Department	Science	Head of Department	Mrs Eyre
5 Year Overview – Curricular Intent			

“Science and everyday life cannot and should not be separated.”

Rosalind Franklin

Science at Ellesmere Park is practical, hands-on and intends for our students to foster an inquisitive nature about how our world works. Science lessons are pitched to ensure challenge for all, so that students can develop their resilience, so that they begin to problem-solve, think, and work independently. For our students to confidently work scientifically, they need to be taught the knowledge so that they can read, write, talk, and think like a scientist. Improving scientific literacy is important, so that students can understand the scientific process, analyse evidence, and use such evidence to think critically.

At Key Stage Three, our curriculum model is researched and evidence-based in a way that is sequenced for learning to progress, where teachers ask questions to reveal common misunderstandings that students may have. In doing so, teachers can plan to challenge those misunderstandings and encourage conceptual development. Students are taught the key concepts, be it cells, particles or forces and motion, and as they progress through their learning journey, our spiralling curriculum model revisits those concepts and allows students to make more connections and develop their schema of understanding. The scope of our Key Stage Three curriculum model allows for students to broaden and deepen their scientific knowledge, with increasing demand.

By Key Stage Four, students have revisited and built up their scientific knowledge over time, to the point where, with support from their teacher, they are clear on the most important knowledge that they need to know. We help our students recognise that the components of science they have been taught previously can be applied to unfamiliar contexts.

Our teachers have high expectations of what our students are capable of; all students should feel successful in their science lessons. We are enthusiastic about what we teach, and in turn we want our students to see a value in learning about science and develop a love for the subject.

For further information contact hannah.eyre@consilium-at.com

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 7	After completing an induction into science to learn about safety, scientific apparatus and the scientific method, students will be taught knowledge and skills from the following components on rotation: Cells, Material Science and Forces. Students should understand: <u>Cells:</u> Cells as the fundamental unit of living organisms, including how to observe, interpret and record cell structure using a light microscope; Sub-cellular structures and their functions; The role of diffusion in the movement of materials in and between cells; Structural adaptations of unicellular organisms; Classification of organisms into groups according to similarities and differences in their features. <u>Materials Science:</u> The identification of materials as composites, metals, polymers, and ceramics; Properties of composite materials, metals, non-metals, polymers, and ceramics; The evaluation of composite materials for uses. <u>Forces:</u> Forces as pushes or pulls, arising from the interaction between two objects, measured in Newtons (N); The use of force arrows in scientific diagrams; The effects of balanced and unbalanced forces; The difference between contact and non-contact forces gravity.		Students will be taught knowledge and skills from the following components on rotation: Inheritance, Organisation, Substances and Mixtures, Sound and Light and the Solar System and Beyond. Students should understand: <u>Inheritance:</u> Heredity as the process by which genetic information is transmitted from one generation to the next; Modelling of chromosomes, genes, and DNA; The work of Watson, Crick, Wilkins, and Franklin in the discovery of DNA. <u>Organisation:</u> The hierarchical organisation of multicellular organisms: from cells to tissues to organs to systems to organisms; How cells enlarge and divide to make new cells in growing multicellular organisms; The structures and functions of the human circulatory system, digestive system, gas exchange system (including the mechanism of breathing), skeletal system and interactions between the skeleton and muscles. Substances and Mixtures: <u>Substances and Mixtures:</u> Arrangement, movement, and energy of particles in the three states of matter; How matter is conserved when it changes state; Properties of solids, liquids, and gases; Atoms and molecules as particles; The difference between a pure substance and a mixture; The process of dissolving to make a solution; Brownian motion in gases; Diffusion because of a concentration gradient; Separation techniques, including filtration, evaporation, distillation, and chromatography. <u>Sound and Light:</u> How sound waves can echo, reflect, and be absorbed; How sound is made and travels, including how microphones and loudspeakers work; How humans hear sounds; How light waves can be absorbed, scatter and reflect; How light travels. <u>The Solar System:</u> What makes up our Solar System; How planets and moons stay in orbit; Why we have days, years, and seasons; Why the days feel longer in Summer; Why it is warmer in some countries compared to others; The lunar cycle and the causes of an eclipse.		