

## Intent:

The ELPS Science curriculum aims to provide all pupils with a strong understanding of the world (living and non-living) by teaching scientific knowledge and conceptual understanding through the disciplines of biology, chemistry, and physics. Core curriculum content is carefully selected to ensure substantive knowledge and vocabulary build progressively. Scientific enquiries are used to deepen understanding and pupils are supported in developing their disciplinary knowledge and skills to allow them to ask, and answer, their own scientific questions.

## Implementation:

Year 1											
Autumn I		Autumn II		Spring I		Spring II		Summer I		Summer II	
<u>Everyday Materials (Chemistry)</u>				<u>Animals, including Humans (Biology)</u>				<u>Plants (Biology)</u>			
<p>In this unit, pupils learn that objects are made from a range of materials. They compare and contrast materials based on appearance and properties and work scientifically to group materials based on their properties.</p> <p>In this unit, pupils will handle and manipulate a range of objects made from a variety of materials including wood, plastic, glass, metal, water, rock, rubber, and fabric. They will learn to distinguish between objects and the materials that they are made of. Pupils will engage in hands-on tasks and experiments to observe fundamental physical properties of these materials, gaining knowledge into what makes each substance unique, and laying the foundation for a deeper understanding of the physical world. Pupils will 'work scientifically' to compare and group various everyday materials based on their simple physical properties.</p>				<p>In this unit, pupils identify and name a diverse range of common animals from each animal group (fish, amphibians, reptiles, birds, and mammals). They will observe the common features of animals (wild and domestic). There is a strong focus on developing vocabulary of animal features (e.g., fin, scales, fur, hooves) and comparative language (e.g., similar, different, larger, smaller). Pupils will also learn to compare and contrast animals from within the same animal group, and also those from different animal groups. In addition to learning about animals (wild and domestic), pupils will identify, name, draw, and label the fundamental parts of the human body, while also understanding the senses associated with each body part. Pupils will connect this knowledge to their learning about animals by describing how animals share many of the senses humans have.</p>				<p>In this unit, pupils are supported to develop their knowledge of trees and plants by naming a wide variety of both common wild and garden plants, starting with those grown on our school grounds. Pupils learn about deciduous trees, which shed their leaves seasonally, and evergreen trees, which maintain their foliage throughout the year. Pupils develop their 'working scientifically' skills by comparing parts of plants and drawing and describing their features. Through this exploration of the natural world, pupils begin to gain a deeper understanding of plant diversity and structure, laying a solid foundation for their scientific understanding of the plant kingdom which they will build on in subsequent years.</p>			
<u>Seasonal Changes</u>											
<p>Pupils observe changes across the four seasons. This 'observation over time' supports pupils to develop their disciplinary knowledge; through these observations, pupils grasp the concept that change can manifest swiftly or unfold gradually. Pupils develop their observational skills and the appropriate language to describe changes. They record their observations in a custom-made booklet (one booklet for each season) and use their recorded data to make comparisons between the four seasons. Pupils will observe and compare changes in the amount of sunlight during the day, the weather, the type of clothes children wear in each season, and the animals and plants present.</p>											

