



Science Policy

This policy represents the agreed principles for the teaching of Science throughout the school. This policy has been agreed by Governors within the school and all Class Teachers representing the Early Years Foundation Stage, Key Stage 1 and Key Stage 2.

1. School Aims

Our aims for the school are based on our agreed values and inform our vision for the school. These are to:

- Learn and grow together within a safe, caring and happy environment
- Continually encourage achievement in all aspects of school life
- Motivate all children with a broad and challenging curriculum
- Treat everyone with honesty, respect and tolerance
- Ensure opportunities for all by providing equal access to learning

2. Aims of Science Teaching

A high-quality Science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of Science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how Science can be used to explain what is Occurring, predict how things will behave, and analyse causes.

The National Curriculum 2014 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 knowledge required to understand the uses and implications of science, today and for the future.

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group - it should not be taught as a separate strand. 'Working scientifically' focusses 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 should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Pupils should seek answers to questions through collecting, analysing and presenting data. 'Working scientifically' is then developed further at key stages 3 and 4, once pupils have built up sufficient understanding of science to engage meaningfully in more sophisticated discussion of experimental design and control.

3. Teaching and Learning Styles

We use a variety of teaching and learning styles in Science lessons. Our principal aim is to develop children's knowledge, skills and understanding. Sometimes we do this through whole-class teaching, while at other times we engage the children in an enquiry-based research activity. We encourage the children to ask, as well as answer, scientific questions. They have the opportunity to use a variety of data, such as statistics, graphs, pictures and photographs. Children use computing skills in Science lessons because it enhances their learning. Sometimes children may take part in role-play and discussions, as well as having opportunities to present reports to the rest of the class. Children regularly engage in a wide variety of problem-solving activities. Wherever possible, we involve the pupils in real-life scientific activities, for example investigating a local environmental problem, or carrying out a practical experiment and analysing the results.

We recognise that in all classes children have a wide range of scientific abilities, and we ensure that we provide suitable learning opportunities for all children by matching the challenge of the task to the ability of the child. We achieve this in a variety of ways:

- Setting tasks which are open-ended and can have a variety of responses
- Setting tasks of increasing difficulty (we do not expect all children to complete all tasks)
- Grouping children by ability and setting different tasks for each ability group but making sure the learning objective is maintained
- Providing resources of different complexity, matched to the ability of the child

4. The Early Years Foundation Stage

We teach Science in our Nursery and Reception classes as an integral part of the topic work covered during the year. The scientific aspects of children's work are linked to the objectives set out in the Early Learning Goals (ELGs) which underpin the curriculum planning for children aged three to five. Science makes a significant contribution to developing a child's knowledge and understanding of the world, for example through investigating what floats and what sinks when placed in water.

5. Science and Computing

Computing enhances the teaching of Science because there are some tasks for which Computing is particularly useful. Software is used to animate and model scientific concepts, and to allow children to investigate processes which it would be impracticable to do directly in the classroom. Data loggers are used to assist in the collection of data and in producing tables and graphs. Children use Computing skills, including using digital cameras, to record, present and interpret data; to review, modify and evaluate their work; and to improve its presentation. Children learn how to find, select and analyse information on the Internet and on other media.

6. Sustainability

Shepherd Primary School is committed to being environmentally sustainable and educating our children and wider school community about sustainability for the future. We are attempting to reduce our ecological footprint and to tread more lightly on the Earth. This equates to reducing the amount of resources we use and buy, the waste we produce and the emissions we produce. Class teachers plan to teach children about sustainability issues, through the teaching of Science, where appropriate and relevant.

7. Resources

The Science resources cupboard is kept well-stocked with clearly-labelled resources needed to teach all of the units from Years 1-6. In addition to this, the library has a good range of Science topic books. The Science subject leader also holds a number of books on AfL, differentiated tasks and 'working scientifically' for use by class teachers. The Science subject leader manages the budget for Science, replenishing resources where necessary.

