

Science Curriculum

'No great discovery was ever made without a bold guess.'
Sir Issac Newton

At our school, the science curriculum is sequenced carefully to ensure that previous knowledge is revisited and developed. Each unit is carefully planned to ensure that prerequisite knowledge is built upon and connected content, between aspects within science and other disciplines is carefully linked and revisited.

Units are organised into key areas of learning that include; plants, living things and their habitats, animals including humans, forces, materials, seasonal changes and energy. These units are then further grouped into biology, chemistry and physics (with an understanding that links can often be made between these aspects).

Mathematical knowledge and skills are used regularly to support understanding of scientific knowledge and develop scientific enquiry. These links have been carefully planned in relation to prior learning outlined in the mathematics programme of study.

The core concepts in science are:

Biology

Chemistry

Physics

The science curriculum is mapped using these core concepts. We plan for progression using the progression points outlined below. Lesson content is planned towards these progression points and follows the model of direct instruction, shared and modelled practice before culminating in independent practice and mastery.

Specific knowledge is acquired through the knowledge organisers in each curriculum area and unit of study to ensure broad and balanced coverage and as a tool for pupils to add to, revise and structure that knowledge.





Biology

When studying plants, pupils in year 1 will focus primarily on understanding what plants are and describing their basic structure e.g. stem, leaves, petals, fruit and roots. This knowledge is then built upon in year 2 where pupils learn about how seeds and bulbs grow into plants. During this learning, pupils explore the requirements for plants to grow healthily.

In lower key stage 2, pupils will use the previous knowledge from both year 1 and year 2 to explore the functions of the different parts of plants in maintaining a healthy life in more depth. This knowledge is then used and built upon in even more depth to better understand living things and their habitats in later key stage 2. Throughout these units, pupils draw on their understanding of how seasonal changes can affect the growth of plants.

When studying animals, including humans, pupils will begin by exploring and grouping common animals into basic classification systems. In a similar way to the plants units, pupils will also learn about the different parts of the human body and link this to senses.

In year 2, pupils will build upon their previous knowledge and look at the basic needs for survival, focusing on animals and humans. Pupils will explore the similarities and differences between the needs of plants and those of animals. They will explore how a healthy lifestyle is important for growth. In key stage two, pupils will learn about how the human body works through learning about its key systems in more depth. In lower key stage 2, pupils will be taught about the muscular, skeletal and digestive systems.

In upper key stage 2, pupils will build on their previous learning by looking at how humans change and grow throughout their life, starting from birth and finishing in old age. Pupils will also be taught about the circulatory system and its component parts. They will use their knowledge to understand how the body's systems can be affected by lifestyle changes.

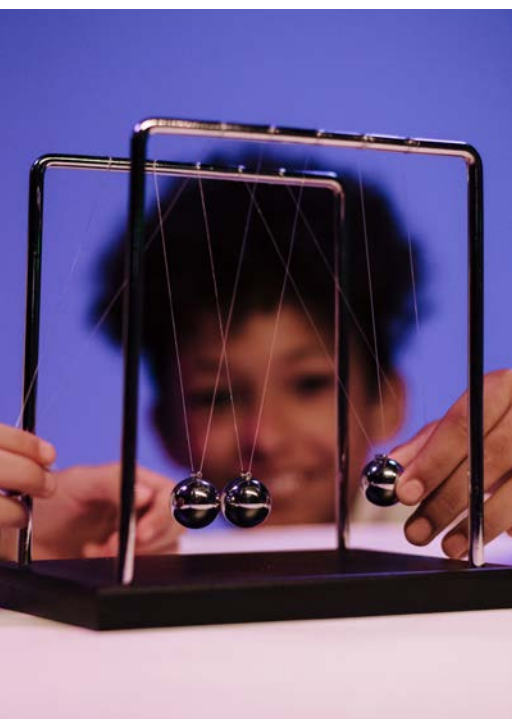
When studying living things and their habits, pupils bring together the knowledge and understanding from units within the plants and animals, including humans sequence of learning. In year 2, pupils use their knowledge of plants and animals to begin understanding how habitats comprise of both plants and animals, which are dependent on each other for life. Pupils will begin to explore life cycles within these habitats and how they play a part in growth. In lower key stage 2, pupils will develop a deeper understanding of classification and how habitats and environments can change, which can either support or pose danger to animal and plant life. Throughout these units, pupils will draw on their understanding of seasonal changes and their impact on life. In upper key stage 2, pupils will use their knowledge of classification to explore variations in life cycles. They will also describe reproduction, making links to life cycles and human growth. In year 6, pupils will explore classification in more depth, incorporating micro-organisms. The final unit of biology uses previous knowledge of living things to explore and learn about evolution and inheritance, paying particular attention to how living things and their characteristics change over time. Knowledge taught previously about fossils, will be revisited to support exploration and find evidence for these changes. When studying evolution, teachers will handle the topic with sensitivity ensuring that they do not imply that science contradicts religious beliefs.