Year 2					
Autumn I	Autumn II	Spring I	Spring II	Summer I	Summer II
<b><u>Uses of Everyday Materials (Chemistry)</u></b>  <p>In this unit, pupils review and build on their learning from the Y1 'Everyday Materials' unit. They will use their knowledge of the properties of different materials, such as wood, metal, plastic, glass, brick, rock, paper, and cardboard, to make decisions about which material they believe, based on their knowledge, will be most suitable for a certain purpose (e.g., which material is suitable for making a raincoat). Then, pupils are supported to perform simple experiments to test their theory. Pupils will 'work scientifically' to set up and carry out their investigation and analyse their results. Pupils will also learn that materials can be manipulated and altered through actions like squashing, bending, twisting, and stretching and will engage in hands-on practical tasks to experience this themselves.</p>		<b><u>Living Things and Life Cycles (Biology)</u></b>  <p>Pupils begin this unit by identifying the characteristics that make a living thing 'alive'. They then proceed to classify a range of objects into one of the following categories: dead, alive, or never having been alive – Some of the items selected for classification are intentionally challenging, aimed at stimulating critical thinking and preventing the formation of misconceptions. Pupils then study a range of habitats, local and beyond (geography link), and the animals and plants that live within them. Micro-habitats are introduced and pupils have the opportunity to explore and discover the living things living within micro-habitats on our school grounds. Pupils extend their learning to understand the basic needs of animals and plants, and how the habitat they live in provides these necessities for them. Pupils complete the unit by studying the life cycles of a range of animals.</p>		<b><u>Plants, and Animals including Humans (Biology)</u></b>  <p>Pupils begin this unit by learning what plants need to grow and linking this with their knowledge of the requirements of living things (including humans) from the previous unit. They apply this knowledge to make predictions about what might happen if plants do not receive enough sunlight. Then, pupils work scientifically to set up a simple comparative test to investigate this. Over the following weeks, pupils observe and measure the changes in the plants that receive varying amounts of light and record these changes for analysis once all the data has been collected. Pupils deepen their knowledge of life cycles by learning about plant life cycles and the importance of flowers.</p> <p>In Summer II, pupils consolidate their knowledge and re-visit topics that the teacher deems beneficial. Pupils participate in carefully-chosen scientific enquiries to further deepen their understanding.</p>	

Year 3				
Autumn I	Autumn II	Spring I	Spring II	Summer I & Summer II
<p><b><u>Rocks (Chemistry)</u></b></p> <p>Pupils begin this unit with a walk around the school grounds to find and identify objects and structures made from rock, and record what the rock is used for. Pupils learn about metamorphic, igneous, and sedimentary rock and how they are formed to help understand what each type of rock is used for. Particular focus is on sedimentary rock where pupils learn about fossil formation. Mary Anning (1799 – 1847), a pioneering palaeontologist and fossil collector, is studied to support pupils with their disciplinary understanding of how scientific knowledge develops over time. Pupils 'work scientifically' by testing the properties of different rocks, for example, for hardness and permeability. Furthermore, pupils also learn the connection between rocks and soils; that soils are made from rocks and organic matter. They learn that there are different types of soils with different properties.</p>	<p><b><u>Light (Physics)</u></b></p> <p>In this unit, pupils learn that light is necessary for seeing things. Pupils identify and classify natural and artificial light sources. They learn that darkness is the absence of light and connect this knowledge to understanding the formation of shadows. They engage in a pattern-seeking inquiry to observe how shadows change depending on a) the location of the light source, and b) the distance between the light source and the object that casts the shadow. Pupils are taught how to test whether a certain material allows light to pass through it, and they work scientifically to test and classify materials based on their opacity. Pupils are expected to use the correct terminology when describing materials (i.e., opaque, translucent, transparent). Pupils also learn about sunlight and the importance of protecting their eyes from its rays.</p>	<p><b><u>Animals including Humans (Biology)</u></b></p> <p>In this unit, pupils learn about the changes animals experience as they develop from offspring into adults. They construct life cycles to visually present these developmental changes and make comparisons between different life cycles. Pupils learn the basic needs of animals for survival and the possible repercussions should their needs be unmet. Pupils also learn about the different food groups and their importance in maintaining our overall health. They 'work scientifically' by researching the importance of exercise for our health, the significance of consuming the right amounts of various types of food, and how hygiene practices directly affect our health.</p>	<p><b><u>Plants (Biology)</u></b></p> <p>In this unit, pupils build upon their knowledge of plants from years 1 and 2. They identify the different parts of flowering plants, learn the correct terminology for them, and appreciate that these parts can vary among different plants. Pupils will observe how water is transported within plants by noting the changes that occur when celery is placed in coloured water. Pupils are taught the requirements for plant growth and work scientifically to investigate how the amount of light affects bean growth. Over the weeks, pupils record bean growth measurements to analyse by the end of the unit. In addition, pupils learn about the plant life cycle and the critical role of pollination. They study seed formation and how the structures of seeds support dispersal.</p>	<p><b><u>Summer I: Forces and Magnets (Physics)</u></b></p> <p>In this unit, pupils learn that objects can move differently on various types of surfaces. They are introduced to the concept of friction and understand that it is a contact force, requiring contact between two surfaces. Pupils participate in a comparative test to observe and compare the effects of friction between different surfaces, measuring the distance an object moves when rolled down ramps made of various materials. Additionally, pupils are introduced to the concept of variables and the importance of controlling variables to ensure the reliability of their tests. Pupils build upon their understanding of forces by comparing friction (a contact force) with magnetism, a non-contact force. They observe how magnets interact; either repel or attract depending on the orientation of their poles (i.e., north or south).</p> <p><b><u>Summer II: Working Scientifically</u></b></p> <p>In Summer II, pupils consolidate their knowledge and re-visit topics that the teacher deems beneficial. Pupils participate in carefully-chosen scientific enquiries to further deepen their understanding.</p>

