What makes me a Scientist?

MANOR PARK INFANT SCHOOL & NURSERY

Learning Together, Success Forever

Why is Science important at our school? (Vision Statement)

Intent

1. Our rationale for teaching Science

Science is a body of knowledge built up through the experimental testing of ideas. Science is also methodology, a practical way of finding reliable answers to questions we may ask about the world around us. Science in our school is about developing children's ideas and ways of working that enable them to make sense of the world in which they live through investigation, as well as using and applying process skills. Science is also a collaborative activity where ideas and suggestions are shared and investigated together. Through practical activities and team work, children experience and learn how to work together have mutual respect for one another and value social cohesion.

We believe that a broad and balanced science education is the entitlement of all children, regardless of ethnic origin, gender, class, aptitude or disability. Our aims in teaching science include:

- Preparing our children for life in an increasingly scientific and technological world.
- Fostering concern about, and active care for, our environment.
- Helping our children acquire a growing understanding of scientific ideas.
- Helping develop and extend our children's scientific concept of their world.
- Developing our children's understanding of the international and collaborative nature of science.

Attitudes

- Encouraging the development of positive attitudes to science.
- Building on our children's natural curiosity and developing a scientific approach to problems.
- Encouraging open-mindedness, self-assessment, perseverance and responsibility.
- Building our children's self-confidence to enable them to work independently.
- Developing our children's social skills to work cooperatively with others.
- Providing our children with an enjoyable experience of science, so that they will develop a deep and lasting interest and may be motivated to study science further.

Skills

- Giving our children an understanding of scientific processes.
- Helping our children to acquire practical scientific skills.
- Developing the skills of investigation - including observing, identifying, classifying, measuring, experimenting, communicating, recording data, presenting data, asking questions, interpreting, explaining.
- Developing the use of scientific language, recording and techniques.
- Developing the use of ICT in investigating and recording.
- Enabling our children to become effective communicators of scientific ideas, facts and data.

2. Our teaching aims

- Teach science in ways that are imaginative, purposeful, well managed and enjoyable.
- Encourage and support children to ask questions about the world and use scientific processes to try and answer them.
- Support children to make links between science and other subjects such as ICT, DT, literacy and numeracy.

Implementation

3. How Science is structured through the school

Delivering a broad and balanced science education to our children is a core principle of our school. Science teaching in the school is about excellence and enjoyment. We adapt and extend the curriculum to match the unique circumstances of our school.

Science is taught throughout the school from Foundation 1 to Year 2. Science is also taught where other opportunities arise and links can be made within the wider curriculum such as through following the children's interests, continuous provision in EYFS or topics and themes.

In KS1 and Foundation stage, a minimum of one third of science lessons overall include practical scientific enquiry.

The school ensures that a broad and balanced science curriculum is followed in which enquiry is at the heart of our children's scientific learning.

Our science scheme of learning ensures progression between year groups and guarantees topics are revisited. Teachers adapt and modify the model plans to suit their children's interests, current events, their own teaching style, the use of any support staff and the resources available. As a maintained school we ensure that any modification does not omit any of the NC.

To better suit the needs of individual classes or mixed-age groups, units may have been moved between years or amalgamated, where appropriate. However, science is taught every half term throughout the school year. Some units may be taught in collaboration with outside agencies, including neighbouring secondary schools.

Impact

We believe that if children have become inquisitive and knowledgeable scientists, then they will be able to articulate their understanding with confidence. This is why pupil voice is an important tool in assessing whether children have made progress. If a child is able to confidently formulate and explain their own responses to an overarching enquiry, then the curriculum and its delivery have been successful. The work produced by our children and the discussions they have, should demonstrate that they are equipped with the scientific skills and knowledge, that will enable them to be ready for the Key Stage 2 curriculum and beyond and life as an adult.

Science unit by unit

At Manor Park Infant and Nursery School, we have our own bespoke, unique curriculum that prioritises progression, embeds knowledge and links to prior learning and enjoyment.

Foundation Stage

Throughout the Foundation Stage children will be exposed to relevant scientific learning experiences, including skills, knowledge and vocabulary, which are fundamental to the development and progression of scientific understanding in Key Stage 1.

Within the Foundation Stage science will be taught in line with Development Matters, specifically ***Understanding the World*** and ***Personal, Social and Emotional Development*** through the identified topics.

Children will participate and engage in both adult-led and independent challenges to investigate and learn about materials, how things work, growing, caring for the natural environment and living things, forces, exploring the natural world, different environments, changing seasons, health and healthy choices about food, drink, activity and toothbrushing.

Investigations within topics are scaffolded using *I see..., I notice…, I wonder…*

In the EYFS *The Characteristics of Effective Teaching and Learning* are the foundations on which the working scientifically skills build in Key Stage 1.

Playing and exploring – children investigate and experience things, and 'have a go.'

Active learning – children concentrate and keep on trying if they encounter difficulties, and enjoy achievements.

Creating and thinking critically – children have and develop their own ideas, make links between ideas, and develop strategies for doing things.

