

Science Policy



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| Review Date | September 2024 |
| Review Frequency | |
| Date for Next Review | September 2026 |
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Reviewed September 2024
By Miss S.Curnow

Science at Whale Hill Primary School

This document is a statement of the aims, principles and strategies for the teaching and learning of Science at Whale Hill Primary School.

Science Intent Statement

Our science curriculum aims to engage and give children an opportunity to experience awe and wonder within science and to want to be curious about the world around them. We want them to make sense of the world by using scientific enquiry skills. Through our progressive, enquiry-based framework, children will develop knowledge of scientists and take part in science events. 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. Alongside developing their scientific skills, pupils will develop a strong sense of how science shapes many everyday things and how science and STEM will impact on their future.

A high-quality science education will help pupils gain a coherent knowledge and understanding of science in context and how it can be applied in the wider world. It should inspire pupils' curiosity to know more and seek to ask questions.

Aims of study

Our aims at Whale Hill are based on the 2014 National Curriculum.

The overall aim of science teaching at Whale Hill is to nurture 'science happy' children with active and enquiring minds to help them understand the fascinating world around them. Additionally, to foster curiosity, critical thinking and hands-on experimentation.

Our specific scientific aims are to help our pupils:

- To ask questions about scientific phenomena.
- To question and discuss the moral and social implications of science.
- To have fun and work like a scientist.
- To use science frames to make informed predictions, observations, measurements and conclusions.
- To present our results in a variety of appropriate ways.
- To carry out fair and safe investigations.
- To use appropriate scientific vocabulary and ideas when describing scientific processes and phenomena.
- To increase scientific knowledge and make links with other subjects such as Mathematical knowledge and skills.
- To be aware of how the lives and work of famous scientists have impacted on our lives and the lives of others.
- To identify patterns in scientific data.
- To understand the importance of science and to know that science is all around us in our everyday lives.

We want to encourage:

- Open mindedness
- Perseverance
- Tolerance
- Curiosity
- Respect for peers
- Teamwork
- Respect for living things and the environment
- Confidence.

How do we teach science?

Science teaching focuses on enabling children to think and work as scientists in order to answer enquiry questions and find out more about the world they live in. See below for each Key Stage:

EYFS

In EYFS, science is included within the Understanding the World area of learning. As with other learning in Reception and Nursery children will mainly learn about science through games and play - which objects float and sink during water play, for example. Activities such as these will help children to develop important skills such as observation, prediction and critical thinking.

In this phase, children are often introduced to individuals, concepts and ideas, building firm foundations for progressive learning in Key Stage 1.

Key Stage 1 (Years 1 and 2) and Key Stage 2 (Years 3 to 6)

The content of science teaching and learning is set out in the 2014 National Curriculum for primary schools in England. Within this, certain topics and areas are repeated across year groups, meaning that children may revisit a particular topic in each year of primary school but with increasing difficulty and with a different focus each time.

For example, the area of animals, including humans is examined in every single year group, with a very clear progression of knowledge and understanding over the six years:

In Year 1 this involves: looking at the human body, recognising animal groups and sorting these animals.

By Year 6, this will have developed into knowing the internal structure of the human body in relation to circulation, classifying living things based on more complex characteristics and exploring scientific research into this classification.

The more detailed content for each year group is as follows:

Year 1

- Plants (basic knowledge of different plants and trees and their structure)
- Animals including humans (basic knowledge of parts of human body and comparing animals - herbivore, omnivore, carnivore, vertebrates and invertebrates)
- Everyday materials (describing properties)
- Seasonal changes (observe and describe seasonal changes and associated weather).

Year 2

- Plants (how plants grow and what they need for this process)
- Animals including humans (needs for survival, food and hygiene)
- Use of everyday materials (explore and compare materials for uses and how solid objects can be changed)
- Living things and their habitats (name a variety of living things within habitats and explore habitats to see how they provide the basic needs of living things, use simple food chains).

Year 3

- Plants (functions of parts of a plant, their requirements to survive, life cycles and water transportation)
- Animals including humans (nutrition, skeleton and muscles)
- Rocks (identify different types of rocks, understand how fossils are formed and investigate different soils)
- Light (light sources, light travelling, shadows and reflection)
- Forces and magnets (magnetic materials, attracting and repelling).

Year 4

- Animals including humans (basic parts and function of the digestive system and teeth and interpret and construct food chains)

- Living things and habitats (identify and name a variety of living thing in local and wider environment, classification keys to assign living things to groups, recognise environments change and can negatively impact habitats)
- States of matter (compare and group different states of matter, understand changes of state, evaporation and condensation)
- Sound (understand how we hear, vibration, pitch and volume)
- Electricity (simple circuits, switches and their function in a circuit, insulators and conductors).

