



Bowburn Primary School Science Policy

Our rationale:

Science is a body of knowledge built up through experimental testing of ideas. Science is also methodology, a practical way of finding reliable answers to questions we may ask about the world around us. Science in our school is about developing children's ideas and ways of working that enable them to make sense of the world in which they live through investigation, as well as using and applying process skills. We believe that a broad and balanced science education is the entitlement of all children, regardless of ethnic origin, gender, class, aptitude or disability.

Aims:

Our aims in teaching science include the following:

1. Preparing our children for life in an increasingly scientific and technological world.
2. Fostering concern about, and active care for, our environment.
3. Encourage every child to investigate, question and discuss in order to acquire scientific knowledge, understanding and skills.
4. Encourage children to hypothesise and to find ways of testing their ideas to provide evidence to support their ideas.
5. Teach scientific vocabulary and to use a variety of ways to present the results of their investigations.
6. Promote key skills by offering a range of contexts for the development of:
 - Literacy – communicating facts, ideas and opinions
 - Mathematics – application of number through collecting, considering and analysing data.
 - ICT – through using a wide range of ICT
7. Provide opportunities to learn about aspects of personal, social and health education (PSHE) and citizenship.
8. Ensure children recognise hazards and risks when working with living things and materials and agree safety rules.
9. Provide opportunities that engage the children in relevant, interactive first hand experiences.

10. Encourage children to work co-operatively and collaboratively, developing children's confidence communicating ideas.

11. To provide opportunities for all children regardless of race, gender or disability.

Our Objectives:

We will fulfil these aims by:

1. Using the rich and stimulating environments that surround our schools to enable us to provide opportunities for learning about life processes and living things, through observation, questioning and wonder.

2. Providing a wide range of interactive, practical activities for individual and group work that encourage the children to explore and find out and develop their understanding of key scientific ideas and make links between different experiences.

3. Developing the children's investigative skills and understanding of Science through the use of questioning and giving them opportunity to express their findings and ideas to their peers and a wider audience.

4. Planning opportunities to develop skills predicting, asking questions, making inferences, drawing conclusions and making evaluations based on evidence and understanding.

5. Teaching scientific and mathematical language, including technical vocabulary and conventions, and drawing diagrams and charts to communicate scientific ideas.

6. Planning opportunities to extract information from sources such as reference books or ICT as well as through science visits and visitors to school.

7. Working collaboratively in pairs or groups, listening to and sharing ideas and treating these with respect.

8. Taking part in the annual National Science Week activities and holding a whole school STEM Week.

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. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content. 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. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.

The nature, processes and methods of science

'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. The notes and guidance give examples of how 'working scientifically' might be embedded within the content of biology, chemistry and physics, focusing 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.

Spoken language

The national curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.

Attainment targets

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) 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

- Animals including humans (basic knowledge of parts of human body and comparing animals)
- Seasonal changes.
- Everyday materials (describing properties)
- Plants (basic structure)

Year 2

- Use of everyday materials (explore and compare materials for uses)
- Living things and their habitats (explore variety of habitats, simple food chains).
- Plants (what plants need to grow)
- Animals including humans (needs for survival, food and hygiene)
- Significant people in Science

Year 3

- Animals including humans (nutrition, skeleton and muscles)
- Rocks (fossils and soils)
- Forces and magnets (magnetic materials, attracting and repelling).
- Light (reflection and shadows)
- Plants (life cycles)

Year 4

- States of matter (changes of state, evaporation and condensation)
- Sound (vibration, pitch and volume)
- Electricity (simple circuits, insulators and conductors).
- Animals including humans (digestive system, teeth and food chains)
- Living things and habitats (classification keys)

Year 5

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

Year 6

- Electricity (voltage and power in circuits, circuit components, symbols and diagrams)

- Evolution and inheritance (how living things have changed over time, fossils, dinosaurs, adaptation to environment).
- Living things and their habitats (classification, characteristics of plant and animal groups)
- Animals including humans (circulatory system, diet and exercise, healthy living)
- Light (how it travels, how we see, shadows)

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

The Science Curriculum

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-topics 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. Science, as a subject, is recommended to be taught (at least) weekly. At Bowburn Primary School we use the Snap Science scheme as a basis for science planning.

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

Early Years

Early Years explore scientific themes and content through the 'Understanding of the World' strand of the EYFS curriculum. This involves guiding the pupils to develop sense of their physical world; looks at plants and animals including humans, seasonal changes and begin to investigate materials. They are assessed in the moment according to milestones within the Development Matters attainment targets.

Key Stage 1

During Key Stage 1, pupils will 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. Pupils will begin to use simple scientific vocabulary to answer their own questions, using scientific enquiries to draw conclusions. The majority of scientific learning in this key stage is done through practical first-hand experiences with some use of appropriate secondary sources. Pupils will be introduced to significant individuals linked to their programmes of study. Reading is embedded through the use of high-quality texts and fluently reading scientific vocabulary. Pupils will develop knowledge about biology, chemistry and physics (including earth science), including how this is evident in their local environment. They should understand basic subject-specific vocabulary relating to all disciplines of science and begin to use their working scientifically skills to enhance their scientific awareness. Pupils will develop their knowledge of physics observing changes across the four seasons and describe the weather associated with each

season and how day length varies. Pupils will also apply their mathematical understanding making tables and charts to display their findings. Pupils will develop their understanding of biology describing the basic needs of animals, including humans, for survival and the main changes in life cycles. Pupils will be able to describe and compare the features of common animals and discuss the importance of exercise, nutrition and hygiene. In chemistry, pupils will name, compare and group a variety of everyday materials and describe their simple, physical properties. They will then investigate the suitability of these materials for particular purposes. Pupils carry out scientific enquiry inside and outside the classroom asking questions, noticing patterns, grouping and classifying, using secondary sources and carrying out simple comparative tests. Pupils develop their communication skills through communicating their ideas about their methods and conclusions. 'Working scientifically' will be developed through the three disciplines (physics, biology and chemistry) along with further developing their mathematical understanding.

Lower KS2 - Year 3 and Year 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.

Upper KS2 - Year 5 and Year 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.

Monitoring

Monitoring takes place regularly through sampling children's work, teacher planning, book scrutiny, pupil interviews/questionnaires, learning walks and lesson visits.

Roles and Responsibilities

The Leadership Team will:

- actively support and encourage staff, praising good practice and supporting staff development, in-service training (particularly for the science leader) and acquiring resources.

The Science Leader will:

- advise and support staff in planning, teaching and learning of science;
- monitor teachers' planning as part of on-going subject monitoring and evaluation of practice;
- use feedback from monitoring to develop an action plan for Science with realistic and developmental targets;
- audit, identify, purchase and organise science resources, ensuring they are readily available and well maintained;
- document and review the agreed ways of working through a written policy document and knowledge and skills progression;
- keep up to date on new developments in the use of science in the curriculum and inform staff;
- promote science throughout the school.

The Class Teacher will:

- be responsible for the planning and teaching of science as set out in this policy;
- follow the subject's long term plan and develop termly year group medium term plans;
- embed the Science Knowledge and Skills Progression document within planning and quality first teaching;
- regularly refer to key vocabulary within the classroom linked to each theme.

Resources

We have a wide range of practical resources and interactive boards to access the internet as a class. Visits are planned to enhance learning and give hands on activities. Planning and resourcing is adapted from Collins Connect's Snap Science Scheme and supplemented with a wide range of complementary resources. In addition, local persons with expertise in particular topics are invited to visit the school and enthuse and inspire our pupils.

Completed by: Mr Wilby

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