

# Whinmoor St Paul's C of E Primary School



## Science Guidance Document



## **Introduction**

Science is a core subject within the National Curriculum and we know that it stimulates and excites pupils' wonder about phenomena and events in the world around them. This policy outlines the purpose, nature and management of Science taught at Whinmoor St Paul's. It reflects the consensus views of all the teaching staff and they are responsible for its implementation.

This policy should be read in conjunction with the New Curriculum 2014 documentation which sets out in detail what pupils will be taught in different year groups as of September 2014.

Science is the study of the physical world, involving a collection of facts from observations, physical experiments and working scientifically (Living Processes, Materials, Physical Processes) from which children form ideas of their world. It is important that children are given the opportunity to explore and understand the world in which they live. We provide children with the knowledge and skills to satisfy their curiosity about the world around them. This includes questioning, experimenting, deducing and reaching conclusions and evaluating the evidence about what has happened, based on evidence. Through science, our children understand how major scientific ideas contribute to the quality of our lives – their influences on business, industry, the environment and medicine. When children are studying, we should foster their enjoyment of exploration, manipulation, comparison, argument and testing.

Science can provide the WOW! factor to inspire and engage active learning which children find fun and motivating.

Science at Whinmoor St Paul's is about giving children the tools to develop their ideas and ways of working that enable them to understand the world through investigation with independence, resilience and enjoyment. This is done with an emphasis on investigation involving prediction, observation, testing and evaluation

## **Intent**

In line with the National Curriculum (2014), we aim to:

- 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 children to answer scientific questions about the world around them
- ensure that children are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future

At Whinmoor St Paul's we provide a high-quality science curriculum embedded with meaningful, memorable learning experiences. We intend to increase pupil's scientific knowledge, develop pupil's working scientifically skills and enable pupils to build on and link prior learning with new learning whilst promoting a love of science for all. We encourage children to question and explore in order to develop and deepen their understanding of the world in which they live, explaining what is occurring, predicting how things may change and analysing causes and effects of our impact on the planet. We aim for our children to have high aspirations for themselves as scientists and ensure they see diversity in science including important scientists whose discoveries have impacted on the way we live.

We ensure that our science learning is practical, fun and fully follows the National Curriculum. We aim to develop deep-thinking, curious and scientific minds. The children learn through practical approaches to science and develop their substantive and disciplinary knowledge and scientific language in a fun and logical way. The children build on their knowledge each year with key concepts broken down into small steps of learning. Topics are led by the children posing 'enquiry questions' as they build their knowledge and working scientifically skills. Wherever possible, we link their science learning into real-world contexts, making it relevant to the world the children are growing up in, focusing on sustainability and climate change. We ensure our children understand the value and importance of making responsible, informed and more sustainable lifestyle choices that minimise our impact on the environment. We do this through our whole school values and providing cross-curricular links so that learning is meaningful.

We encourage our children to share science learning and discoveries that they have made outside of

school as this underpins our principle that children are constantly developing their understanding of the world through first hand experiments and exploration.

## **Implementation**

At Whinmoor St Paul's, teachers create a positive attitude to science learning within their classrooms and promote the belief that high standards in science are achievable for all children. Our whole school approach to the teaching and learning in science allows the children to;

- develop a rich knowledge of vocabulary
- develop a thirst for learning
- give children the skills they need for later life (Cultural Capital)
- enable our children to respect the opinions and beliefs of others
- teach our children about the world around them, and beyond Whinmoor
- give memorable experiences to enrich their lives

The medium-term planning and progression mapping of science lessons will reflect exactly what content, knowledge and skills are critical for pupils to progress through the curriculum in each year. There is a clearly mapped progression document that shows how these topics progress across the years. Teachers plan using White Rose Science resources for each science topic. The schemes of learning contain key facts, vocabulary, prior learning, questions, and potential misconceptions.

Animals, including humans					
Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<ul style="list-style-type: none"> <li>• Identify and name a variety of common animals including fish, amphibians, reptiles, birds and mammals</li> <li>• Identify and name a variety of common animals that are carnivores, herbivores and omnivores</li> <li>• Describe and compare the structure of a variety of common animals (fish, amphibians, reptiles, birds and mammals including pets)</li> <li>• Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense</li> </ul>	<ul style="list-style-type: none"> <li>• Notice that animals, including humans, have offspring which grow into adults</li> <li>• Find out about and describe the basic needs of animals, including humans, for survival (water, food and air)</li> <li>• Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene</li> </ul>	<ul style="list-style-type: none"> <li>• Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat</li> <li>• Identify that humans and some other animals have skeletons and muscles for support, protection and movement</li> </ul>	<ul style="list-style-type: none"> <li>• Describe the simple functions of the basic parts of the digestive system in humans</li> <li>• Identify the different types of teeth in humans and their simple functions</li> <li>• Construct and interpret a variety of food chains, identifying producers, predators and prey</li> </ul>	<ul style="list-style-type: none"> <li>• Describe the changes as humans develop to old age</li> </ul>	<ul style="list-style-type: none"> <li>• Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood</li> <li>• Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function</li> <li>• Describe the ways in which nutrients and water are transported within animals, including humans</li> </ul>
Autumn 1 Spring 2	Autumn 1, Autumn 2 Spring 2 Summer 2, Summer 4	Autumn 1, Autumn 2, Autumn 3	Summer 4, Summer 5	Spring 2	Summer 3, Summer 4

Science is taught to enable all children to achieve through adapted teaching suited to their abilities. Our curriculum is progressive and we build upon the learning and skill development of the previous years, with a strong focus on the understanding of key scientific vocabulary. Working scientifically skills are embedded into lessons to ensure these skills are being developed throughout the children's school career, and new vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in keeping with the topics.

