



Science Policy

Approved by SLT on:

25th April 2023

Review Date:

Summer Term 2027

BARLEY LANE PRIMARY SCHOOL
SCIENCE POLICY

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2. Aims

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

The 2014 national curriculum for science 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 skills** required to understand the **uses and implications** of science, today and for the future. We understand that it is important for lessons to have a skills-based focus, and that the knowledge can be taught through this.

Throughout the programmes of study, the children will acquire and develop the key knowledge that has been identified within each unit and across each year group, as well as the application of scientific skills. We ensure that the Working Scientifically skills are built-on and developed throughout children’s time at the school so that they can apply their knowledge of science when using equipment, conducting experiments, building arguments, and explaining concepts confidently and continue to ask questions and be curious about their surroundings.

2. Curriculum Intent

Science at Barley Lane Primary is based on developing children's ideas and breadth of knowledge with regards to Biology, Chemistry and Physics, enabling them to make sense of the world in which we live in. When children leave Barley Lane, we aim for them to be equipped with the scientific knowledge they require to understand the uses and implications of science, today and for the future. All children and staff are encouraged to be inquisitive throughout their time at Barley Lane and beyond. The science curriculum fosters a curiosity in children about our universe and promotes respect for the living and non-living. Throughout the years, children will acquire and develop the key knowledge and vocabulary that has been identified in our carefully planned science units. We aim to ensure the 'scientific enquiry skills are built on, year on year, to ensure their ability to apply their knowledge when investigating, building arguments, and explaining concepts with confidence, whilst also continuing to fuel their curiosity and question their local surroundings of London and Essex, and the universe we live in. Specialist vocabulary for science topics is taught and built up, and effective questioning to communicate ideas is encouraged.

Our Science curriculum fits in within our wider curriculum intent as through science we provide a range of learning experiences: experimentation, investigation, outdoor learning, workshops, whole school assemblies and carefully chosen trips. Children develop the knowledge of how scientists in the past have shaped their lives around them today. This is all done to help develop our children's understanding of the world around them and put their learning into context, in order for them become the well-rounded students Barley Lane aims to achieve.

2.1 Vision & Principles

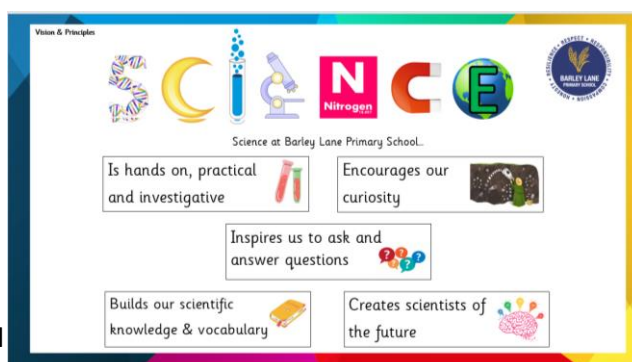
Staff and children were involved in the creation of the Barley Lane's Science Principles.

At Barley Lane Primary School, we want children to be curious and to achieve scientific expertise that will prepare them for the next stage of their education.

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.

This vision and Principle are in child speak and are displayed in classrooms to embed with children: Science at Barley Lane Primary School.



These posters are on display on the working wall in science and referred to throughout the coverage of each science topic.

- Children are encouraged to ask their own questions and be given opportunities to use their scientific skills and research to discover the answers. This curiosity is celebrated within the classroom.
- Teachers ask a range of questions which enable all children to take part, listening carefully to answers and taking learning forward, using open and closed questions and allowing children time to think.
- Planning involves teachers creating engaging lessons, often involving high-quality resources to aid understanding of conceptual knowledge.
- Teachers use precise questioning in class to test conceptual knowledge and skills and assess pupils regularly to identify those children with gaps in learning, so that all pupils keep up.
- New vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in-keeping with the topics.
- Working Scientifically skills are embedded into lessons to ensure these skills are being developed throughout the children's school career. The key knowledge for each topic and across each year group is mapped across the school and checked at the end of each science topic.
- 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 by accessing outdoor learning.
- Teachers help develop the knowledge of how scientists (or diverse backgrounds) in the past and present have shaped their lives around them today.

2.2 Scientific knowledge and conceptual understanding

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Children's starting points are identified at the beginning of each science topic and the children are able to convey and record what they know already. At the end of the block, children's knowledge is checked in line with the key knowledge identified prior to the teaching block. Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary and teachers ensure that this is developed within each lesson and throughout each science topic. The science curriculum ensures that children are provided with regular opportunities to apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. Through use of the KWL strategy, children are also able to suggest what they would like to learn at the start of each teaching sequence, and this ensures that teachers are able to adapt the programme of study to ensure that this is informed by children's interests and to maximise their engagement with and motivation to study science.

