SCIENCE POLICY

Date effective: September 2026
Review cycle: Two Yearly
Review date: September 2028
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Definition

Science is a way of working that allows children, through practical first hand experiences and secondary sources, to develop their knowledge and understanding of the world in which they live. These experiences should enable children to observe, question, investigate, make sense of and communicate and evaluate their findings.



Aims

•Provide a broad, challenging and enquiry-based curriculum for pupils, meeting the requirements of the national curriculum programmes of study for science.

•Teach investigative science where pupils can explore, ask questions, learn and discover a deeper understanding of the world in which we live;
•Apply skills and knowledge to real-life contexts and understand the implications of science.

•Prioritise essential experiences and opportunities for pupils to open their eyes to the possibilities the subject brings.

•Develop staff's subject knowledge through regular training to ensure deliver of an engaging curriculum and provide opportunities for cross-curricular opportunities.

Science Curriculum Intent:

To ignite children's curiosity about the world around them works and to equip them with the skills and knowledge to explore and find answers to questions the may pose about the world the live in.

Curriculum

All children have access to the Early Years Foundation Stage Curriculum and Science Curriculum. At Hill Farm we use a long term spiral curriculum plan which progressively builds on knowledge and skills. Children cover all units in the National Curriculum each year to embed learning into the long term memory, and to develop knowledge of working scientifically. Scientific vocabulary is taught within each subject, and as a Voice 21 school, our curriculum has a strong oracy focus which provides pupils with regular opportunities to learn to talk and to learn through talk. High expectations of oracy and vocabulary are embedded throughout our science curriculum.

National Curriculum

- The National Curriculum aims to ensure that all pupils:

- 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.

Key Stage 1:

By the end of Key Stage 1, pupils will be taught about the world around them: pupils are taught to experience and observe natural phenomena by looking closely at nature. They will be encouraged to ask questions, observe changes over time, notice patterns, group and classify things and carry out comparative tests. Key vocabulary will be introduced and pupils will be encouraged to use this language by describing what they have found out. The key topics taught in this phase include;
Plants – identifying, naming and describing their structure, moving onto how seeds and bulbs grow.

Animals including humans – identifying, naming and describing fish, amphibians, birds, mammals and reptiles, classifying them into carnivores, herbivores and omnivores. When focusing on mammals, pupils will identify, name and draw basic parts of the human body including those associated with the senses. They will recognise that animals produce offspring that grow and will identify the basic needs of those animals. In year 2, pupils will focus on humans, their need for exercise, food and hygiene.

*Everyday materials – i*dentifying, naming and describing everyday materials, being able to compare and group them. Pupils will move onto identifying their suitability and everyday use and whether solid shapes can be manipulated.

Seasonal changes – observing changes throughout the seasons, including the weather and length of day light.

L*iving things and their habitats* – comparing differences between things that are living and dead. Pupils will identify the suitability of animals` habitats and the basic needs they provide. Pupils will learn to name different plants and animals in their habitats and identify how they obtain food, creating basic food chains.

Lower Key Stage 2

Across years 3 and 4, pupils will be taught to broaden their scientific view of the world around them: they are taught to explore, talk, test and develop ideas about everyday phenomena and the relationships between living things and familiar environments, functions, relationships and interactions. They will be encouraged to ask their own questions about what they observe and make their own decisions about which types of scientific enquiry are the most appropriate, including changes over time, noticing patterns, grouping and classifying, and comparative and fair tests.

They will be taught to draw conclusions using some scientific language to talk and write about what they have discovered, supporting these conclusions with recorded findings using drawings, diagrams, keys, bar charts and tables. The key topics taught in this phase include:

Plants – identifying and describing the functions of different parts of flowering plants, including pollination, seed formation and seed dispersal. Exploring the requirements of plants for life and growth. Pupils will also investigate water transportation in plants.

Animals including humans – identify that nutrition is from what we eat and the right amounts that are needed. In year 4, pupils will describe the simple functions of the human digestive system, the different types of human teeth and their functions and construct and interpret food chains, identifying producers, predators and prey.

Rocks - compare and group together different kinds of rocks, describe how fossils are formed and recognise that soils are made from rocks and organic matter.

Light – identifying light and dark, understanding reflection, to protect our eyes from sun light and how light produces shadows.

Forces and magnets – comparing different surfaces, forces that need contact and magnetic forces.

Living things and their habitats – pupils will group living things using classification keys, identify and name a variety of living things in the local and wider environment and consider environmental changes and their dangers.

States of matter – In year 4, pupils will compare and group materials together, observe changes in state and link evaporation and condensation to the water cycle

Sound – In year 4, pupils identify how sounds are made, recognise how vibrations travel and find patterns in pitch and volume.

Electricity – In year 4, pupils identify common electrical appliances, construct a simple circuit naming its basic parts and recognise common conductors and insulators.

