Science Curriculum

	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
Year 5 (2 hours a week)	**Earth and Space** Starting with the solar system, students will learn about the movement of the Earth, and other planets, in relation to the sun. Then, focusing on planet Earth, students will learn about the movement of our moon and use information about the Earth's rotation to explain day and night.	**Properties & Changes of Materials (1)** Students will investigate the characteristics of everyday materials and group them based on properties such as hardness and conductivity. Students will then apply this knowledge to the use of everyday materials such as metal, wood and plastic.	**Living things and their habitats** Focusing on the five different vertebrate groups, students will learn about their different lifecycles and how reproductive strategies relate to the number of offspring. Then, to deepen their learning, students will investigate the process of reproduction in flowering and non-flowering plants.	**Forces** Starting with the identification of gravity as a force, students will learn how other forces may affect the movement of an object. To gain a deeper understanding of the benefits of forces students will learn how simple mechanisms, such as levers and gears, have allowed humans to have a greater 'effect'!	**Animals, including humans** Starting from birth, students will learn about the human life cycle and the different stages of development and growth they have already experienced. Then, with links to the PSHCEE curriculum, students will learn how puberty will affect their bodies and how lifestyle can affect their future development.	**Properties & Changes of Materials (2)** Through different experiments students will develop an understanding of reversible and irreversible changes. Using their knowledge of solids, liquids and gases, students will learn how to separate a mixture of different substances (including how to dissolve a solid into a liquid and get it back again!)
Year 6 (2 hours a week)	**Living things and their habitats** Starting with the early teachings of Aristotle, students will learn how he tried to classify the world around him. Then, using the teachings of Carl Linnaeus, students will use modern classification techniques to classify living things into the different Kingdoms and Classes. Students will then experiment with yeast to identify whether or not it can be classified as a living organism.	**Electricity** After learning about circuit components and their corresponding symbols, students will progress from building circuits from pictures to building them from circuit diagrams. Once competent at working with circuits, students will investigate the impact of adding/removing cells and components.	**Animals, including humans** Building on their knowledge of organs in the human body, students will develop a deeper understanding of how their respiration and circulatory systems works. Students will then investigate how external lifestyle factors, such as diet and exercise, can affect their bodies.	**Light** Starting off by identifying sources of light, students will learn how light travels to their eyes and how they are able to see opaque objects. Students will then investigate the relationship between shadow size and the positions of light source and object.	**Evolution and Inheritance** After looking at the diary of Mary Anning, students will analyse the evidence of previous life forms (dinosaurs) through the discovery of fossils. Then, by researching the findings of Charles Darwin, students will see how the Theory of Evolution explains adaptation in plants and animals.	**Scientific Enquiry** Towards the end of the year, after students have taken their end of key stage assessment, students will development their own experiment to answer a question. To do this this they must identify and control variables, accurately measure and record their results before presenting their findings clearly.

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Year 7 (3 hours a week)	**Cells & Hierarchical Organisation** Robert Hooke invented the microscope so he could explore the microscopic world. Using his research, students will prepare microscopic slides of animal and plant cells so their structures can be compared. From this point, students will expand their knowledge of cells by researching different types of specialised cell (as well as other microscopic organisms!)	**Forces (Balanced & in-motion)** Sir Isaac Newton led the world in the research of Forces – in doing so, creating the 'Laws of Motion' that we use today. To begin, Students will identify the different types of force that can act on an object before interpreting its movement through the calculation and direction on resultant forces.	**Chemical Reactions of Acids & Alkalis** Before students start handling acids and alkalis students will first learn about 'Hazard Symbols' and the role acids and alkalis play in our daily lives. Once they have the knowledge to experiment safely, students will use acids and/or alkalis to determine the effective of difference types of indicator before investigating the neutralising effect of ant-acids.	**Energy Resources & Transfers** Students will learn how energy can appear in different forms as well as the identification of processes that can transfer that energy into the surroundings. By looking at the different ways energy can be stored, students will discover how energy can be obtained from renewable/non-renewable energy sources and explain how energy is able to be released from fuel by the process of combustion.	**Electricity (Current & Static)** Following on from the Y6 work on component symbols are used to create circuit diagrams, students will learn how to measure current and potential difference. Using these skills, students will investigate series and parallel circuits as well as resistance. Students then compare charge and static electricity using information about electrons.	**Relationships in an Ecosystem** Starting off with a simple food chain, students will learn how energy is passed between producers and consumers. Students will then develop this knowledge by linking food chains together (to form webs) as well as analysing the population of each species needed to sustain the pyramid. Finally, students will investigate the response of food chains to environmental factors (such as toxic materials).
	Particulate Nature of Matter Students will use their knowledge of particles, as well learning about the role of energy, to draw diagrams of substances in the 3 States of Matter. By developing their knowledge of energy, students will discover how different substances respond to heat and how, with enough energy, they are able to change state.	**Atoms, Elements & Compounds** Starting with definitions of keywords and an introduction to the Periodic Table, students will the use atomic diagrams and chemical equations to develop their understanding of physical and chemical changes. To develop their practical skills, students will oxidise metallic elements and discover how masses can be affected.	**Reproduction (in humans)** In this topic students will learn about the anatomy of the male and female reproductive systems before developing their knowledge of how, through the process of fertilisation, two cells are able to multiply exponentially to create a foetus.	**Reproduction (in plants)** As a comparison to reproduction in animals (and humans), students will learn about the life cycle of plants and the process of germination. By dissecting the reproductive organs of a flower, students will learn about plant anatomy and use it to explain the process of pollination. To develop students' skills in scientific enquiry, they will investigate the different methods of seed dispersal.	**Pure & Impure Substances** By defining materials as Solvents, Solutes and Solutions, students will develop their understanding of physical changes by using applying different techniques to separate a range of mixed substances.	**Inheritance, Genes, DNA & Chromosomes** Starting with the pioneering research of Crick, Watson, Wilkins and Franklin, students will learn about the structure of DNA. Using this knowledge, students will discover how inherited characteristics are determined by DNA as well as explain the variation within a species and how changes to the environment may lead to extinction.