2.3 The nature, processes and methods of science

‘Working scientifically’ specifies the understanding of the nature, processes and methods of science for each year group and this is embedded within lessons and focuses on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils are given opportunity to seek answers to questions through collecting, analysing and presenting data.

2.4 Spoken language

The national curriculum for science reflects the importance of spoken language in pupils’ development across the whole curriculum – cognitively, socially and linguistically. At Barley Lane science lessons provide a quality and variety of subject specific language to enable the development of children’s confident and accurate use of scientific vocabulary and their ability to articulate scientific concepts clearly and precisely. They are encouraged and assisted in making their thinking clear, both to themselves and others, and teachers ensure that pupils build secure foundations by using discussion to probing and remedying their misconceptions.

3. Implementation

3.1 Planning and Resources

Planning is a process in which all teachers are involved. Planning should be done with year group teams. All teachers should keep a copy of the termly and weekly planning in their files.

We use the DFES Science scheme of work. The key knowledge and skills of each science topic is also informed by the PLAN ‘Planning Matrices’. Teachers also have access to the Hamilton resources and are able to source further support and resources, in line with national pedagogy, from the National Stem Centre.

Further evidence of ‘good science’ taking place in classrooms includes:

- An active learning environment, showcasing the Barley Lanes Science Principles, and relevant Working Scientifically posters for age phase on the working walls during science topic coverage.
- Children being encouraged to ask and answer questions and discuss their work and ideas.
- Children devising and conducting their own investigations within the context of the relevant curriculum content, as well as being given opportunities to develop their working scientifically skills.
- Children recording their findings in a variety of ways.
- Children showing enjoyment in the activities they are undertaking.
- The cross curricular teaching of science.

We have sufficient, high-quality science resources to aid and support the teaching of all units and topics taught, from EYFS to Y6. We keep these in a central store, where they will be labelled and easily accessible to all staff. EYFS have a range of resources kept in classes, for simple access for

children during exploration. The library contains a good supply of science topic books to support children's individual research.

3.2 Organisation

Science will be taught in planned and arranged into topic blocks by the class teacher, to have a project-based approach.

	Autumn	Spring	Summer
Nursery	All About Me Festivals & Celebrations	Growing	Under the Sea / Animals
Foundation Stage	All About Me Festivals & Celebrations	Around the World	Fairy Tales
Year 1	1. Animals including Humans - Ourselves	1. Everyday Materials – Marvellous Materials	1. Plants – What's growing in our gardens?
	2. Everyday Materials – Let's build	2. Animals including Humans – Our Pets	2. Seasonal Changes – Wonderful weather
Year 2	1. Everyday materials – Materials Matter	1. Plants – Ready Steady Grow	1. Living things and their habitats – Gardens & allotments
	2. Everyday materials – Squash, bend, twist, stretch	2. Living things and their habitats	2. Animals including humans – Healthy Animals
Year 3	1. Rocks & Fossils	1. Forces & Magnets	1. Plants – Roots and Shoots
	2. Light and Shadow	2. Animals inc Humans – Keeping healthy	2. Plants - Artful Flowers, Fruits and Seeds
Year 4	1. Sound	1. Habitats	1. Animals inc Humans – Teeth / Digestive system
	2. Electricity	2. Living things – Classification and food chains	2. Changing States
Year 5	1. Forces	1. Earth and Space	1. Living things and their habitats

	2. Changes of Materials	2. Properties of Materials	2. Animals including Humans
Year 6	1. Animals, including humans 2. Living things and their habitats	1. Evolution and Inheritance	1. SATs
	1. Light 2. Electricity	2. Living things and their habitats 3. Revision of forces	2. Revision of all other science topics

3.3 How do we teach Science?

Science teaching focuses on enabling children to think as Scientists. 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)

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 should be encouraged to be curious and ask questions about what they notice. They should be helped to develop their understanding of scientific ideas by using different types of scientific enquiry to answer their own questions, including observing changes over a period of time, noticing patterns, grouping and classifying things, carrying out simple comparative tests, and finding things out using secondary sources of information. They should begin to use simple scientific language to talk about what they have found out and communicate their ideas to a range of audiences in a variety of ways. Most of the learning about science should be done through the use of first-hand practical experiences, but there should also be some use of appropriate secondary sources, such as books, photographs and videos.