Students will be taught knowledge and skills from the following components on rotation: Variation, Health and Disease, Atoms, Elements and Compounds, Designing Materials and Heating and Cooling. Students should understand: <u>Variation:</u> What fossils are, how they form and what we can learn from fossil evidence; How organisms within the same species can differ from each other; The difference between continuous and discontinuous variation. <u>Health and Disease:</u> The difference between physical and mental health; Causes and treatment of ill health; The effects of exercise, asthma and smoking on gas exchange; what recreational drugs are and the impact of substance misuse. <u>Atoms, Elements and Compounds:</u> The work of John Dalton on atoms; The difference between atoms, elements, and compounds; How we represent elements and compounds. <u>Designing Materials:</u> How we explain the melting points, masses, and flexibility of polymer materials <u>Heating and Cooling:</u> Internal energy; The production of a heating and cooling curve; The transfer of heat energy; The investigation of conduction, insulation, and radiation	

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Year 8	Students will be taught knowledge and skills from the following components on rotation: Diet and Exercise, Solubility and Chemical Change, Earth's resources, and Motion. Students should understand: <u>Diet and Exercise:</u> The components of a healthy diet; Why we need nutrients; How we know how much energy is in food; Why some people require more energy than others; How we investigate energy in food; Why we should eat a balanced diet and what happens if we do not; The dangers of obesity and effects of deficiency diseases on the body; The effects of exercise on the body. <u>Solubility and Chemical Change:</u> What happens in a chemical reaction; The difference between a physical and chemical change; How to investigate chemical changes such as thermal decomposition, combustion, and oxidation; Why some substances are soluble; How to investigate solubility; The causes of a saturated solution. <u>Earth's resources:</u> What is inside the Earth; How the structure of Earth can be modelled; The formation of igneous rock; How to investigate crystal size in igneous rock. <u>Motion:</u> How to calculate the speed, distance, and time of a journey and how this can be represented on a distance/time graph; What relative motion is; How drag can affect motion; How drag can be investigated; What causes the motion of an object to change; What energy transfers are involved in changing the motion of an object.		Students will be taught knowledge and skills from the following components on rotation: Biochemistry, Understanding Chemical Reactions, Air Pollution and How we see and Making images. Students should understand: <u>Biochemistry:</u> Photosynthesis; Adaptations of plant roots and leaves; How plants absorb water and minerals and exchange gases; The difference between aerobic and anaerobic respiration; Fermentation; How we can investigate fermentation of glucose. <u>Understanding Chemical Reactions:</u> How to represent chemical reactions using symbol equations; Reactions of metals with acid; Displacement reactions; Extraction of metal from ores/metal oxides using carbon; What catalysts are and how they affect the rate of a chemical reaction. <u>Air Pollution:</u> What the Earth's atmosphere is made up of and how its composition has changed over time; How human activities are changing the composition of the Earth's atmosphere today; The impact of human and natural activities on climate change; The importance of recycling. <u>How we see and Making images:</u> How ray diagrams are used to demonstrate reflection and refraction of light; Dispersion of white light using prisms; Structure and function of parts of the eye; How we see, including how we see colours; What lenses are and how they can help to correct vision; How cameras use lenses. <u>Space and Beyond:</u> Stars and Galaxies; The lifecycle of stars; Why Scientists think that Space is expanding; How Scientists make observations of Space; How telescopes work; Whether there could be life on other planets.		