Year 4				
Autumn I	Autumn II	Spring I	Spring II	Summer I & Summer II
<p><b><u>States of Matter (Chemistry)</u></b></p> <p>Pupils begin this unit by comparing a range of materials and grouping them according to whether they are solids, liquids, or gases. They learn the properties of each state of matter and use that information to group unfamiliar materials. To deepen pupils' understanding, they are taught the particle model. This knowledge is used to explain what happens when materials change state, e.g., when they are melted. Pupils work scientifically by conducting a comparative test to determine whether white, milk, or dark chocolate melts the fastest at 40°C. Pupils are expected to use the terms independent variable, dependent variable, and control variables when planning the investigation. A link is made to geography, whereby pupils learn about the water cycle and the role that evaporation and condensation play in it. Pupils also learn about the factors that can speed up evaporation and discuss how climate change can affect the water cycle.</p>	<p><b><u>Living Things and Their Habitats (Biology)</u></b></p> <p>In this unit, pupils learn how scientists use classification systems, understanding that living things are sorted into groups based on similar characteristics. This systematic approach allows scientists to study organisms more effectively, as well as classify and identify unknown organisms. Pupils work scientifically to group a variety of living things based on their physical characteristics and learn the key features of the five animal groups (mammals, birds, amphibians, and reptiles). Pupils expand their knowledge by identifying the key features of invertebrates and use this information to construct simple dichotomous classification keys to identify animals in our local environment. The unit concludes with pupils learning about the negative and positive human impact on animals in the local area and the wider world, and the changes we can make to safeguard our environment.</p>	<p><b><u>Animals including Humans (Biology)</u></b></p> <p>In this unit, pupils learn about the different parts of the digestive system and their functions and are taught the related technical vocabulary (e.g., oesophagus, intestines). Pupils will write an explanation text for the digestion process and are expected to use and spell key vocabulary correctly in their work. Pupils also learn to identify different types of human teeth and explain how their shape is suited to their function. Pupils will expand on this knowledge by examining photos of sets of teeth to determine which animal it might have belonged to, and whether the animal was, perhaps, a herbivore, carnivore, or omnivore. Pupils build on their understanding of how food provides energy by interpreting and constructing various food chains. In addition, pupils will be supported in constructing and interpreting food chains, identifying the predators, prey, and producers in each.</p>	<p><b><u>Sound (Physics)</u></b></p> <p>In this unit, pupils build upon their learning from the 'States of Matter' unit taught in autumn 1, where pupils learnt that all matter is made of particles. Pupils learn that sound (energy) is produced when these particles vibrate. These vibrations travel through a medium to reach the ear. Sound can be a tricky concept for pupils since we cannot 'see' sound; to ensure pupils develop a secure understanding of sound, they participate in a task where they observe the 'effects' of sound by using a tuning fork to listen to sounds, watch for vibrations, and feel vibrations. Pupils work scientifically to plan and carry out investigations exploring volume and pitch. They also participate in a problem-solving task that requires them to investigate how sounds change as the distance from the sound source increases.</p>	<p><b><u>Summer I: Electricity (Physics)</u></b></p> <p>In this unit pupils expand their knowledge to learn about a different form of energy (electricity) in addition to sound energy that they learnt in the previous unit. Pupils learn the names of the different components of an electrical circuit and how to connect them together to create a complete circuit. This practical unit allows pupils to develop their understanding of electricity by manipulating components and observing the effects of incomplete and complete circuits, including how switches are used to create a break in the circuit. Pupils are supported to draw simple diagrams which they will build on Year 6 where they will learn the correct symbols for the components. Furthermore, pupils will group materials into conductors and insulators, and explain why certain materials are used for certain purposes based on their electrical conductivity.</p> <p><b><u>Summer II: Working Scientifically</u></b></p> <p>In Summer II, pupils consolidate their knowledge and re-visit topics that the teacher deems beneficial. Pupils participate in carefully-chosen scientific enquiries to further deepen their understanding.</p>