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Year 8 (3 hours a week)	**Earth & Atmosphere** Starting from the structure of planet Earth, students will learn how the formation of rocks leads to their classification as well as how, over time, processes such as weathering and the movement of tectonic plates can lead to the formation of new rocks.	**Light Waves** Starting with a recap on ray diagrams and reflection, students will explain refraction by referencing the speed of light as well as use wavelengths (and the work of Newton) to explain how a spectrum can be created. Furthermore, through the use of differently coloured opaque objects and light filters will investigate how the human eye is able to see different colours, as well as turn red into black!	**Nutrition & Digestion** Starting with the NHS 'Eat Well' plate, students will learn the science behind nutrition by experimenting with different foods to discover both the nutrition and of energy within it. Students will use this knowledge to research vitamin and mineral sources before investigating the negative effects of malnutrition. Students will then use their knowledge of their digestive system (and enzymes!) to explain the process of absorption and how glucose is transported around the body.	**Patterns in the Periodic Table** Building on students' knowledge of elements from Year 7, students will learn how Mendeleev constructed the periodic table using the Bohr Atom Model that will introduce the topic of sub-atomic particles. Then, by using the position of elements within the periodic table, students will predict the reactivity series.	**Plants & Photosynthesis** Using microscopes, students will use skills in plant dissection to investigate stoma before discovering how the different parts of plants relate to the reactants and products of photosynthesis. Using their knowledge of atoms and chemical reactions, students will link photosynthesis to the Carbon and Nitrogen cycles.	**Revision** Preparation for end of Key stage assessments.
	Transfer of Thermal Energy Using several small experiments students will investigate the factors that affect the cooling rate of water. Building on this knowledge, students will then apply their knowledge of particles to explain how thermal energy travels through different states of matter (or no matter at all!)	**Sound Waves** Starting off with a guitar and a drum, students will use their knowledge of particles to explain how sound travels from an object to their ear, as well as use an oscilloscope to draw images of individual sound waves. Students will then discover the anatomy of the human ear before investigating their own hearing range (in comparison to other animals).	**Gas Exchange Systems & Respiration** Using knowledge of the composition of the atmosphere, students are to investigate the difference between inhaled and exhaled air. Students will then develop a detailed understanding of how breathing leads to the diffusion of oxygen into the blood stream and how our bodies are able to convert oxygen and glucose into energy through cellular respiration.	**Chemical Reactions** Building on their knowledge of chemical reactions (from Year 7), students will perform a variety of experiments to identify different types of chemical reaction. Using their knowledge of atoms and compounds, students will explain their findings using balanced chemical equations.	**Magnetism and Electromagnets** To begin the topic students will investigate the properties and field patterns of bar magnets. Then, using the findings of Michael Faraday, students will learn how the invention of the dynamo has paved the way to many other inventions. After students have made their own electromagnet they will plan an investigation into its strength by experimenting with its components.	**Scientific Enquiry** Using all their skills on scientific enquiry, students will plan an appropriate experiment to answer the question 'Why do penguins huddle?' whilst being able to quantify the benefits.