Upper Key Stage 2

By the end of Year 6, pupils will be taught to develop a deeper understanding of a wide range of scientific ideas. Pupil are encouraged to explore, talk about their ideas, ask their own questions about scientific phenomena and analyse functions, relationships and interactions more systematically. At upper key stage 2, pupils will encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They are encouraged to follow their own line of enquiry, selecting the most appropriate ways to answer science questions including observing changes over different periods of time, noticing patterns, grouping and classifying things and carrying out comparative and fair tests. Pupils should independently take measurements using scientific equipment and record findings, increasing complexity of scientific diagrams to include labels, classification keys, tables, scatter graphs, bar and line graphs. Pupils should draw conclusions based on their data and observations, including explanations of causal relationships and reporting on the degree of trust in their results. Finally, they should support or refute their findings with scientific evidence, ideas or arguments.
The key topics taught in this phase include;

Living things and their habitats – describing differences in the life cycles of a mammal, an amphibian, an insect and a bird as well as describing the process of reproduction in some of these animals. Pupils will move onto describing classification into broad groups based on observation characteristics.

Animals, including humans – describing human changes as we develop into old age. In year 6, pupils will identify, name and describe the main parts of the human circulatory systems, recognise the impact of diet, exercise, drugs and lifestyle of body functions and describe how nutrients and water are transported within animals.

Properties and changes of materials – comparing and grouping materials based on their properties (including hardness, solubility, transparency, conductivity and response to magnets). Knowing which materials dissolve and how to recover a substance, using the key vocabulary of reversible and

irreversible changes. Separating mixtures through filtering, sieving and evaporating. Giving reasons for uses of everyday materials.

Earth and Space – In year 5, pupils will describe the movement of the earth, and other planets, relative to the sun. Describe the movement of the moon and explain how Earth's rotation signifies day and night.

Forces – describing and explaining the forces of gravity, air resistance, water resistance and friction. Recognising that smaller forces such as levers, pulley and gears have a greater effect.

Evolution and inheritance – In year 6, pupils will recognise that living things have changed over time, that animals produce offspring that vary and how plants and animals are adapted to suit their changing environments.

Light – recognising that light travels in straight lines and that objects are seen because they reflect light into our eyes. Pupils will use this information to explain why shadows have the same shape as the object that casts them.

Electricity – recognise the effects of an increase in voltage in a circuit and use recognised symbols when representing circuits in diagrams.

Scientific Skills

Scientific skills are mapped out across each year group so pupils can build on prior learning year in year. There are seven skills which are covered across the lessons each year.

	Year 1 and 2	Year 3 and 4
Asking Questions	⇒ Ask simple questions and recognize they can be answered in different ways	⇒ Ask relevant questions and using different types of scientific enquiries to answer them ⇒ Use results to raise further questions
Predicting	⇒ To make simple predictions based upon their knowledge	⇒ Use results to make predictions for further results based upon previous results and own knowledge
Setting up tests	⇒ Perform simple tests using simple equipment	⇒ Set up simple practical enquiries, comparative and fair tests ⇒ Use results to suggest improvements for an enquiry
Observing	⇒ Use simple measurements and equipment ⇒ Observe similarities and differences closely	⇒ Make systematic and careful observations and, where appropriate, take accurate measurements using standard units and a range of equipment
Recording	⇒ Gather and record data to help answer questions	⇒ Record findings using simple scientific language, drawings, labelled diagrams and keys ⇒ Gather, record and classify data in a variety of ways ⇒ Record findings using bar charts and tables
Communicating results	⇒ Talk about what they found out and how it can be used in a wider context ⇒ Use simple secondary sources to find answers ⇒ Communicate in a range of ways and being to use simple scientific vocabulary	⇒ Use results to draw simple conclusions ⇒ Identify differences, similarities or changes to simple scientific ideas and processes ⇒ Use straightforward scientific evidence to answer questions or to support their findings
Evaluating	⇒ Use observations and ideas to suggest answers to questions	⇒ Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions ⇒ Present data in a variety of ways

	Year 3 and 4	Year 5 and 6
Asking Questions	⇒ Ask relevant questions and using different types of scientific enquiries to answer them ⇒ Use results to raise further questions	⇒ Ask relevant questions, suggesting different types of enquiry to answer them ⇒ Use results to raise further questions
Predicting	⇒ Use results to make predictions for further results based upon previous results and own knowledge	⇒ Use test results to make predications and to set up further comparative and fair tests
Setting up tests	⇒ Set up simple practical enquiries, comparative and fair tests ⇒ Use results to suggest improvements for an enquiry	⇒ Plan different types of scientific enquires to answer questions, including recognising and controlling variables where necessary
Observing	⇒ Make systematic and careful observations and, where appropriate, take accurate measurements using standard units and a range of equipment	⇒ Take measurements using a range of scientific equipment with increasing accuracy and precision
Recording	⇒ Record findings using simple scientific language, drawings, labelled diagrams and keys ⇒ Gather, record and classify data in a variety of ways ⇒ Record findings using bar charts and tables	⇒ Record data and results of increasing complexity ⇒ Portray data using tables, scatter graphs, bar and line graphs
Communicating results	⇒ Use results to draw simple conclusions ⇒ Identify differences, similarities or changes to simple scientific ideas and processes ⇒ Use straightforward scientific evidence to answer questions or to support their findings	⇒ Use scientific diagrams, labels, classification keys to represent scientific knowledge ⇒ Report and present findings from enquiries, including conclusions, causal relationships and explanations
Evaluating	⇒ Report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions ⇒ Present data in a variety of ways	⇒ Discuss whether results are trustworthy, in oral and written forms, such as displays and other presentations

Scientific Enquiries

These enquiry types are different scientific methods used to help develop scientific skills. We ensure that pupils undertake a range of these each year.