Year 5				
Autumn I	Autumn II	Spring I	Spring II	Summer I & Summer II
<p><b><u>Forces (Physics)</u></b></p> <p>In this unit, pupils learn about gravity and conduct a demonstration to show that objects of different masses fall to the ground at the same time. They explore the contributions of Isaac Newton and Galileo to our understanding of forces. Pupils deepen their knowledge of friction (learned in Year 3) as they are taught about air resistance and water resistance. They consolidate their learning by working scientifically to conduct investigations to find out whether the surface area of a parachute affects the time it takes for it to fall to the ground. A similar investigation is repeated, but in water, allowing pupils to transfer knowledge about air resistance to water resistance. Additionally, pupils learn about gears and pulleys. They use Newton meters to measure the amount of force needed to lift a load and observe how this changes when simple machines are used.</p>	<p><b><u>Living things and Their Habitats (Biology)</u></b></p> <p>In this unit, pupils build upon their prior knowledge of pollination and fertilisation in flowering plants gained in the Year 3 'Plants' unit. They are introduced to essential vocabulary related to the female and male parts of the flower, and they are expected to incorporate these terms into their written work. Pupils also learn about asexual reproduction, exemplified by methods such as runners and tubers, enabling them to compare the advantages and disadvantages of both reproductive methods. Furthermore, pupils conduct research on the life cycles of animals from various animal groups (mammals, birds, reptiles, amphibians, and fish) to identify similarities and differences between these life cycles. Pupils present their findings to their peers through oral presentations.</p>	<p><b><u>Earth and Space (Physics)</u></b></p> <p>Pupils begin this unit by learning that the Sun is at the centre of our solar system. Using models of the solar system, they gain an understanding of how the Moon orbits the Earth and how the Earth orbits the Sun. They learn the names and order of the planets from the Sun and their relative distances from the Sun. Pupils tackle common misconceptions about the solar system, such as the idea that all planets are solid, and that the solar system is flat (2-dimensional). They study the differences between the heliocentric and geocentric models and link their learning to history to explain why people in the past believed that the Sun revolved around the Earth. In addition, pupils use their understanding of the Earth's rotation to explain why we have day and night, and why the Sun appears to move across the sky throughout the day.</p>	<p><b><u>Animals including Humans (Biology)</u></b></p> <p>This unit builds on life cycles pupils learnt in the 'Living Things and Their Habitats' unit by exploring various stages of the human life cycle. Pupils gain insights into the changes that humans undergo as they progress from infancy to old age. They engage in scientific research and data analysis to enhance their comprehension of each stage of development. This knowledge is then applied to create a detailed timeline illustrating growth and development. Additionally, pupils investigate whether there is a correlation between the mass of animals and the length of their gestation period. This involves pupils organising and analysing a set of raw data, and plotting the data on a graph to identify trends and outliers.</p>	<p><b><u>Summer I: Properties and Changes of Materials (Chemistry)</u></b></p> <p>In this unit, pupils learn how to test everyday materials for their properties, such as the response to magnets, the electrical conductivity, their hardness, and their transparency - all of which are properties that pupils have encountered in Years 3 and 4. New properties that pupils are taught about include solubility and thermal conductivity. Pupils build on their knowledge of particles and states of matter when learning about solubility and how to recover a substance from a solution. They also learn that some changes are not reversible (e.g. changes associated with burning) while others are (e.g. dissolving, and mixing). Pupils will engage in a problem-solving task to separate a mixture that requires them to use their knowledge of the properties of each component in the mixture.</p> <p><b><u>Summer II: Working Scientifically</u></b></p> <p>In Summer II, pupils consolidate their knowledge and re-visit topics that the teacher deems beneficial. Pupils participate in carefully-chosen scientific enquiries to further deepen their understanding.</p>