Year 5

- Animals including humans (human development from birth to old age)
- Living things and their habitats (life cycles and reproduction in humans and plants)
- Properties and changes of materials (dissolving, separating materials, reversible and irreversible changes)
- Forces (gravity, air resistance, water resistance, friction, mechanisms)
- Earth and Space (relationship between the Earth, Sun and Moon, the solar system, Earth's rotation and night and day).

Year 6

- Animals including humans (basic parts of the human circulatory system, diet and exercise, healthy living, transportation of nutrients and water in animals)
- Living things and their habitat (classification, characteristics of plant and animal groups)
- Light (how it travels, how we see, shadows)
- Electricity (voltage and power in circuits, circuit components, symbols and diagrams)
- Evolution and inheritance (how living things have changed over time, living things produce offspring, fossils, dinosaurs, adaptation to environment).

Alongside these areas runs the Working Scientifically element. This focuses on the skills the children need to become accurate, careful and confident practical scientists. Children are expected to master certain skills in each year group and there is a very clear progression of these set out for each school to refer to. For example: In Year 1 a child may have to ask questions, carry out a simple test, record simple data and then try to answer questions.

By Year 6, they should be able to plan and carry out a fair test by using equipment accurately and taking exact readings or measurements. They are also expected to be able to draw conclusions from their results and record them using a range of graphs and charts.

See the Working Scientifically Progression document for evidence of how these are mapped out across the year for each phase at our school.

We recognise that there are children of a wide range of academic ability within every class and we aim to provide suitable and beneficial learning opportunities by matching the challenge of the task to the ability of the child. We achieve this in a number of ways:

- Setting common tasks which are open-ended and can have a variety of responses.
- Setting tasks that require different levels of scaffolding. All children access the same learning.
- Allowing all children in the classroom to access the challenge question. This is achieved by displaying the challenge so it is visible for all children to attempt. We acknowledge that some

children need further provision when recording written work so challenges can be recorded in alternative ways (video, pictures, verbal discussion).

- Providing resources of different complexity depending upon the ability of the child.
- Using classroom assistants, when available, to support groups.
- Careful seating arrangements within class to enable mixed ability learners to share their experiences and skills of working like a scientist and learn from one another.

Science Curriculum Planning

We carry out curriculum planning for science in two phases. The long term plan maps the topics studied by each year group during each term over the academic year and breaks the focus enquiry question into sub-questions to be learned about and investigated. The medium term planning details what is to be studied during a half term for each week, in relation to a focused topic.

As the basis for medium term planning, we use the Whale Hill Science Overview and Progression Grid documents, which were designed and based on the 2014 National Curriculum. science as a subject is recommended that we teach it 2 hours a week. The Science Overview has been compiled with a strong emphasis on the development of knowledge and understanding and a separate document shows how the scientific skills and concepts progress across EYFS, Key Stage 1 and Key Stage 2.

The science subject leader reviews planning and teaching regularly to ensure the coverage of objectives and skills is consistent across the school.

Science Capital

'The concept of **science capital** can be imagined like a 'holdall', or bag, containing all the **science**-related knowledge, attitudes, experiences and resources that you acquire through life. ... That is, the more a young person has, the more likely they are to plan to continue with **science** in the future.'

'Enterprisingscience.com'

As a school it is our duty to challenge Scientific stereotypes and create Science in context that is relevant to our children's lives and local area, enriching their 'Science Capital' exposure.

Implementation

What will Science look like in the classroom?

- * Science will be taught to enthuse and inspire learners to question the world around them.
- * Lesson starter activity and low stakes quizzing – reviewing previous learning and consolidation of knowledge and skills through starter activities. Misconceptions will also be addressed through these quizzes.
- * Specify key vocabulary to be used and its meaning explained and understood. Vocabulary to be displayed on working walls within every classroom across school. This should be regularly reviewed each week.
- * Conduct investigations that are engaging and create awe and wonder, inspiring young minds to investigate independently or with appropriate scaffolding.
- * Research, investigation and interpretation of findings.
- * A focus placed on oracy within science lessons - children will communicate their scientific knowledge and understanding appropriately and will be able to apply this to their knowledge outside of school.
- * Children will be able to evaluate their learning
- * Display materials, vocabulary and resources to support and enhance learning.
- * Appropriately challenging texts will be available to develop wider understanding.
- * Challenges will be displayed so that they are visibly accessible for all children to attempt.
- * Children will be able to describe how to work like a scientist in line with the Working Scientifically statements from the National Curriculum.