	Year 1 and 2	Year 3 and 4
Grouping and classifying	⇒ Find out about the world by asking simple questions ⇒ Make simple observations using simple equipment ⇒ Compare objects with support	⇒ Ask questions building on prior knowledge from Milestone 1 ⇒ Decide which criteria you will sort objects into ⇒ Explain how objects are sorted ⇒ Use simple classification keys
Research	⇒ With support, look in non-fiction books, newspapers, magazines and the internet to find answers ⇒ Talk to 'experts' and ask the simple questions	⇒ Look in books, newspapers, magazines and the internet to find answers ⇒ Talk to 'experts' and ask them questions based upon what you want to find out and ask them scientific questions about what they do
Pattern Seeking	⇒ With support, begin to notice patterns and relationships ⇒ Record data through pictograms, tally charts or simple tables	⇒ Look for naturally occurring patterns and relationships ⇒ Begin to identify, with support, changes, similarities and differences t ing simple conclusions ⇒ Answer questions and begin to identify new questions ⇒ Record data through bar charts, pictogram and tables
Observation over time	⇒ Observe closely using simple equipment, with support	⇒ Make careful observations using simple equipment ⇒ Think about how long to observe for and which equipment is most suitable to use
Comparative or Fair Testing	⇒ Experience practical testing opportunities, planned with support ⇒ Use simple equipment, with support ⇒ Carry out simple tests	⇒ Set up simple, comparative and fair tests with support ⇒ Recognise the difference between comparative and fair tests and which on is necessary ⇒ Take measurements using standard units and begin to use data loggers with support

	Year 3 and 4	Year 5 and 6
Grouping and classifying	⇒ Ask questions building on prior knowledge from Milestone 1 ⇒ Decide which criteria you will sort objects into ⇒ Explain how objects are sorted ⇒ Use simple classification keys	⇒ Ask scientific questions building on primary learning and wider general knowledge ⇒ Identify, classify and sort through a range of different types of classification and describe how they've been sorted and other possibilities ⇒ Learn about the work of taxonomists
Research	⇒ Look in books, newspapers, magazines and the internet to find answers ⇒ Talk to 'experts' and ask them questions based upon what you want to find out and ask them scientific questions about what they do	⇒ Conduct own scientific research using a range of sources - books, newspapers, magazines, journals and the internet. ⇒ Begin to critically analyse scientific research ⇒ Identify scientific evidence that has been used to support or refute ideas
Pattern Seeking	⇒ Look for naturally occurring patterns and relationships ⇒ Begin to identify, with support, changes, similarities and differences then drawing simple conclusions ⇒ Answer questions and begin to identify new questions ⇒ Record data through bar charts, pictogram and tables	⇒ Look for different causal relationships in data and identify evidence that refutes or supports ideas ⇒ Use relevant scientific language and illustrations to discuss, communicate and justify scientific ideas ⇒ Record data through line graphs, pie charts and previously collated data
Observation over time	⇒ Make careful observations using simple equipment ⇒ Think about how long to observe for and which equipment is most suitable to use	⇒ Decided what is best to observe and why ⇒ Choose which equipment is best suited and why ⇒ Decide what measurements to take and how to record data
Comparative or Fair Testing	⇒ Set up simple, comparative and fair tests with support ⇒ Recognise the difference between comparative and fair tests and which on is necessary ⇒ Take measurements using standard units and begin to use data loggers with support	⇒ Choose the most appropriate equipment to make measurements and explain how to use it ⇒ Use results to make predictions and identify when further observations, comparative and fair tests might be needed

Assessment

The impact of our science curriculum and the progress of pupils is measured through continual teacher assessment throughout each lesson against our science progression documents. In addition, regular

retrieval practice is undertaken by all pupils to assess the knowledge in pupils' long term memory and to help inform future planning. End of term proof of progress (POP) tasks. are completed either digitally in KS2 or as a class in KS1. These outcomes are used to inform teacher judgements at the end of each term and data is recorded on our whole school system so that the Science Leader can analyse.

Aspirations

To develop pupils' aspirations, a link to a career is identified and discussed in every Science lesson. For example, pupils may discuss and explore the roles of Engineers of Nutritionists, and consider how their learning relates to these.

Monitoring and Evaluation

The Science Lead undertakes regular monitoring to ensure our curriculum is effective and that pupils are learning the intended knowledge outlined. This includes learning explorations, book looks, pupil voice and data analysis. In regular one-to-ones, this feedback is shared with SLT to help inform whole school priorities and next steps.