Students will be taught knowledge and skills from the following components on rotation: Reproduction, Interdependence of Organisms, Evaporation and the Water Cycle, Energy and Reactions, Acids and Alkalis, More about Force and Simple Electrical Circuits. Students should understand: <u>Reproduction:</u> Puberty in humans; The difference between the biological male and female reproductive systems; The menstrual cycle; Fertilisation; Gestation in humans; The importance of the placenta during pregnancy; What happens during birth in humans; The structure of a flower; How plants reproduce; How we investigate seed dispersal in plants; The stages of a lifecycle of a butterfly. <u>Interdependence of organisms:</u> What ecosystems are; How food chains and food webs represent feeding relationships and energy transfer; How organisms depend on each other in an ecosystem; Why bees are vital for human food security. <u>Evaporation and the Water Cycle:</u> The difference between boiling and evaporation; How liquids evaporate; Permeability of rocks and how this can be investigated; What happens in the water cycle and how the cycle can be modelled effectively. <u>Energy and Reactions:</u> How we can investigate endothermic and exothermic reactions. <u>Acids and Alkalis:</u> What makes a substance an acid or alkalis; How indicators are used to identify acids and alkalis; What the pH scale tells us about the acidity or alkalinity of a substance; How we can react acids and alkalis to make salts; How we can investigate the acidity of metal and non-metal oxides; What acid rain is, how it forms and the effects of acid rain on the environment. <u>More about Force:</u> Why weight changes on other planets; Why springs are stretchy; What Hooke's Law is and how it can be investigated; What moments or turning forces are and how they can be calculated. <u>Simple Electrical Circuits:</u> How to represent circuit components using symbols in scientific diagrams for electrical circuits; How to build a series circuit; How to measure current and voltage in a series circuit; How to draw accurate series circuit diagrams; How current and voltage in a series circuit can be investigated; The causes of static electricity.	

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Year 9	Students will be taught knowledge and skills from the following components on rotation: Infectious Disease, Weathering and Erosion, The Periodic Table, More Electrical Circuits, Waves and Fuel Uses and Costs. Students should understand: <u>Infectious Disease</u> What pathogens are; How bacteria cause disease; How viruses cause disease; How fungi cause disease; How we can investigate the growth of bacteria; Whether all diseases are infectious. <u>Weathering and Erosion:</u> Different types of weathering; How chemical weathering can be investigated; The difference between weathering and erosion. <u>The Periodic Table:</u> What elements are; How elements were originally arranged on the Periodic Table by Mendeleev; How the original Periodic Table changed over time; What the different patterns in the Periodic Table are, including the Alkali metals, Transition metals, Halogens and Noble gas elements; How we can investigate the properties of metals and non-metals. <u>More Electrical Circuits:</u> How to build a parallel circuit; How to measure current and voltage in a parallel circuit; How to draw accurate parallel circuit diagrams; How current and voltage can be investigated in a parallel circuit; What electrical resistance is; How resistance can be investigated in electrical circuits; How we can model electrical resistance in circuits. <u>Waves:</u> What water waves are; How we can calculate wave speed; Similarities and differences between light waves and water waves; What pressure waves are; How pressure waves are used in cleaning; How pressure waves are used in physiotherapy. <u>Fuel Uses and Costs:</u> What makes a good fuel; Different types of fuel; How we can investigate the energy transferred by different fuels; How we can compare energy efficiency; What the cost of fuel is; Alternative energy resources; What power is and how power can be calculated.		Students will be taught knowledge and skills from the following components on rotation: Biodiversity and Human Impact, Adaptation and Evolution, Rock Changes, Floating and Sinking and Magnets and Electromagnets. Students should understand: <u>Biodiversity and Human Impact:</u> Why there are different kinds of ecosystems; The different levels within ecosystems; The living and non-living parts of an ecosystem; How organisms can be identified inside and outside the science laboratory; How organisms are classified and named; How quadrats can be used to investigate the distribution of organisms; What biodiversity is and why it is so important; What the threats are to biodiversity; How humans can help to preserve biodiversity. <u>Adaptation and Evolution:</u> How organisms are adapted to their environment; Why organisms compete; What natural selection is; How to model natural selection; How natural selection can lead to evolution; What can cause the extinction of a species. <u>Rock Changes:</u> What sedimentary rocks are; How fossil fuels form; What happens in the carbon cycle; How sedimentary rocks can change to become metamorphic rocks; What the rock cycle is and how it can be modelled. <u>Floating and Sinking:</u> What density is; How density can be investigated; What pressure is; How pressure can be investigated; What causes pressure in the atmosphere and under water; What convection is; What causes a convection current; How a convection current can be modelled. <u>Magnets and Electromagnets:</u> How magnets behave; How we can demonstrate a magnetic field; How compasses work; How electromagnets work; How we can investigate electromagnets; Where we see magnetic effects.	