Compare which are dominant and recessive disorders and use Punnett squares to predict the chances of inheriting each.	Earth. M7 - Discuss the extent to which human activity has changed the environment, in comparison to natural activity. D5 - Evaluate possible solutions to changes in the environment, occurring from natural or human activity. UNIT 4.6 * Variation - Compare the types of variation in a population and the three causes of variation (give examples). - Compare the processes of selective breeding, genetic engineering, cloning and embryo transplants. Discuss the applications of each as well as the advantages/ disadvantages and ethical implications. - Describe how variation has enabled Evolution to happen through the process of Natural	Unit 4.7 * Sampling techniques - Interpret data on abundance of populations of organisms within ecosystems. (Be familiar with calculating the mean, mode, median as well as calculating the % abundance.) REQUIRED PRACTICAL - Use sampling techniques to measure the population size of a common species. - Use sampling techniques to investigate distribution. * Cycles - Compare the processes in the water cycle, nitrogen cycle and carbon cycle and explain their importance. - Describe the process of decomposition and compare the factors that affect the rate of decomposition. REQUIRED PRACTICAL Investigate the effect of temperature on the decay of fresh milk by measuring the pH. * Effect of human	structure. D2 - Relate applications of compounds to their properties and to their bonding and structure. RECAP/ REVISION/ EXAM PRACTISE FOR UNITS 4.1-4.7	

	hormones in plants (auxins) control growth (phototropism and geotropism). REQUIRED PRACTICAL - Investigate the effect of light or gravity on the growth of germinated seedlings. HIGHER - Compare the roles of gibberellins and ethene in plants and their applications in the food industry. UNIT 4.6 * Cell division - MITOSIS (define as a process that happens in asexual reproduction and outline the main stages in the mitosis process). - MEIOSIS (define as a process that happens in sexual reproduction and outline the main stages in the meiosis process). - Compare the processes of mitosis and meiosis. - Compare the advantages and disadvantages of asexual and sexual reproduction. Give examples of organisms that carry out both asexual and sexual	- Compare the moral and ethical implications of using embryo screening to test for genetic diseases. - Demonstrate how the sex of a baby is determined through the sex chromosomes (XX and XY). HIGHER - Demonstrate the correct use of genetic crosses to predict inheritance. RECAP/ REVISION/ EXAM PRACTICE FROM UNITS 4.1-4.6 MOCK EXAM	Selection. (Compare Charles Darwin's theory with Jean-Baptiste Lamark's theory.) - Compare the reasons why Darwin's theory wasn't originally accepted at the time. - Compare the evidence we have for Evolution through fossils. (Compare Evolutionary trees.) - Compare the evidence for inheritance bases on Mendel's work. * Classification - Describe Carl Linnaeus' classification system and an understanding of the use of the binomial system to name species today. - Describe the new system by Carl Woese and compare reasons why we now need an updated system. UNIT 4.7 * Communities - Compare the biotic and abiotic factors that affect	activity on the environment. - Research waste management, deforestation, global warming and compare the impacts they are having on the environment and the biodiversity of organisms within ecosystems. - Research and compare methods being used to increase biodiversity again such as sustainable fishing.		

	reproduction.		communities within ecosystems. (Extract data to form ideas about what living things are competing for in a habitat.) - Compare adaptations of animals and plants that live in extreme environments. (Research extremophiles – bacteria that can survive in extreme conditions.) * Levels of organisation - Use food chains to show the trophic levels within ecosystems. (Use the correct terminology such as Apex predators.) - Compare how living things are independent within ecosystems (interpret predator-prey graphs.) - Construct pyramids of biomass and compare reasons why the transfer of biomass is only 10% between each trophic level.			