Working Scientifically skills are embedded into lessons to ensure that skills are systematically 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. All classrooms will display the Working Scientifically symbols and will regularly review these with the children each week to ensure children are fully aware of the crucial skills of working like a scientist.

Teachers demonstrate how to use scientific equipment, and the various Working Scientifically skills in order to embed scientific understanding. Teachers find opportunities to develop children's understanding of their surroundings by accessing outdoor learning and links to local areas and employers.

Our pupils will:

- * Be engaged because they enjoy and are challenged by the curriculum we have designed for them through topics, activities, resources and enrichment opportunities.
- * Be resilient and enthusiastic learners.
- * Develop scientific knowledge and skills over time because of careful planning, teaching is designed to ensure that children know more and remember more over time.

Assessment

We assess pupils as we observe them during lessons and mark their work following this, annotating with appropriate comments if necessary.

Science skills and learning can be enhanced through effective verbal and written questions.

Children who are accessing 'deeper learning' within science are identified on registers compiled by the More Able Leader in collaboration with relevant teaching staff.

SEN

It is important for teachers to plan work in science which facilitates high expectations, matches children's needs and helps them to make progress.

Pupils with SEN may be defined as those with:

- Physical and sensory difficulties e.g. poor co-ordination, restricted mobility, hearing problems
- Intellectual difficulties e.g. problems with literacy, numeracy, memory
- Emotional and behavioural difficulties e.g. narrow concentration span, ADD, ADHD
- English as a second language

Teachers implement and develop strategies to support SEN pupils whilst supporting inclusion in science.

Teachers plan for appropriate pace and use a range of kinaesthetic/multi-sensory tools to promote enjoyment and progress.

Knowledge and skills can be developed in small steps through analogies, drama and practical activities. Paired and group work in science is widely used and can foster interpersonal and communication skills. Carefully matched work suited to the child's own needs and range of learning can promote confidence and stimulate an interest in future learning, leading to a better understanding of the world around them.

The Science subject leader monitors samples of children's work across the school and conducts regular work scrutinies and learning walks. Furthermore, a sample of children are spoken to from all year groups to gauge their enjoyment, understanding and opinions on their scientific learning. Their pupil voice is taken into consideration to help teachers to plan an effective and inspiring curriculum. In addition, the subject leader collects staff and parent feedback from questionnaires sent out at the beginning of the year. Staff and parents have the opportunities to share their experiences, feelings and attitudes towards science at our school and this is done anonymously to ensure honest feedback is provided. This allows science teaching to remain at a high standard across school.

Resources

There are sufficient teaching resources for most science teaching units in school, which are replaced and renewed as needed through resource audits. Resources are kept by the appropriate year groups, relating to their topics. The resources within year groups also include appropriate textbooks.

Links with outside agencies are promoted where possible for enrichment, such as the hatching egg project that we endeavor to take part in each year, which is shared throughout year groups. STEM events resources are readily available with links to Science Ambassadors, which are used. National Science Events are encouraged at Whale Hill, such as World Space Week and British Science Week, and we participate in these events to help engage and inspire children and their families.

Monitoring and Review

Monitoring of the standards of work and the quality of teaching in science is the responsibility of the subject leader. The work of the subject leader also includes supporting colleagues in the teaching of science, updating staff on current developments in the subject and providing lead and direction for the subject in the school. Observations of teaching, planning and work scrutiny take place over the course of the year in order to maintain and continue to raise standards.

Impact

How will this be measured?

Pupil voice will show:

- * A progression of learning and understanding, with appropriate vocabulary.
- * A developed understanding of the methods and skills of Scientists at an age-appropriate level.
- * A progressively developing understanding of key historical themes and concepts, as identified in the Science progression document.
- * Confidence in discussing Science and their own work.

Displays around school and books will show:

- * A varied and engaging curriculum which develops a range of scientific skills.
- * Pupils have had opportunities for practice and refinement of skills.
- * Clear progression of skills in line with expectations set out in progression documents.
- * That pupils, over time, develop a range of skills across all of the areas of the scientific curriculum.
- * Working scientifically symbols and evidence of these carried out across the year, as well as coverage of enquiry types.
- * Relevant vocabulary that is reviewed weekly with children.

The subject leader will:

- * Monitor standards in science to ensure the outcomes are at expected level.
- * Provide ongoing CPD support based on the outcomes of subject monitoring to ensure that the impact of the curriculum is wide reaching and positive.
- * Review and update documentation as required.