Chemistry

When studying materials, pupils in year 1 will learn about how objects in their daily lives are made out of a variety of common materials. Pupils will learn how to group materials based on their physical properties e.g. hard, bendy. In year 2, pupil's knowledge will be extended by learning about how materials are selected for particular uses based on the properties identified. The pupils will explore how materials can be manipulated using contact forces such as pushes, pulls and twists. In year 3, pupils will learn about rocks and their properties. They will compare and group using skills and knowledge they have learnt from years 1 and 2. They will explore how fossils are formed, what they are and how they can be used.

In year 4, pupils will learn about and explore how materials can change state due to the application or removal of heat energy and at what temperature the change of state occurs. They will focus on grouping materials that have the same state and the processes of condensation and evaporation. Pupils will use this knowledge in their geography curriculum to better understand the water cycle. In year 5, pupils will and explore and group materials based on whether they are soluble or insoluble. Pupils will investigate ways to separate materials that have formed a solution as well as explore reversible and irreversible changes. Pupils will explore how these materials are experienced and play a part in everyday life.



Physics

When studying forces, pupils in year 3 will begin by exploring contact and non-contact forces. This will be explored through comparing how objects can be moved through pushes, pulles and magnetism. In year 4, pupils will continue to look at non-contact forces in the form of electrical force. They will explore simple circuits and their components, as well using knowledge of materials previously gained to identify common conductors and insulators. In year 5, pupils will explore the non-contact force of gravity and will focus on building a deeper knowledge of contact forces, in particular air resistance, water resistance and friction. Pupils will use knowledge developed in design and technology to explore how mechanisms are used to allow a small force to have a greater impact. In year 6, pupils will revisit electricity focusing on the variation of the different components and how this effects the functionality of a circuit e.g. brightness of bulbs, loudness of buzzers. Pupils will also be taught to make accurate diagrams and representations of circuits using internationally recognised symbols.

When studying units related to energy in key stage 2, pupils will begin in year 3 by studying light. Pupils will explore how darkness is the absence of light and how shadows are formed when light sources are blocked. Knowledge of materials and their properties, taught in key stage 1, will be revisited when exploring how to make shadows using different objects. In year 4, pupils will explore the effect of energy on states of matter and how differing levels of applied energy can change a material. Pupils will also explore sound as an energy. They will learn about vibrations, pitch and volume and how this all contributes to how humans can hear sound. Pupils will use prerequisite knowledge taught in animals, including humans to better understand human senses. In year 6, pupils will revisit and extend their knowledge of light by exploring how light behaves, travels and is sensed by the eye. Pupils will use their knowledge and understanding of shadows to explore how light travels in straight lines.

When studying earth and space, pupils in year 1 will explore how seasons change throughout the year and what effect this has on temperatures, length of day light and living things. When in year 5, pupils will be taught about the solar system, movement of the planets and how day and night occurs. Pupils in year 5 will also learn about the relationship between the earth, sun and moon and this system's place within the solar system.