8. Science Curriculum Planning

We carry out our curriculum planning for Science in two phases (long term and medium term). The Long Term Plan (LTP) maps the scientific topics studied in each term during each Key Stage, according to the range of units identified in each year. These units of work are aligned to ensure cross-curricular links are best made to enrich and broaden the curriculum. In some cases, we combine scientific study with work in other subject areas, especially at the Early Years Foundation Stage; at other times the children study Science as a discrete subject. We use the local environment of our school wherever possible to enrich the children's experiences, for example in our fieldwork.

The Long Term Plan (LTP) also sets out the National Curriculum statutory requirements in terms of subject knowledge and unit specific skills which can then be applied to the learning objectives in the Medium Term Plans. The detailed LTP for Science can be found in the Subject Leader's Science folder. The units covered in each year groups are arranged as follows:

Term	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Autumn	Animals Including Humans (Common Animals, Plants & Diets)	Living Things & Their Habitats (Living, Dead, Never Alive, Habitats) Plants (Seeds & Bulbs)	Forces & Magnets (Movement & Magnets) Light (Shadows & Reflection)	Animals Including Humans (Digestion, Teeth & Food Chains) Living Things & Their Habitats (Classification & Human Effect on Environment)	Earth & Space (Solar System, Movement of the Moon, Day & Night)	Animals Including Humans (Circulation & Health) Living Things & Their Habitats (Classification: Plants, Animals & Microbes)
Spring	Everyday Materials (Objects & Materials) Seasonal Changes (Weather & Seasons)	Uses of Everyday Materials (Materials for Different Uses)	Animals Including Humans (Food, Diet, Skeletons & Muscles)	States of Matter (Solid, Liquid, Gas)	Forces (Gravity, Friction & Mechanisms) Properties & Changes of Materials (Dissolving, Reactions & Separation)	Evolution & Inheritance (Evolution, Adaptation & Inheritance)
Summer	Plants (Wild & Garden)	Animals Including Humans (Growth, Survival & Health)	Rocks (Types, Fossils & Soil) Plants (Parts & Growth)	Electricity (Circuits & Components) Sound (Vibrations & Features)	Living Things & Their Habitats (Life Cycles, Reproduction of Plants & Animals) Animals Including Humans (Growth, Development & Puberty)	Electricity (Changing Circuits and Symbols) Light (How Light Travels)

Medium Term Plans (MTPs), written by the class teacher, give details of each unit of work and the objectives, statutory requirements and key skills to be taught for each term. They also set out the activities and teaching which will take place. The Science subject leader reviews these plans each term. MTPs are kept in the termly planning folder for each class.

The topics in Science are planned to build on prior learning. All Science lessons are differentiated to cater for pupils of differing abilities. We ensure that there are opportunities for children of all abilities to develop their skills and knowledge in each unit, and we also build progression into the Science scheme of work, so that the children are increasingly challenged as they move up through the school.

9. The Contribution of Science to Teaching in other Curriculum Areas

English - Science contributes significantly to the teaching of English by actively promoting the skills of reading, writing, speaking and listening. Texts that children study during English lessons can be of a scientific nature and children develop oral skills through discussions and recounting their observations of scientific investigative work. They develop their writing skills through recording information, report writing and projects.

Mathematics - Science contributes to the teaching of Mathematics in a number of ways and the two subjects interlink frequently. For example, estimating, predicting and measuring are all key skills in both subjects. The recording of scientific investigation results often requires pupils to produce tables and graphs which are taught as part of the Mathematics curriculum.

Personal, Social, Health and Citizenship Education (PSHCE) and SEAL - Science makes a significant contribution to the teaching of PSHCE and SEAL. Firstly, some Science subject matter lends itself to raising matters of citizenship and social welfare. For example, children study the way people recycle material and how environments are changed for better or worse. Secondly, the subject gives children numerous opportunities to debate and discuss. They can organise campaigns on matters which are of concern to them. Science thus promotes the concept of positive citizenship.