‘Working scientifically’ is described separately in the programme of study but must always be taught through and clearly related to the teaching of substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

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

Lower Key Stage 2 (Years 3 and 4)

The principal focus of science teaching in lower key stage 2 is to enable pupils to broaden their scientific view of the world around them. They should do this through exploring, talking about, testing and developing ideas about everyday phenomena and the relationships between living things and familiar environments, and by beginning to develop their ideas about functions, relationships and interactions. They should ask their own questions about what they observe and make some decisions about which types of scientific enquiry are likely to be the best ways of answering them, including observing changes over time, noticing patterns, grouping and classifying things, carrying out simple comparative and fair tests and finding things out using secondary sources of information. They should draw simple conclusions and use some scientific language, first, to talk about and, later, to write about what they have found out.

‘Working scientifically’ is described separately at the beginning of the programme of study but must **always** be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge.

Upper Key Stage 2 (Years 5 and 6)

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 should 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 upper key stage 2, they should encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates. They should also begin to recognise that scientific ideas change and develop over time. They should 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 should 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 must **always** be taught through and clearly related to substantive science content in the programme of study. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read, spell and pronounce scientific vocabulary correctly.

4. Impact

Children’s progress is continually monitored throughout their time at Barley Lane Primary School and is used to inform future teaching and learning. By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant

programme of study as set out in the National Curriculum. These are set out as statutory requirements. We also draw on the non-statutory requirements to extend our children and provide an appropriate level of challenge.

Children receive effective feedback through teacher assessment, both orally and through written feedback in line with the success criteria. Children are guided towards achievement of the main objective through the use of process based 'WILF', provided by and explained by the teacher. Children will have these to refer to in the lesson, where they will be evident in their books and used to identify areas of difficulty by children and teachers when reviewing and assessing work.

Assessment for learning is continuous throughout the planning, teaching, and learning cycle. However, children are more formally assessed half termly in KS1 and KS2 using a variety of methods:

- Observing children at work, individually, in pairs, in a group, and in classes.
- Questioning, talking and listening to children
- Considering work/materials / investigations produced by children together with discussion about this with them.
- ScholarPack Formative assessments recorded through the half terms of topic covered and Summative assessments informed from this and completed each term.

In line with the KWL strategy, children identify what they know already about each topic, as well as what they would like to know. The programme of study takes is responsive to the children's starting points, as well as their specific interests. It also ensures a focus on the key identified knowledge of each topic, which is mapped within and across year groups to ensure progression. At the end of each blocked science topic, this key knowledge is checked. Outcomes of work also evidence its acquisition.

In EYFS, we assess the children's Understanding of the World according to the Development Matters statements and some aspects of Expressive Arts Design are also science based.

5. Equal Opportunities

At Barley Lane Primary School we are committed to providing all children with an equal entitlement to scientific activities and opportunities regardless of race, gender, culture or class.

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

6. Inclusion

In school we aim to meet the needs of all our children by differentiation in our science planning and in providing a variety of approaches and tasks appropriate to ability levels. This involves providing opportunities for SEND children to complete their own projects, with support, to develop speech and language skills, as well as scientific skills and knowledge. This will enable children with learning and/or physical difficulties to take an active part in scientific learning and

practical activities and investigations and to achieve the goals they have been set. Some children will require closer supervision and more adult support to allow them to progress whilst more able children will be extended through differentiated activities. By being given enhancing and enriching activities, more able children will be able to progress to a higher level of knowledge and understanding appropriate to their abilities. Teachers will use the school's inclusion planning key to ensure that a range of strategies are used which include and motivate all learners, ensuring that optimum progress is made throughout each part of the lesson.

7. Role of the Subject Leader

It is the responsibility of the subject leader to monitor the standards of children's work. The subject leader is also responsible for supporting colleagues in their teaching, for being informed about current developments in the subject, and for providing a strategic lead and direction for science in the school. The subject leader monitors the budget, resources science topics and books trips and workshops to support learning. The subject leader has specially-allocated time for fulfilling the task of reviewing samples of children's work, training, liaising with other subject leaders from other schools and organising science week.

8. Role of Parents

Parental input is highly valued, and parents are regularly invited and welcomed into school to share their own expertise with the children. Children may receive science project as homework based on their current topic and we encourage parents to work on these projects with their children.

9. Linked Policies

Curriculum Policy
Assessment and Feedback Policy
Marking Policy
Teaching & Learning Policy