



WHOBERLEY HALL
PRIMARY SCHOOL

Science Policy

Date Written- Autumn 2024

Next Review- November 2025

Believing  **Achieving**  **Learning for Life**

Intent

- It is our intention for science to develop in all children a lifelong curiosity and interest in the sciences, which contributes to their personal development and ability to contribute in the future to the advancement of the sciences.
- Children are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future. The acquisition of key scientific knowledge is an integral part of our science lessons. When planning our science curriculum, we intend for children to have the opportunity, wherever possible, to learn through varied investigations, leading to them being equipped for life to ask and answer scientific questions about the world around them.
- As children progress through the year groups, they build on their skills in working scientifically, as well as on their scientific knowledge, as they develop greater independence in planning and carrying out fair and comparative tests to answer a range of scientific questions.
- The children will be shown the importance of the five key Scientific Enquiry skills (research, observing over time, fair testing, pattern seeking and classifying) in becoming an independent learner.
- Each science unit taught, has an accompanying knowledge organiser which can be used to help reinforce the key knowledge for each unit as set out in the science national curriculum, as well as additional vocabulary.
- Our science roadmap ensures children have a varied, progressive and well- designed science curriculum that provides the opportunity for progression across the full breadth of the Science National Curriculum for EYFS, KS1 and KS2.

Implementation

- **A progressive Science Programme of Study** for Years Nursery to 6 is used to deliver learning in line with the National Curriculum expectations for Science.
- The **EYFS characteristics of effective learning** underpin the independent learning skills needed for Working Scientifically. 1. Playing and Exploring – children investigate and experience things, and ‘have a go’ 2. Active learning – children concentrate and keep on trying if they encounter difficulties, and enjoy achievements 3. Creating and Thinking critically – children have and develop their own ideas, make links between ideas, and develop strategies for doing things.
- Key **EYFS Scientific Knowledge** taken from Understanding of the World and Personal, Social and Emotional Development underpins the learning covered in Years 1-6 and reference is made to the children.
- The **school grounds** are used to support the delivery of science lessons, in all year groups.
- All children develop **scientific knowledge and conceptual understanding** that allows them to link learning and ideas.
- Children develop **understanding of science enquiry** thus enabling them to independently ask and answer scientific questions about the world around them.
- **Key vocabulary** is explicitly taught to children as part of quality-first teaching. Specialist scientific vocabulary is clearly modelled on knowledge organisers. The vocabulary is taught in a sequence that enables students to become independent and secure learners.
- **Knowledge Organisers** enable children to learn and retain the key vocabulary and basis of expected knowledge contained within each unit and are used throughout lessons, guided and independently, at home and at school.
- The **progression of skills for working scientifically** are developed through the year groups and scientific enquiry skills are of key importance within lessons. Specifically identified are the skills of observing over time, pattern-seeking, identifying, classifying and grouping, comparative testing and research using secondary sources.
- **Scientific knowledge and enquiry skills** are developed with increasing depth and challenge as children move through the year groups. They complete investigations and hands-on activities while gaining the scientific knowledge for each scientific unit.
- **Sequences of lessons** help to embed scientific knowledge and skills, with each lesson building on previous learning. Within each lesson is an opportunity to revisit and connect to prior learning. This enables both self and teacher assessment that then informs future lessons.
- Science is **taught explicitly** for a minimum of two hours from Years R to 6.
- Authentic learning links are made to the **wider curriculum**, that revisit and secure knowledge in the long-term memory, for example DT (making electrical circuits), Computing (research), Mathematics (pattern

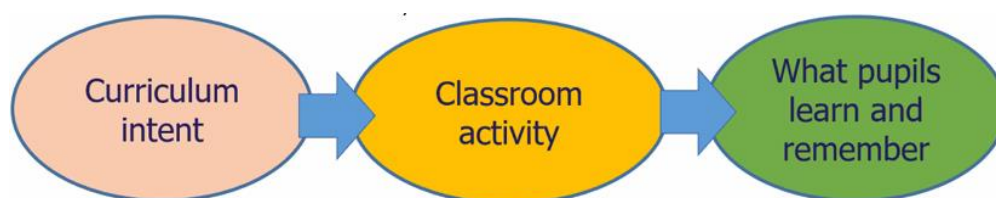
seeking/measuring), Literacy (non-chronological reports), PHSE (healthy eating), History (famous Scientists and discoveries), Geography (habitats, volcanoes).