Spiritual, Moral, Social and Cultural (SMSC) development - Science teaching offers children many opportunities to examine some of the fundamental questions in life, for example, the evolution of living things and how the world began. Through many of the amazing processes that affect living things, children develop a sense of awe and wonder regarding the nature of our world. Science raises many social and moral questions. Through the teaching of Science, children have the opportunity to take part in discussions, for example, the effects of smoking and the moral questions involved in these issues. We give pupils+ the chance to reflect on the way people care for our planet, and how Science can contribute to the way we manage the earth's resources. Science teaches children about the reasons why people are different and, by developing the children's knowledge and understanding of physical and environmental factors, it promotes respect for other people.

10. Science and Inclusion

At our school we teach Science to all children, whatever their ability and individual needs. Science forms part of the school curriculum policy to provide a broad and balanced education to all children. Through our Science teaching we provide enjoyable and engaging learning opportunities that enable all pupils to make good progress. We strive hard to meet the needs of those pupils with special educational needs, those with disabilities, those with special gifts and talents, and those learning English as an additional language, and we take all reasonable steps to achieve this. For further details see individual whole-school policies: Special Educational Needs; Gifted and Talented; English as an Additional Language; Inclusion.

When progress falls significantly outside the expected range, the child may have Special Educational Needs (SEN). Our assessment process looks at a range of factors – classroom organisation, teaching materials, teaching style, differentiation – so that we can take some additional or different action to enable the child to learn more effectively. Assessment against

the National Curriculum allows us to consider each child's attainment and progress against Age Related Expectations. This ensures that our teaching is matched to the child's needs.

Intervention for SEN children will lead to the creation of an Individual Education Plan (IEP). An IEP may include, as appropriate, specific targets in relation to Science.

We enable all pupils to have access to the full range of activities involved in learning Science. Where children are to participate in activities outside the classroom (a trip to a science museum for example) we carry out a risk assessment prior to the activity, to ensure that it is safe and appropriate for all pupils.

11. Assessment

Formative assessment consists of four elements:

- Sharing learning objectives
- Effective questioning
- Self and peer evaluation
- Effective feedback

Teachers will plan for and use AfL in lessons. This should:

- Allow teachers to understand where their children are in terms of their subject knowledge and enquiry skills
- Allow the teacher to plan for future learning based on their assessments
- Ensure that children are confident in their learning and their ability to improve

At the end of each unit of work, teachers will need to make a judgement on the child's subject knowledge and their ability to 'work scientifically'. This is done using the Herts for Learning assessment tool for Science. Teachers will annotate and highlight assessment criteria as children demonstrate evidence of achieving it. Evidence for a judgment will be made from a variety of sources to include AfL during lessons and from investigative tasks during each unit of work (teachers should be planning at least one investigation per unit of work).

Assessments for subject knowledge of each unit are recorded in the assessment tables at the end of the MTPs and should be placed in the termly planning folder and on the shared drive.

At the end of each term, Class Teachers will use their assessments to give each child an overall 'phase' and 'step' in Science. End of term levels will be recorded on the Assessment grids on the shared drive and will be monitored by the Science subject leader on a termly basis.

12. Monitoring and review

It is the responsibility of the subject leader to monitor the standard of children's work and the quality of teaching in science. 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.

Monitoring allows the subject leader to assess the quality of planning, teaching and learning to ensure progress is being made, coverage is assured and standards are being met.

Planning - The Science subject leader will monitor planning on a termly basis and will feedback to class teachers and the SLT as necessary.

Work scrutiny - Samples of children's work will be monitored regularly by the Science subject leader and feedback to class teachers will be given as appropriate.

Pupil Voice - The Science subject leader will regularly talk to groups of children from each year group on a termly basis about their views on their Science learning, Feedback will be given to class teachers as appropriate.

Observations & Teaching and Learning Walks - The Science subject leader will be given time to observe colleagues in their teaching of Science during each academic year.