Students will be taught knowledge and skills from the following components on rotation: Cell Biology, Inheritance and the Genome, Interdependence of Organisms and Classification, Atomic Structure and the Periodic Table, Bonding, Energy of Moving Particles and Measuring and Calculating Motion. Students should understand: <u>Cell Biology:</u> What the main parts of the cell are; The difference between eukaryotes and prokaryotes; How we draw and label cells from the field of view; How we calculate actual sizes of cells; How microscopy techniques have developed over time; The advantages and disadvantages of electron microscopy. <u>Inheritance and the Genome:</u> What chromosomes are and how they determine our sex; What DNA is; How DNA can be extracted from fruit; Why the Human Genome Project is so important; Why we inherit some characteristics and not others; What genetic disorders are. <u>Interdependence of Organisms and Classification:</u> The causes of interdependence within a community; How changes in abiotic and biotic factors affect a community; How belt transects can be used to investigate the distribution of a species; How materials are cycles through an ecosystem; How the three domains are used to classify organisms. <u>Atomic Structure and the Periodic Table:</u> The difference between atoms, elements, and compounds; How our understanding of atoms has changed over time; What is inside the nucleus of an atom; How we know the number and placement of electrons in an atom; What the Periodic Table can really tell us about elements; How we explain the properties of elements in Group 1, 7 and 0. <u>Bonding:</u> Why atoms would want to lose or gain electrons; How metals and non-metals bond; How we can investigate the properties of ionic compounds; How non-metals bond; What metallic bonding is; How we can use models to represent chemical bonds. <u>Energy of Moving Particles:</u> How energy can be stored and transferred; What the first law of thermodynamics is; What specific heat capacity is and how it can be investigated; What specific latent heat is. <u>Measuring and Calculating Motion:</u> The difference between a vector and scalar; The different between speed and velocity; How we calculate the acceleration of a moving object; How we represent journeys on a velocity/time graph; How we interpret velocity/time graphs; What terminal velocity is.	

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Year 10	Students will be taught knowledge and skills from the following components on rotation: <u>Cell Biology</u> Cells are the basic unit of all forms of life. Students will explore how structural differences between types of cells enables them to perform specific functions within the organism. These differences in cells are controlled by genes in the nucleus. For an organism to grow, cells must divide by mitosis producing two new identical cells. If cells are isolated at an early stage of growth before they have become too specialised, they can retain their ability to grow into a range of different types of cells. This phenomenon has led to the development of stem cell technology. This is a new branch of medicine that allows doctors to repair damaged organs by growing new tissue from stem cells. <u>Organisation</u> Students will learn about the human digestive system which provides the body with nutrients and the respiratory system that provides it with oxygen and removes carbon dioxide. In each case they provide dissolved materials that need to be moved quickly around the body in the blood by the circulatory system. Damage to any of these systems can be debilitating if not fatal. Although there has been huge progress in surgical techniques, especially regarding coronary heart disease, many interventions would not be necessary if individuals reduced their risks through improved diet and lifestyle. Students will also learn how the plant's transport system is dependent on environmental conditions to ensure that leaf cells are provided with the water and carbon dioxide that they need for photosynthesis. <u>Atomic Structure and the Periodic Table</u> The periodic table provides chemists with a structured organisation of the known chemical elements from which they can make sense of their physical and chemical properties. The historical development of the periodic table and models of atomic structure provide good examples of how scientific ideas and explanations develop over time as new evidence emerges. The arrangement of elements in the modern periodic table can be explained in terms of atomic structure which provides evidence for the model of a nuclear atom with electrons in energy levels. <u>Energy</u> The concept of energy emerged in the 19th century. The idea was used to explain the work output of steam engines and