- **Foundational knowledge** is planned for, to fill gaps in children's cultural capital and ensure children have a broad range of experiences of the world, to be able to make sense of new learning and build existing schema.
- **Displays** in classrooms and around the school reinforce learning from the science curriculum.
- **Learning assessment** occurs through Knowledge reflections (before and after topics), quick quizzes (based upon prior learning), Explorify challenges (website) as well as teacher observation. Planning is adjusted accordingly, and children are supported in line with the outcome of these assessments.
- Teachers are aware of their children's **Science levels** and these are considered in planning and teaching. These levels are monitored by the Science Coordinator to ensure that children are both supported and encouraged according to their need.
- **Home support** is encouraged through the sharing of Knowledge Organisers and Home learning challenges.
- **Science experiences** are regularly offered beyond the classroom environment. Over the last few years, Whoberley have held a Junior Science Club (in partnership with The Transport Museum), hosted workshops from The Royal Society and Sublime Science, facilitated an 'Eco' club and have secured a grant from the Royal Institute to 'measure the effect of Living Walls on children's physical and psychological wellbeing'. We have also hosted a series of workshops from a local Education provider 'Wild Earth' whose intention was to enhance not only Scientific learning but also increase pupil wellbeing and concentration.
- Whoberley Hall is the **lead school** in a Coventry North Ogden Trust partnership that aims to encourage enrichment and improve pupils' view of STEM subjects and ultimately careers.
- In 2024-2025 academic year, Whoberley Hall is completing the **Primary Science Quality Mark** with an additional part of the award being for achievements in school outreach.

Impact

- Progress in science is measured through a child's ability to know more, remember more and explain more. This includes both substantive and disciplinary (working scientifically) knowledge.
- Children will be able to speak confidently about their learning in science and use their books to support explanations of what they have learned.
- Children who feel confident in their science knowledge and skills will be excited about science, show that they are actively curious to learn more and will see the relevance of what they learn in science lessons to real-life situations and the importance of science in the real world.
- Children will speak about science lessons and learning with enthusiasm and more will leave primary school with a positive experience of and enthusiasm to continue studying science at secondary school.
- Whole-school and parental engagement with science, will be improved through the use of science-specific home learning tasks and shared use of knowledge organisers.
- Pre and Post Knowledge Reflections (progress from a baseline activity at the start of the unit of learning) will reflect progression of knowledge, skills and understanding.

Teaching and Learning



Teaching and learning at Whoberley Hall always begins with the Curriculum Intent. Planning and teaching are focussed upon this and not upon the classroom activity. If learning were to be based upon the activity (and not the intent), then there is the potential for the intent to be altered and the learning to become confused. In all lessons, **children are explicitly told the intent** to explore. They are then presented with a question, problem, topic, environment or a set of resources. The children will then follow a Scientific Enquiry process to explore the intent.

The Scientific Enquiry process is used in lessons to develop the children's knowledge and working scientifically skills: 1. Experience and explore the world around them. 2. Developing a Scientific question to answer 3. Consider methods of answering that question 4. Collect evidence and evaluating its effectiveness 4. Answer the question 5. Explain their findings. Where appropriate, teachers will support children in the process stages, but as the children progress through our school, the expectation is that they become more independent and autonomous in this process. Children will be able to mind map their learning and show links between knowledge areas, building upon prior learning.

At the start of every Scientific topic, teachers do not assume prior knowledge as some children may have been absent or may need areas revisiting or securing. All children complete a knowledge reflection that contains questions assessing prior knowledge (linked to the NC and year groups). From this, the teacher can ascertain gaps in knowledge or equally knowledge beyond NC expectations and ensure that the planning offers opportunities that match the needs of the children.

For each topic, inPrint Knowledge Organizers will be available for children to use. These will introduce key vocabulary and prior/ new essential knowledge. The children will frequently visit this document to help them mentally organize their learning. Regular, quick quizzes based upon these documents will be given to the children to ensure that learning is secured.

To become a successful Scientist, children need to be secure in the five areas of Scientific Enquiry: Research, Observing over time, Comparative testing, Classifying and Pattern Seeking. They underpin Scientific learning and are explicitly discussed in our lessons.

Scientific resources are introduced in line with NC Working Scientifically requirements. The skills in using the equipment are purposely developed over time. For example, when using a thermometer, concepts (standard units, repeating tests, measuring) and procedures (holding, reading and resting the thermometer) are considered and developed within the planning.

Outdoor learning is brilliant! Not only do pupils enjoy learning outdoors, research shows that taking lessons outside is more effective in terms of engagement, retention and attainment and even helps to improve attendance. Pupils also experience new curriculum connections. At Whoberley, Children will have the opportunity to explore and take part in a wide range of primary science activities outdoors. We will cover biology, chemistry and physics outdoors, with curriculum links highlighted throughout.

