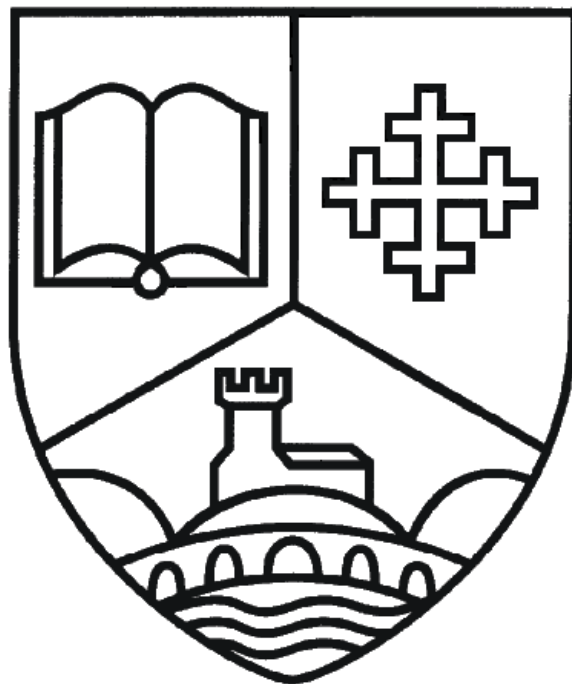


Bidford-on-Avon CE Primary School



Policy for Science

1. Introduction

This policy outlines the teaching, learning and management of the Science Curriculum at Bidford-on Avon Church of England Primary School. The school's policy for science is based on the National Curriculum for Key Stages 1 and 2. The policy has been drawn up to reflect our whole school approach to science and has been discussed with staff and has the agreement of the Governing Body. The implementation of this policy is the responsibility of the Head Teacher and teaching staff.

2. Purpose of study, intent and aims

A high-quality science education provides the foundations for understanding the world through the disciplines of Biology, Chemistry and Physics. Through developing 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 and scientific investigation. 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 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.

3. Teaching and Learning

At Bidford-on-Avon Primary School, science is taught both discreetly, with relevant links made to the wider curriculum. Opportunities for learning are also drawn from outside agencies and visits to places of interest. We believe that pupils are best served being taught the best possible content, within discreet curriculum areas. Our curriculum is knowledge-rich and disciplinary/subject-based focussing on the key knowledge, vocabulary and skills. As appropriate contextual links are made across other curriculum subjects to provide meaning and context for learning e.g. science linked to maths and data management; botanical art linked to a science study of plants; PE activities linked to the exploration of ways to keep healthy.

We know that good science teaching and learning occurs in our school when:

- Children have the opportunity to learn through first-hand, **practical** experiences.
- Children have access to **resources** which support their learning.
- Learning is **relevant** to the children and within the context of their own lives.
- Children have the opportunity to share their **prior knowledge** and ideas with others.
- Activities link to other areas of the **curriculum**.
- Children are encouraged to **discover** things for themselves through practical exploration.
- **Assessment** is used to inform planning and support the children to make progress.
- Links are made with outside agencies, the wider **community** and transition schools.

Teachers provide a step-by-step approach to building procedural and conceptual knowledge within lessons so that pupils develop a secure understanding of each key block of knowledge and concepts before progressing to the next scientific topic. Scientific knowledge is taught through investigative processes during which the children learn to plan and conduct investigations, to complete research, to obtain evidence and consider their results. Skills such as

observing, questioning, predicting, measuring, recording, evaluating, problem solving and communicating their findings (orally, graphically and in writing) are all developed as children move through the school. Teachers use a variety of strategies including first-hand practical experience, demonstrations, discussion, pupil led presentations, pictures, video and audio clips, role play, data collection, presentation and analysis and reference books to develop pupils' understanding. Subject specific and technical vocabulary is a key feature of every lesson, with opportunities given to practice and apply learnt vocabulary wherever possible. Working scientifically is embedded within lesson content, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. Children are encouraged to ask, as well as answer, scientific questions in order to identify misconceptions, develop their thinking skills, review key knowledge and communicate ideas clearly. Wherever possible, we involve the pupils in 'real' scientific context, for example, researching a local environmental problem or carrying out a practical experiment and analysing the results.