then generalised to understand other heat engines. It also became a key tool for understanding chemical reactions and biological systems. Limits to the use of fossil fuels and global warming are critical problems for this century. Physicists and engineers are working hard to identify ways to reduce our energy usage. <u>Electricity</u> Electric charge is a fundamental property of matter everywhere. Understanding the difference in the microstructure of conductors, semiconductors and insulators makes it possible to design components and build electric circuits. Many circuits are powered with mains electricity, but portable electrical devices must use batteries of some kind. Electrical power fills the modern world with artificial light and sound, information and entertainment, remote sensing, and control. The fundamentals of electromagnetism were worked out by scientists of the 19th century. However, power stations, like all machines, have a limited lifetime. If we all continue to demand more electricity this means building new power stations in every generation – but what mix of power stations can promise a sustainable future?		Students will be taught knowledge and skills from the following components on rotation: <u>Infection and Response</u> Pathogens are microorganisms such as viruses and bacteria that cause infectious diseases in animals and plants. They depend on their host to provide the conditions and nutrients that they need to grow and reproduce. They frequently produce toxins that damage tissues and make us feel ill. Students will explore how we can avoid diseases by reducing contact with them, as well as how the body uses barriers against pathogens. Once inside the body our immune system is triggered which is usually strong enough to destroy the pathogen and prevent disease. When at risk from unusual or dangerous diseases our body's natural system can be enhanced using vaccination. Since the 1940s a range of antibiotics have been developed which have proved successful against several lethal diseases caused by bacteria. Unfortunately, many groups of bacteria have now become resistant to these antibiotics. The race is now on to develop a new set of antibiotics. <u>Bonding, Structure, and Properties of Matter</u> Chemists use theories of structure and bonding to explain the physical and chemical properties of materials. Analysis of structures shows that atoms can be arranged in a variety of ways, some of which are molecular while others are giant structures. Theories of bonding explain how atoms are held together in these structures. Scientists use this knowledge of structure and bonding to engineer new materials with desirable properties. The properties of these materials may offer new applications in a range of different technologies. <u>Quantitative Chemistry</u> Chemists use quantitative analysis to determine the formulae of compounds and the equations for reactions. Given this information, analysts can then use quantitative methods to determine the purity of chemical samples and to monitor the yield from chemical reactions. Chemical reactions can be classified in various ways. Identifying different types of chemical reaction allows chemists to make sense of how different chemicals react together, to establish patterns and to make predictions about the behaviour of other chemicals. Chemical equations provide a means of representing chemical reactions and are a key way for chemists to communicate chemical ideas. <u>Particle Model of Matter</u> The particle model is widely used to predict the behaviour of solids, liquids, and gases and this has many applications in everyday life. It helps us to explain a wide range of observations and engineers use these principles when designing vessels to withstand high pressures and temperatures, such as submarines and spacecraft. It also explains why it is difficult to make a good cup of tea high up a mountain! <u>Atomic Structure</u> Ionising radiation is hazardous but can be very useful. Although radioactivity was discovered over a century ago, it took many nuclear physicists several decades to understand the structure of atoms, nuclear forces, and stability. Early researchers suffered from their exposure to ionising radiation. Rules for radiological protection were first introduced in the 1930s and subsequently improved. Today radioactive materials are widely used in medicine, industry, agriculture, and electrical power generation.	