At Whoberley Hall, children will, in every lesson, be given opportunities to describe the intent of their learning and the Scientific Enquiry strand that they are using (research, observing over time, fair testing, classifying or pattern seeking). They will be encouraged to confidently discuss the effectiveness of their approach in answering their Scientific question linked to the intent.

Visitors will also be encouraged with the purpose of developing the children's aspirations and broadening the horizons of their life-long learning. The experience of positive role models will also heighten the children's awareness of their own impact and encourage them to contribute positively to wider society.

In Science, all children should be given a challenge appropriate to their ability. Where children are showing understanding at a greater depth, appropriate challenges (to deepen learning) can include (but are not limited to): mind mapping (recording links with prior learning), exploring another aspect of Scientific enquiry (research/ fair testing/ pattern seeking/ observing over time/ classifying), planning a 'what next?' investigation, assessing knowledge using the knowledge organizer. For any extension task; the lesson intent must be reflected upon and the knowledge deepened.

Assessment

Assessment for learning is continuous throughout the planning, teaching and learning cycle.

- Upon commencement of a new Topic, relevant scientific knowledge and Working Scientifically skills are directly assessed through a whole class **Knowledge Reflection**.
- Children are **observed** at work, individually, in pairs, in a group and in class during whole class teaching.
- Quick quizzes/ **knowledge pit-stops** are regularly given using learning covered in previous year groups. These are both teacher led, and student led.
- **Explorify** is used in every lesson for an instant whole class assessment on previous topics or to ascertain if children are making links between topics (applying Scientific learning).
- **Differentiated, open-ended questions** that require children to explain and unpick their understanding are asked throughout topics.
- Practical **TAPS** assessment lessons (as recommended by TES and PSTT) are interspersed in the planning, where relevant.
- Effective **feedback** both verbal and written is given where appropriate.
- Opportunities for **self-assessment**, consolidation, depth and target setting are provided.
- **Book moderations and Pupil Voice** are used to evaluate the range and balance of work and to ensure that tasks meet the needs of different learners, with the acquisition of the pre-identified key knowledge of each topic being evidenced through the outcomes. The Science Co-ordinator and Senior leadership team are responsible for **monitoring the standard** of the children's work and the quality of teaching in Science. The Science Co-ordinator is responsible for supporting colleagues in the teaching of Science, for being informed about current developments in the subject and for providing a strategic lead and direction for the subject in the school.
- At the end of each topic, children are given the opportunity to record and link their learning using the **hexagon assessment** technique. Children define and link new vocabulary that they have discovered during the topic.

Planning and Resources

Statutory requirements for the teaching and learning of Science are laid out in the National Curriculum in England Framework Document for Teaching, September 2014 and the Statutory framework for the Early Years Foundation Stage, March 2021.

The Year 1-6 planning documents for Biology and Chemistry have been created in line with recent EEF advice and were supported in their creation by The Primary Science Teaching Trust, the Coventry Primary Science School Partnership Cluster and our Science Governor Amanda Poole, who cowrote 'THE 10 KEY ISSUES WITH CHILDREN'S LEARNING IN PRIMARY SCIENCE IN ENGLAND' document. The Physics planning at Whoberley Hall is provided by The Ogden Trust, who also offer excellent CPD and resources to support.

The planning documents have been created to fulfil specific aims: 1. To embed/ intersperse Scientific Enquiry opportunities throughout the planning. 2. To ensure that Working Scientifically skills are progressive from Years N to 6. 3. To ensure that a range of outdoor learning opportunities are given. 4. To promote a self-led investigative approach to Science that builds autonomy and confidence. 5. To ensure depth and security of curriculum coverage. 6. To encourage the children to build links and recognize prior learning that supports their current topic. 7. To ensure that lesson intents are clear and progressive.

An enrichment program has been developed to ensure that all pupils experience STEM visitors, family engagement opportunities, field trips and extra-curricular activities. These opportunities also enable the children to showcase their learning through science fayres and award programs.

Teachers will seek to take advantage of opportunities to make cross-curricular links. They will plan for pupils to practice and apply the skills, knowledge and understanding acquired through science lessons to other areas of the curriculum:

- Science shares strong links with mathematics – taking measurements (length, time, mass, etc), data handling and presenting data in tables and using graphs and pie charts.
- We recognize the important role computing skills play in the development of scientific skills. We also recognize the importance of being computer literate. Computing skills are used regularly to enhance teaching and learning of science and to give all children the opportunity to use computing to research, collect, analyze and present scientific findings (see ICT policy).
- Geography shares a 'natural' link with Science and pupils should have every possible opportunity to explore the science present in and around their school environment.
- Children should have the opportunity to research and learn about famous scientists from history and how their achievements have changed or impacted upon our lives.
- Scientific investigation allows the children to communicate in a variety of contexts through promoting the skills of reading, writing, speaking and listening.

