



National Curriculum Aims

- develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics
- develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them
- are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

National Curriculum Purpose

A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

Intent

Science teaching at Pinner Park Primary School aims to give all children a strong understanding of the world around them whilst acquiring specific skills and knowledge to help them to think scientifically, to gain an understanding of scientific processes and the uses and implications of science today and for the future.

At Pinner Park Primary School, scientific enquiry skills are embedded in each topic the children study and these are revisited and developed throughout their time at school from EYFS understanding the world, through to Year 6. Topics, such as animals are taught and observed in EYFS, and then revisited in further details in KS1 and KS2. This model allows children to build upon their prior knowledge and increases their enthusiasm for the topics whilst embedding this procedural knowledge into the long-term memory.

All children are encouraged to develop and use a range of skills including observations, planning and investigations, as well as being encouraged to question the world around them and become independent learners in exploring possible answers for their scientific based questions. We nurture children's curiosity and inspire them to develop an appreciation for science. Specialist vocabulary for topics is taught and built up, and effective questioning to communicate ideas is encouraged. Concepts taught should be reinforced by focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions.

Implementation

As part of the planning process, teachers need to plan the following:

- Opportunities for children to talk and develop reasoning skills;
- The key knowledge (including vocabulary) all children must master supported by the use of knowledge organisers;
- A cycle of lessons for each topic, which carefully plans for progression, depth and mastery;
- Challenging lessons that encourage play, exploration and collaboration;
- Challenge questions for pupils to apply their learning in a philosophical/open manner;
- Where appropriate, organise trips and visits from experts who will enhance the learning experience.

Impact

Our Science Curriculum is high quality, well thought out and is planned to demonstrate progression. If children are keeping up with the curriculum, they are deemed to be making good or better progress. In addition, we measure the impact of our curriculum through the following methods:

- A reflection on standards achieved against the planned outcomes;
- A celebration of learning for each term which demonstrates progression across the school i.e. whole schools displays, assemblies and British Science Week;
- Tracking of knowledge in pre and post learning quizzes;
- Pupil discussions about their learning.

Knowledge & Skills

Knowledge refers to the theories and concepts making up science, the method of posing questions and carrying out investigations. Although there is no fixed way in which scientists work, all investigations tend to have aspects of common processes such as observation, classification, hypothesising, data collection, interpretation of data and evaluation. Children will progressively build up this knowledge as they move up through school.

Scientific knowledge should:

- be based on children's existing concepts in science
- arouse curiosity about natural phenomena which stimulates the posing of questions about such phenomena
- be a systematic means of enabling the children to ask and attempt to answer questions arising from observations
- provide models of scientists who have contributed to the field of science
- expose students to the various strands of specialisation, but which are still related
- recognise that different students experience science differently

In science, knowledge is needed to collect, understand and evaluate scientific evidence. It's the scientific method, i.e. changing one variable whilst keeping everything else the same – and seeing what happens. It is the ability to develop cognitive skills related to science such as acquiring scientific language, making observations, taking measurements, gathering, analysing and interpreting data, making generalisations, creating models, communicating and carrying out investigations. We use this knowledge every day.

For example, when children have an understanding of the impact of an investigation into air resistance during a topic on forces, they would develop their disciplinary knowledge by suggesting, discussing and interpreting other possible outcomes if some of the other variables were altered.

As children build their knowledge within their studies they will have ongoing opportunities for scientific enquiry. Children must understand the methods of scientific enquiry including how evidence is gathered and used to make scientific claims and how to ask perceptive questions. Skills that underpin scientific enquiry such as thinking critically, evaluating and examining results from investigations allows for further opportunity for children to apply their knowledge meaningfully.

Creativity

Creativity and knowledge work closely as creativity can involve making connections using prior knowledge to create new. Pinner Park Primary School, curriculum planning encourages and supports identifying natural links between science and other subject disciplines such as English, art and mathematics. These links are deliberate and purposeful. They are created naturally and never forced.

Assessment

Tracking children's progress throughout their school life is vital in order to establish their acquisition of knowledge and skills. At Pinner Park Primary School, learning always starts with the children's prior knowledge and any misconceptions they may have. Class teachers establish the children's prior knowledge using a variety of methods i.e. unit grids and mind maps. Units of work are then personalised to the children.

Misconceptions that arise throughout the unit are identified and addressed appropriately by the teacher. As a Federation we are currently exploring approaches to assessing children's recall of their learning to assess how effectively knowledge and skills have been embedded and mastered.