Students will be taught knowledge and skills from the following components on rotation: <u>Bioenergetics</u> Students will explore how plants harness the Sun's energy in photosynthesis to make food. This process liberates oxygen which has built up over millions of years in the Earth's atmosphere. Both animals and plants use this oxygen to oxidise food in a process called aerobic respiration which transfers the energy that the organism needs to perform its functions. Conversely, anaerobic respiration does not require oxygen to transfer energy. During vigorous exercise the human body is unable to supply the cells with sufficient oxygen and it switches to anaerobic respiration. This process will supply energy but also causes the build-up of lactic acid in muscles which causes fatigue. <u>Chemical Changes</u> Understanding of chemical changes began when people began experimenting with chemical reactions in a systematic way and organizing their results logically. Knowing about these different chemical changes meant that scientists could begin to predict exactly what new substances would be formed and use this knowledge to develop a wide range of different materials and processes. It also helped biochemists to understand the complex reactions that take place in living organisms. The extraction of important resources from the earth makes use of the way that some elements and compounds react with each other and how easily they can be 'pulled apart'. <u>Energy Changes</u> Energy changes are an important part of chemical reactions. The interaction of particles often involves transfers of energy due to the breaking and formation of bonds. Reactions in which energy is released to the surroundings are exothermic reactions, while those that take in thermal energy are endothermic. These interactions between particles can produce heating or cooling effects that are used in a range of everyday applications.	Students that have opted to study GCSE Separate Sciences follow a similar rotation, with further study within each component. Most students follow the AQA GCSE Combined Science: Trilogy specification. Those that have opted to study the Separate Science pathway follow the AQA GCSE Biology, Chemistry and Physics specification.

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 11	Students will be taught knowledge and skills from the following components on rotation: Homeostasis and Response Cells in the body can only survive within narrow physical and chemical limits. They require a constant temperature and pH as well as a constant supply of dissolved food and water. To do this the body requires control systems that constantly monitor and adjust the composition of the blood and tissues. These control systems include receptors which sense changes and effectors that bring about changes. Students will explore the structure and function of the nervous system and how it can bring about fast responses. They will also explore the hormonal system which usually brings about much slower changes. Hormonal coordination is particularly important in reproduction since it controls the menstrual cycle. An understanding of the role of hormones in reproduction has allowed scientists to develop not only contraceptive drugs but also drugs which can increase fertility. The Rate and Extent of Chemical Change Chemical reactions can occur at vastly different rates. Whilst the reactivity of chemicals is a significant factor in how fast chemical reactions proceed, there are many variables that can be manipulated to speed them up or slow them down. Chemical reactions may also be reversible and therefore the effect of different variables needs to be established to identify how to maximise the yield of desired product. Understanding energy changes that accompany chemical reactions is important for this process. In industry, chemists and chemical engineers determine the effect of different variables on reaction rate and yield of product. Whilst there may be compromises to be made, they carry out optimisation processes to ensure that enough product is produced within a sufficient time, and in an energy-efficient way. Forces Engineers analyse forces when designing a great variety of machines and instruments, from road bridges and fairground rides to atomic force microscopes. Anything mechanical can be analysed in this way. Recent developments in artificial limbs use the analysis of forces to make movement possible.		Students will be taught knowledge and skills from the following components on rotation: Inheritance, Variation and Evolution Students will discover how the number of chromosomes is halved during meiosis and then combined with new genes from the sexual partner to produce unique offspring. Gene mutations occur continuously and on rare occasions can affect the functioning of the animal or plant. These mutations may be damaging and lead to several genetic disorders or death. Very rarely a new mutation can be beneficial and consequently, lead to increased fitness in the individual. Variation generated by mutations and sexual reproduction is the basis for natural selection; this is how species evolve. An understanding of these processes has allowed scientists to intervene through selective breeding to produce livestock with favoured characteristics. Once new varieties of plants or animals have been produced it is possible to clone individuals to produce larger numbers of identical individuals all carrying the favourable characteristic. Scientists have now discovered how to take genes from one species and introduce them into the genome of another by a process called genetic engineering. Despite the huge potential