Key Stage One and Key Stage Two resources are held centrally in the main corridor. These have been matched to the Ogden Trust Primary Science resources list and audited (by request) by The Primary Science Teaching Trust. Resources are regularly audited to ensure that they are relevant and up-to date.

For effective teaching of science, topic related resources (books, artefacts, etc) should be present on display and accessible to children within the classrooms.

The outcome of lessons (recorded in Science books) will be child and age dependent. Examples of age-related examples are contained within the Medium-Term plans for guidance only.

Extended writing opportunities linked to the topic are interspersed in the planning. These are marked in detail in accordance with the marking policy.

Planning for EYFS has been developed to capture the natural curiosity of the children through links to the seasons and calendar events.

Progression of Working Scientifically from EYFS to Key Stage 1 is guided by 'The Salters Institute' Working Scientifically in the Primary Classroom. This document has been developed by York University, is updated to reflect the 2021 EYFS guidance and is recommended by TES.

Science week activities and visitors will be available for both EYFS and Years 1 – 6.

Organization

EYFS

Pupils explore science topics through making predictions, using their senses and investigating materials and their properties. Specific Science Knowledge is taught through the related strands of 'Understanding the World' and 'Personal, Social and Emotional Development'. Working Scientifically skills are also taught through 'Mathematics' and 'Physical Development' objectives.

Teachers and teaching assistants support pupils to develop a solid understanding of things occurring around them in their day-to-day lives. Children are encouraged to be creative and inquisitive as they participate in activities. Pupils are encouraged to use their natural inquisitiveness whilst taking part in explicit science lessons or exploratory play in the EYFS environment.

KEY STAGE 1

The principal focus of science teaching in **key stage 1** is to enable pupils to experience and observe phenomena, looking more closely at the natural and humanly-constructed world around them. They are encouraged to be curious and ask questions about what they notice. They are helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and researching using secondary sources of information. They begin to use simple scientific language to talk about what they have found out and communicate their ideas in a variety of ways. Most of the learning about science is through first-hand practical experiences, but there is also some appropriate use of secondary sources, such as books, photographs and videos.

Substantive knowledge in Physics is not part of the 2014 National Curriculum but pupils 'Find the Physics' through links to the curriculum provided by The Ogden Trust. This enables early mapping of knowledge within the children's minds.

'Working scientifically' is described separately in the programme of study but is **always** taught in clear relation to the substantive science content in the programme of study.

Pupils learn to read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

KEY STAGE 2

The principal focus of science teaching in upper key stage 2 is to enable pupils to develop a deeper understanding of a wide range of scientific ideas. They do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. At key stage 2, they encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They also begin to recognise that scientific ideas change and develop over time. They select the most appropriate ways to answer science questions using different types of scientific enquiry, including observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests and finding things out using a wide range of secondary sources of information. Pupils draw conclusions based on their data and observations, use evidence to justify their ideas, and use their scientific knowledge and understanding to explain their findings.

'Working and thinking scientifically' is described separately at the beginning of the programme of study but is always taught through and clearly related to substantive science content in the programme of study.

Pupils are taught to read, spell and pronounce scientific vocabulary correctly. Visual images accompany key words on displays and knowledge organisers to support all learners.

Equal Opportunities and Inclusion

At Whoberley Hall, we believe that it is important that different communities, religions, ethnicities, abilities, gender groups, family types are represented in materials used across all subjects. Children should see positive representations of themselves and feel that their backgrounds and cultural traditions are important and relevant.

All pupils are entitled to access the Science curriculum at a level appropriate to their needs. To ensure inclusion, teachers use a range of strategies in line with the school's SEND Policy. Independent tasks, as well as teaching, are also well-adapted to ensure full accessibility, as well as to provide appropriate challenge to different groups of learners. The school makes full use of additional adults who are deployed effectively to ensure that identified children can make progress in each curriculum area, according to their full potential.

Pictorial/ word banks are given to children to encourage use of key vocabulary and to allow children with English as an additional language to fully engage in the lesson.

Through establishing what children already know and what they want to know, teaching takes account of children's own interests to ensure topic relevance to all individual learners. Opportunities for enrichment are also fully utilised, to ensure a fully inclusive and engaging Science curriculum.

“Scientists have become the bearers of the torch of discovery in our quest for knowledge.” Stephen Hawking

‘The important thing is to never stop questioning’ Albert Einstein