Curriculum Intent for Science

Intent

At Preston Manor Lower School, we believe that an outstanding Science education provides the foundation whereby children make sense of the world they live in. Our teaching of science encourages children to develop that curiosity of the world they live in, as well as foster a love of how the modern world works around them. We aim to push our pupils to question why and how things happen around them; enabling them to explain, make logical predictions and evaluate their findings from an informed position. With the support of the upper school, pupils are provided with resources and lab experiences. It is our desire to inspire future leaders of Science.

Science is organised into a long term plan identifying which units of learning will be covered across the year, ensuring that it is broad and balanced, enjoyable and engaging, challenging and meets the needs of all learners in our school. Sequenced lessons ensure that there is progression. Knowledge and skills are built upon across the half term. Progression is also clear across the year groups.

It provides opportunities for children to develop as independent, confident and successful learners, with high aspirations, who know how to make a positive contribution to their community and the wider society.

From Reception to Year 6, the children will increase their long-term memory by building a bank of knowledge and skills which they can apply across the curriculum. Through teaching these units of learning, the teachers will further develop their subject knowledge of the subjects they are teaching.

In reception, children are taught indirectly through the topics covered in the EYFS Curriculum; Understanding the World, Physical Development, Expressive Arts and Design. **By the end of Reception, the children will be able to:**

- to explore people, plants, creatures and
- make decisions and talk about the world around them.
- explore creatures, people, plants and objects in their natural environments.
- They will observe and manipulate objects and materials to identify differences and similarities.
- Learn to use their senses,
- make observations of animals and plants and explain why some things occur and talk about changes.
- ask questions about why things happen and how things work.

By the end of KS1, in working scientifically, children will be able to:

- use appropriate scientific language from the national curriculum
- ask their own questions about what they notice
- use different types of scientific enquiry to gather and record data, using simple equipment where appropriate, to answer questions, observing changes over time, noticing patterns, grouping and classifying things and carrying out simple comparative tests.
- finding things out using secondary sources of information
- communicate their ideas, what they do and what they find out in a variety of ways.

By the end of KS1, for science content, children will be able to:

- name and locate parts of the human body, including those related to the senses
- describe the importance of exercise, a balanced diet and hygiene for humans
- describe the basic needs of animals for survival and the main changes as young animals, including humans, grow into adults
- describe the basic needs of plants for survival and the impact of changing these and the main changes as seeds and bulbs grow into mature plants
- identify whether things are alive, dead or have never lived
- describe and compare the observable features of animals from a range of groups and group animals according to what they eat
- describe how animals get their food from other animals and/or from plants, and use simple food chains to describe these relationships
- describe seasonal changes
- name different plants and animals and describe how they are suited to different habitats
- distinguish objects from materials, describe their properties, identify and group everyday materials and compare their suitability for different uses.

By the end of KS2, in working scientifically, children will be able to:

- use appropriate scientific language from the national curriculum

- describe and evaluate their own and others' scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources
- ask their own questions about the scientific phenomena that they are studying, and select the most appropriate ways to answer these questions, recognising and controlling variables where necessary (i.e. observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests, and finding things out using a wide range of secondary sources)
- use a range of scientific equipment to take accurate and precise measurements or readings, with repeat readings where appropriate
- record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- draw conclusions, explain and evaluate their methods and findings, communicating these in a variety of ways
- raise further questions that could be investigated, based on their data and observations

By the end of KS2, for science content, children will be able to:

- name and describe the functions of the main parts of the digestive, musculoskeletal and circulatory systems and describe and compare different reproductive processes and life cycles in animals
- describe the effects of diet, exercise, drugs and lifestyle on how the body functions
- name, locate and describe the functions of the main parts of plants, including those involved in reproduction and transporting water and nutrients
- use the observable features of plants, animals and micro-organisms to group, classify and identify them into broad groups, using keys or other methods
- construct and interpret food chains
- describe the requirements of plants for life and growth; and explain how environmental changes may have an impact on living things
- use the basic ideas of inheritance, variation and adaptation to describe how living things have changed over time and evolved; and describe how fossils are formed and provide evidence for evolution
- group and identify materials, including rocks, in different ways according to their properties, based on first-hand observation; and justify the use of different everyday materials for different uses, based on their properties
- describe the characteristics of different states of matter and group materials on this basis; and describe how materials change state at different temperatures, using this to explain everyday phenomena, including the water cycle
- identify and describe what happens when dissolving occurs in everyday situations; and describe how to separate mixtures and solutions into their components
- identify, with reasons, whether changes in materials are reversible or not
- use the idea that light from light sources, or reflected light, travels in straight lines and enters our eyes to explain how we see objects, and the formation, shape and size of shadows
- use the idea that sounds are associated with vibrations, and that they require a medium to travel through, to explain how sounds are made and heard
- describe the relationship between the pitch of a sound and the features of its source; and between the volume of a sound, the strength of the vibrations and the distance from its source
- describe the effects of simple forces that involve contact (air and water resistance, friction), that act at a distance (magnetic forces, including those between like and unlike magnetic poles), and gravity
- identify simple mechanisms, including levers, gears and pulleys, that increase the effect of a force
- use simple apparatus to construct and control a series circuit, and describe how the circuit may be affected when changes are made to it; and use recognised symbols to represent simple series circuit diagrams
- describe the shapes and relative movements of the Sun, Moon, Earth and other planets in the solar system; and explain the apparent movement of the sun across the sky in terms of the Earth's rotation and that this results in day and night.

Implementation

The curriculum incorporates the statutory requirements of the National Curriculum 2014 and other experiences and opportunities which best meet the learning and developmental needs of the children in our school.

Science is planned and taught for a half term, or can be taught in blocks. Educational visits and visitors are arranged to enhance the children's learning experiences. Displays will support, reflect and celebrate the children's learning.

Knowledge organisers are sent to families before the unit of learning is taught to allow the children and their family to discuss the forthcoming learning and carry out further research to support the learning. They will have the opportunity to read around the subject. It also highlights the knowledge and vocabulary the children will gain. The children will also complete a home learning project to support their learning.

CPD has been planned across the year to support the teaching and learning process, focussing on planning, challenge, questioning and developing cultural capital.

Impact

Enjoyment of the curriculum promotes achievement, confidence and good behaviour. Children feel safe to try new things.

In Science, the children will be very clear about why they are learning the content taught to them. By the end of the unit of learning, the children will have acquired new vocabulary and new knowledge, which they will be able to recall and improve their long-term memory. They will be able to use the skills they have learned across the curriculum. Children will make progress over time, which will be clear in their books. The subject knowledge and pedagogy of learning for teachers will be improved. Individual teachers will have been supported through targeted CPD.