While the children are playing and exploring, teachers should be modelling, encouraging and supporting them to do the following:

- Show curiosity and ask questions

- Make observations using their senses and simple equipment
- Make direct comparisons
- Use equipment to measure
- Record their observations by drawing, taking photographs, using sorting rings or boxes, using simple tick sheets
- Use their observations to help them to answer their questions
- Talk about what they have been doing and found out
- Identify, sort and group
- Using and reinforcing relevant vocabulary

In Foundation, we use Tapestry as a tool for tracking the children's scientific experiences, knowledge and understanding. This provides opportunities for children to revisit and discuss prior learning in order to make links to reinforce and embed understanding.

Year 1

Animals including Humans -*We are Anatomists*

The children will learn that humans have key parts in common, but these vary from person to person. Also, that humans (and other animals) find out about the world using their senses and that humans have five senses – sight, touch, taste, hearing and smelling. These senses are linked to particular parts of the body. **In Foundation the children are encouraged to explore and investigate using all their senses and this unit builds on this prior learning.**

Animals including Humans – *We are zoologists*

The children will learn that animals vary in many ways having different structures e.g. wings, tails, ears etc. Animals also have different skin coverings e.g. scales, feathers, hair and the children will learn that these key features can be used to identify them. They will also learn that animals eat certain things - some eat other animals, some eat plants, some eat both plants and animals. **This unit extends the children's learning in Foundation where the children's natural curiosity is encouraged and the observation and identification of animals outside such as birds, worms and insects are explored. The children are also involved in caring for animals and take part in first-hand scientific explorations of animal life cycles, such as chick eggs.**

Everyday materials - *We are material scientists*

In this unit the children will be given the opportunity to explore and investigate different types of materials. They will learn that objects are made of one or more materials and that some particular objects can be made from different materials e.g. plastic, metal or wooden spoons. The children will learn that materials can be described by their properties e.g. shiny, stretchy, rough etc. and that some materials e.g. plastic can be in different forms with very different properties. **This builds on prior learning in Foundation where the children have the opportunity to use all their senses in hands-on exploration of materials, explore collections of materials with similar and/or different properties and talk about the differences between materials and the changes they notice**.

Plants – *We are botonists*

This topic grows on the scientific foundations from Early Years. **In Foundation, time is given to exploring their environment and learning to understand the need to respect and care for the natural environment and all living things. This includes planting seeds, caring for the growing plants as well as discussing the lifecycle and naming the parts of a plant. This unit allows the children to extend this knowledge.** Growing locally, there will be a vast array of plants which all have specific names. These can be identified by looking at the key characteristics of the plant. Plants have common parts, but they vary between the different types of plants. Some trees keep their leaves all year while other trees drop their leaves during autumn and grow them again during spring.

Seasonal Changes -*We are meteorologists*

Seasonal changes will be observed and discussed throughout the year and specific lesson incorporated into each term. Photographs of seasonal changes will be kept as a record to compare how plants and trees have changed throughout the year. A daily weather record will also be kept to enable the children to discuss how the weather also changes over the seasons. In addition to this the children will also be encouraged to notice how the day length varies. **This builds on the children's prior learning in Foundation when noticing and discussing seasonal changes and the weather as they arise, making close observations of plants and seeds and changes in the natural environment whilst outside.**

Year 2

Animals including humans – *We are physiologists*

In this unit the children will learn that animals, including humans, have offspring which grow into adults. In humans and some animals, these offspring will be young, such as babies or kittens, that grow into adults. In other animals, such as chickens or insects, there may be eggs laid that hatch to young or other stages which then grow to adults. The young of some animals do not look like their parents e.g. tadpoles. All animals, including humans, have the basic needs of feeding, drinking and breathing that must be satisfied in order to survive. To grow into healthy adults, they also need the right amounts and types of food and exercise. Good hygiene is also important in preventing infections and illnesses. **This unit builds on prior learning in Year 1 where the children draw and label the basic parts of the human body and say which part of the body is associated with which sense. It also expands upon the children's ability to identify and name a variety of animals. This unit also links to learning in Foundation which focusses on growing, living things and healthy choices.**

Uses of everyday materials – *We are material scientisits*

In this unit the children will learn that all objects are made of one or more materials that are chosen specifically because they have suitable properties for the task. For example, a water bottle is made of plastic because it is transparent allowing you to see the drink inside and waterproof so that it holds the water. When choosing what to make an object from, the properties needed are compared with the properties of the possible materials, identified through simple tests and classifying activities. A material can be suitable for different purposes and an object can be made of different materials. Objects made of some materials can be changed in shape by bending, stretching, squashing and twisting. For example, clay can be shaped by squashing, stretching, rolling, pressing etc. This can be a property of the material or depend on how the material has been processed e.g. thickness. **This unit builds on prior learning in Year 1 where the children distinguish between an object and the material from which is made and also on the children's ability to identify, describe, compare and group a variety of everyday materials on the basis of their basic simple properties.**