A range of strategies to support the teaching of science are used at Whinmoor St Paul's

### **Scaffolding**

- support for SEN/EAL children with learning vocabulary; this may include flash cards, word mats, word banks
- visual aids, stories and pictures to support learning
- hands – on and multi -sensory experiences
- support in writing sentences e.g., missing words rather than writing the whole sentence when doing longer pieces of writing

All scaffolding follows a 'I do, you do, we do' approach.

### **Explicit Instruction**

- pupils may be supported in their thought process in science

- pupils will be given specific opportunities by adults to practice specific skills that are barriers to their learning
- visual aids and concrete examples (where necessary) will be used to support learning

### Cognitive and Metacognitive Strategies

- tasks may be 'chunked' into smaller steps
- visual prompts may be used to aid learning
- story maps can be used to explain e.g. how our digestive system works
- depending on ability, children with SEN may be asked to evaluate their own progress and discuss what they can do to move their learning forward

### Flexible Grouping/Fading

- temporary groups may be established to support learning a particular concept
- pre-teaching and support with new learning and post-teaching delivered if misconceptions arise

### Use of technology

- tasks set may include useful apps/websites to move learning forward as well as multi-sensory experiences including outdoor areas

### Key vocabulary

- **metamorphosis** – the process by which the young form of an insect or amphibian changes into an adult form



- **larva** – the young form of an insect



- **pupa** – an insect after it has been a larva and before it becomes an adult, usually enclosed in a cocoon or hard case



- **chrysalis** – a specific type of pupa that occurs in the life cycle of butterflies



- **insect** – a small animal that has three body sections, six legs and antennae

### Vocabulary

Vocabulary for each small step of learning is evident in the topic block. Teachers will use this vocabulary in lessons and display it on working walls in classrooms.

In Key Stage 2 the key vocabulary is taught during the lesson and then assessed at the end of the lesson to ensure understanding.

Through enrichment days, such as 'science week', we promote the profile of science across school and allow time for the children to freely explore scientific topics. They engage in a wide variety of problem solving activities and wherever possible we involve the pupils in 'real-life' scientific activities. Children have the opportunity to use a variety of data, such as statistics, graphs, pictures and photographs as part of their scientific enquiry.

All children are encouraged to participate in science lessons regardless of gender or ethnic background. The school will react positively to gender-typical attitudes and encourage the breaking of them. Our school is committed to the principle that all pupils can access the curriculum to their full potential. Each individual's well-being, needs, education and learning will be met through a broad and balanced curriculum, high expectations and suitable targets, well-trained staff and a sense of belonging. Therefore, whatever their needs, children will have access to the science curriculum. Where possible, activities are differentiated or adapted to ensure full participation for specific pupils.

### Impact

The impact of what has been implemented is constantly reviewed by the subject coordinator and evidence is recorded in the subject leader file. The science lead will take responsibility for giving the head teacher feedback about the impact of science strategies from the evidence collected. The successful approach to the

teaching of science at Whinmoor St Paul's will result in a fun, engaging, high quality science education, that provides children with the foundations for understanding the world that they can take with them once they complete their primary education.

Formative assessment is used as the main tool for assessing the impact of science at Whinmoor St Paul's as it allows for misconceptions and gaps to be addressed more immediately rather than building on insecure scientific foundations. Assessment for learning is continuous throughout the planning, teaching and learning cycle. However, children are more formally assessed in KS1 and in KS2 using a variety of methods:

- Through science lesson observations, which will be at an agreed time with an agreed focus, as and when required. The impact of science strategies may also be seen in observations of all other subjects, for example, in the quality of data handling in mathematics or in the quality of report writing produced in literacy.
  - Through interviews/surveys conducted with groups of children in school so that the impact of strategies can be seen from their perspective.
  - Through interviews or questionnaires or informal feedback with staff members sought regularly by the Science Leader about the impact of strategies that have been implemented.
- End of unit assessment/tests
- Through detailed auditing and analysis of all aspects of children's work (both that associated with science, and that with other subjects where there is a science component), books, working walls and teachers' feedback about this work.

Children at Whinmoor St Paul's will:

- demonstrate a love of science work and an interest in further study and work in this field
- retain knowledge that is pertinent to Science with a real life context
- be able to question ideas and reflect on knowledge
- be able to articulate their understanding of scientific concepts and be able to reason scientifically using rich language linked to science
- demonstrate a high love of mathematical skills through their work, organising, recording and interpreting results.
- work collaboratively and practically to investigate and experiment.

Impact of learning will be assessed through: Pupil and Teacher interviews, deep dives, assessing whether or not children can answer questions about BIG IDEAS and make links to prior learning.