benefits that this technology can offer, genetic modification remains highly controversial. Organic Chemistry The chemistry of carbon compounds is so important that it forms a separate branch of chemistry. A great variety of carbon compounds is possible because carbon atoms can form chains and rings linked by C-C bonds. This branch of chemistry gets its name from the fact that the main sources of organic compounds are living, or once-living materials from plants and animals. These sources include fossil fuels which are a major source of feedstock for the petrochemical industry. Chemists can take organic molecules and modify them in many ways to make new and useful materials such as polymers, pharmaceuticals, perfumes and flavourings, dyes, and detergents. Chemical Analysis Analysts have developed a range of qualitative tests to detect specific chemicals. The tests are based on reactions that produce a gas with distinctive properties, or a colour change or an insoluble solid that appears as a precipitate. Instrumental methods provide fast, sensitive, and accurate means of analysing chemicals, and are particularly useful when the amount of chemical being analysed is small. Forensic scientists and drug control scientists rely on such instrumental methods in their work. Chemistry of the Atmosphere The Earth's atmosphere is dynamic and forever changing. The causes of these changes are sometimes man-made and sometimes part of many natural cycles. Scientists use very complex software to predict weather and climate change as there are many variables that can influence this. The problems caused by increased levels of air pollutants require scientists and engineers to develop solutions that help to reduce the impact of human activity. Using Resources Industries use the Earth's natural resources to manufacture useful products. To operate sustainably, chemists seek to minimise the use of limited resources, use of energy, waste, and environmental impact in the manufacture of these products. Chemists also aim to develop ways of disposing of products at the end of their useful life in ways that ensure that materials and stored energy are utilised. Pollution, disposal of waste products and changing land use has a significant effect on the environment, and environmental chemists study how human activity has affected the Earth's natural cycles, and how damaging effects can be minimised. Waves Wave behaviour is common in both natural and man-made systems. Waves carry energy from one place to another and can also carry information. Designing comfortable and safe structures such as bridges, houses and music performance halls requires an understanding of mechanical waves. Modern technologies such as imaging and communication systems show how we can make the most of electromagnetic waves.	Students will be taught knowledge and skills from the following components on rotation: Ecology The Sun is a source of energy that passes through ecosystems. Materials including carbon and water are continually recycled by the living world, being released through respiration of animals, plants, and decomposing microorganisms, and taken up by plants in photosynthesis. All species live in ecosystems composed of complex communities of animals and plants dependent on each other and that are adapted to conditions, both abiotic and biotic. These ecosystems provide essential services that support human life and continued development. To continue to benefit from these services humans need to engage with the environment in a sustainable way. Students will explore how humans are threatening biodiversity as well as the natural systems that support it. They will also consider some actions we need to take to ensure our future health, prosperity, and well-being. Magnetism and Electromagnetism Electromagnetic effects are used in a wide variety of devices. Engineers make use of the fact that a magnet moving in a coil can produce electric current and that when current flows around a magnet it can produce movement. It means that systems that involve control or communications can take full advantage of this. Space Physics (GCSE Separate Science Physics only) Questions about where we are, and where we came from, have been asked for thousands of years. In the past century, astronomers and astrophysicists have made remarkable progress in understanding the scale and structure of the universe, its evolution and ours. New questions have emerged recently. 'Dark matter', which bends light and holds galaxies together but does not emit electromagnetic radiation, is everywhere – what is it? And what is causing the universe to expand ever faster?	
					Students that have opted to study GCSE Separate Sciences follow a similar rotation, with further study within each component, including an extra component in Physics titled 'Space Physics'	
					Most students follow the AQA GCSE Combined Science: Trilogy specification. Those that have opted to study the Separate Science pathway follow the AQA GCSE Biology, Chemistry and Physics specification.	