Year 6				
Autumn I	Autumn II	Spring I	Spring II	Summer I & Summer II
<p><b><u>Evolution and Inheritance (Biology)</u></b></p> <p>Pupils build on their learning of fossil formation in Year 3. In this unit, they learn how scientists use fossils to understand the living things that inhabited the Earth millions of years ago. Pupils are taught about the evolution of the eohippus to the modern-day horse, and the role that inheritance, variation, and adaptation play in the process. This unit also introduces pupils to Charles Darwin and his ground-breaking work that contributes to our understanding of evolution. Pupils learn how living things are adapted to their environment and use the case study of the peppered moth to demonstrate their understanding. They classify plant and animal adaptations according to whether they are structural, behavioral, or physiological.</p>	<p><b><u>Electricity (Physics)</u></b></p> <p>This unit builds on pupils' learning of electricity from their studies in Year 3. In this unit, pupils are taught the standardised symbols for electrical components, which they use throughout the unit to record their circuits. Pupils work scientifically to investigate the effects of different changes made to a circuit, such as how the number of cells in a circuit affects the brightness of the lamps, and how the number of lamps in a circuit affects the overall brightness. A real-world problem-solving task requires pupils to apply their knowledge, design, and test their circuits. Pupils are also introduced to the pioneering work of Michael Faraday and conduct research to discover his contributions to the field of electricity.</p>	<p><b><u>Living things and Their Habitats (Biology)</u></b></p> <p>In this unit, pupils delve deeper into the classification system and are introduced to the work of Carl Linnaeus. They review the physical characteristics of animals in each of the vertebrate groups (mammal, fish, bird, reptile, amphibian), and explain the criteria for an animal's classification within one group as opposed to another. Pupils will observe, and list, the physical characteristics of some invertebrates to identify common features of members within the group. They will also classify plants as either flowering or non-flowering. Additionally, pupils learn about microorganisms - how some can be harmful, while others can be beneficial, and the differences between bacteria and viruses.</p>	<p><b><u>Animals including Humans (Biology)</u></b></p> <p>The unit begins with pupils learning about the human (double) circulatory system. Each part of the system is then taught in depth. They learn the roles of the heart and lungs, and the functions of red blood cells, white blood cells, platelets and plasma. For blood vessels, pupils describe how the structure of each type of blood vessel (vein capillary and artery) is suited to its function. Pupils use their acquired knowledge to write an explanation text for the circulatory system. Pupils work scientifically by investigating the effect of exercise on heart rate and use their knowledge to explain the results. In addition, pupils learn about maintaining a healthy lifestyle and substances that can prove harmful or deadly to our health and well-being.</p>	<p><b><u>Summer I: Light (Physics)</u></b></p> <p>In this unit, pupils learn that light travels in straight lines and actively engage in an activity to demonstrate this fundamental concept. They use this knowledge, in conjunction with the understanding that light reflects off of objects, to create simple diagrams that illustrate how we can see. Pupils extend their knowledge of reflection to mirrors, explaining how we can see objects located behind us. Shadows, a topic introduced in the Year 3 light unit, are built upon. Pupils draw diagrams and write explanations for why shadows have the same shape as the objects that cast them. Pupils engage in scientific inquiries, exploring how shadows change when the light source is moved, taking care to identify and control variables that could impact their results.</p> <p><b><u>Summer II: Working Scientifically</u></b></p> <p>In Summer II, pupils consolidate their knowledge and re-visit topics that the teacher deems beneficial. Pupils participate in carefully-chosen scientific enquiries to further deepen their understanding.</p>

### **Enrichment Opportunities:**

At our primary school, we offer a range of exciting enrichment opportunities to inspire a love of science. During **Science Week**, children take part in hands-on experiments, competitions, and a vibrant science fair.

We have **close links with Wembley High**, where our Year 5 and 6 pupils attend real science lessons in fully equipped secondary school labs.

On **Career Day**, children meet scientists from different fields, helping them explore the many possibilities a future in science can offer.