Living things and their habitats – *We are biologists*

In this unit the children will learn that all objects are either living, dead or have never been alive. Living things are plants (including seeds) and animals and that dead things include dead animals and plants and parts of plants and animals that are no longer attached e.g. leaves and twigs, shells, fur, hair and feathers (This is a simplification, but appropriate for Year 2 children.) An object made of wood is classed as dead. Objects made of rock, metal and plastic have never been alive (again ignoring that plastics are made of fossil fuels). **This builds on prior learning in Year 1 where the children have identified, named, described and compared both plants and animals. This includes learning about different structures and features of plants and animals. In addition, there is opportunity to extend knowledge and understanding of materials.**

The children will also learn that animals and plants live in a habitat to which they are suited, which means that animals have suitable features that help them move and find food and plants have suitable features that help them to grow well. The habitat provides the basic needs of the animals and plants – shelter, food and water. Within a habitat there are different micro-habitats e.g. in a woodland – in the leaf litter, on the bark of trees, on the leaves. These micro-habitats have different conditions e.g. light or dark, damp or dry. These conditions affect which plants and animals live there. The plants and animals in a habitat depend on each other for food and shelter etc. The way that animals obtain their food from plants and other animals can be shown in a food chain. **This builds on prior learning in Year 1 where the children explored the plants which grow and are suited to the local area, that the common parts of a plant vary and the fact that animals eat certain things.**

Plants – *We are botonists*

Children will observe and describe how seeds and bulbs grow into mature plants. They will find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. Children will be introduced to the requirement of plants for germination, growth and survival, as well as the processes for reproduction and growth in plants. The children will observe and record with some accuracy, the growth of a variety of plants as they grow over time from a seed or bulb or observing similar plants at different stages of growth. This may also include setting up a comparative test to show that plants need light and water to stay healthy. **This builds on prior learning in Year 1 where the children explored the plants which grow and are suited to the local area, that the common parts of a plant vary. In addition this also builds on observation and discussions of how plants change through the seasons.**

What are the key concepts in science at our school?

Asking simple questions and recognising that they can be answered in different ways
• While exploring the world, the children develop their ability to ask questions (such as what something is, how things are similar and different, the way things work, which alternative is better, how things change and how things happen). Where appropriate they answer these questions. • The children answer questions developed with the teacher often through a scenario. • The children are involved in planning how to use resources provided to answer the questions using different types of enquiry, helping them to recognise that there are different ways in which questions can be answered.
Observing closely, using simple equipment
• Children explore the world around them. They make careful observations to support identification, comparison and noticing change. They use appropriate senses, aided by equipment such as magnifying glasses or digital microscopes, to make their observations. • The begin to take measurements, initially by comparison, then using non-standard units.
Performing simple tests
• The children use practical resources provided to gather evidence to answer questions generated by themselves or the teacher. They carry out: tests to classify; comparative tests; pattern seeking enquiries; and make observations over time.
Identifying and classifying
• Children use their observations and testing to compare objects, materials and living things. They sort and group these things, identifying their own criteria for sorting. • They use simple secondary sources (such as identification sheets) to name living things. They describe the characteristics they used to identify a living thing.
Gathering and recording data to help in answering questions
• The children record their observations eg using photographs, videos, drawings, labelled diagrams or in writing. • They record their measurements eg using prepared tables, pictograms, tally charts and block graphs. • They classify usin g simple prepared tables and sorting things.
Using their observations and ideas to suggest answers to questions
• Children use their experiences of the world around them to suggest appropriate answers to questions. They are supported to relate these to their evidence eg observations they have made, measurements they have taken or information they have gained from secondary sources. • The children recognise ‘biggest and smallest’, ‘best and worst’ from their data.

Science Long Term Plan

Science	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
F1	People who help us *Nursery rhymes*		Traditional tales *All about our bodies*		Explorers/map skills	
F2	People who help us *Nursery rhymes*		Traditional tales *All about our bodies*		Explorers/map skills	
F1 and F2	The Changing Seasons					
Year 1	Everyday Materials *We are material scientists*		Animals including humans *We are anatomists*	Animals including humans *We are zoologists*	Plants *We are botanists*	
	Seasonal change *We are phenologists and meteorologists*					
Year 2	Uses of everyday materials *We are material scientists*		Animals including humans *We are physiologists*		Living things and their habitats *We are biologists* Plants *We are horticulturists and botanists*	

How will we know the children learn well in Science at our school?

How well do children learn in Science?	Evidence
Pupils can use the knowledge and vocabulary they have learnt to verbally articulate their understanding. They show that they can retain facts.	Child-led Book Looks Pupil voice
Pupils can use knowledge they've learnt and transfer to a structured piece of writing. Showing they can retain facts and show an understanding of their learning.	Book Looks Pupil voice
Pupils use homework and topic walls effectively to show how they are building on prior learning and using current knowledge and vocabulary to develop understanding.	Work scrutiny Pupil voice Homework Displays

Pupils show a natural curiosity for their topic	Pupil voice Homework Classroom visits
Use of progression documents allows pupils skills to develop through year groups	Work scrutiny Pupil voice Topic Plans Progress Planners