At Bidford-on-Avon Primary School, we believe that science should be meaningful and embedded in the children's daily experiences. The science curriculum should involve practical experiences, engaging resources, creativity and personalised learning, and is complemented by events such as National Science Week and engagement with the Ogden Trust supporting science learning across our local science hub.

At Bidford-on-Avon Primary School our aim is to deliver a Science curriculum which can be accessed by all pupils. The curriculum should engage and inspire learners whilst conforming to, but not being limited to, the National Curriculum. We recognise the fact that in all classes there are children of different abilities in science and we aim to provide suitable and challenging learning opportunities by differentiating tasks, resources and giving additional support to children individually and in groups where necessary and allowing extensions to science work through independent research, creativity and problem solving.

4. Science Curriculum Planning

Science is a discrete subject within the National Curriculum for both Key Stages 1 and 2. Science curriculum planning is organised in three ways, long term schemes of work, medium term and short term planning. (See curriculum policy). Curriculum maps also outline the whole curriculum studied each year at each phase. Long term schemes map out the elements of the Science programme of study studied each year for KS1, LKS2 and UKS2. Schemes identify the relevant Science content, key objectives and key vocabulary studied in each unit of work. Supporting Progression maps also outline the key learning to be attained at the end of KS1, lower KS2 and Upper KS2.

Medium and short term planning builds upon their prior learning and long term schemes detailing the aim, content, key vocabulary, key knowledge, resources, assessment milestones, cross-curricular links and cultural capital and series of differentiated lessons taught over each unit of work, relevant to the Key Stage and class. All planning is completed on standardised planning proformas to ensure consistency in content and expectation.

The principal focus of science teaching in key stage 1 is to enable pupils to experience and observe phenomena, predominantly through the use of first-hand practical activities, looking more closely at the natural and humanly-constructed world around them. In lower key stage 2 they broaden their scientific view of the world around them, by 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. Finally, in upper key stage 2 they develop a deeper understanding of a wide range of scientific ideas by asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. They encounter more abstract ideas and begin to recognise how these ideas help them to understand and predict how the world operates.

A knowledge organiser identifying the key knowledge and vocabulary for each science topic is also sent home to parents and used by children to support and focus their learning.

The timing allocated to teaching Science each term is outlined in the curriculum policy.

As we have a combination of single and mixed year group classes, planning is done as part of a 2 year rolling programme. This ensures children have complete coverage of the national curriculum and do not have to repeat topics.

Science is delivered as individual and blocked lessons. Blocked lessons provide consistent time for pupils to develop, review and adapt pieces of work within a sustained time frame, whilst individual lessons might focus on developing a key scientific skills or knowledge.

A range of science resources including skeletons, anatomical figures, scientific diagrams and images are displayed around school to provide a stimulus to pupil's curiosity, discussion and engagement in the learning environment.

A pupil science committee supports science learning across the school, organising presentations, displays and supporting the organisation and management of science equipment.

5. Curriculum Impact

The following outcomes are a result of the quality of our Science curriculum and wider provision, which focuses on all pupils 'knowing more, remembering more, doing more' and altering their long-term memory:

- a broad range of skills linked to scientific knowledge and understanding, as well as scientific enquiry and investigative skills.
- a secure understanding of key scientific vocabulary that will enable all pupils to communicate their correct understanding of the concepts taught.
- pupils will develop a range of scientific skills such as carrying out comparative and fair tests, identifying patterns and using evidence to support/refute ideas or arguments; this will support them in the next stage of their education
- awe and wonder around the amazing and fascinating world of Science
- developing an enjoyment and pleasure in learning about Science

Early Years Foundation Stage

Science within Early years is covered under 'understanding the world'. Science is valued and promoted through direct teaching and purposeful learning opportunities across different topics throughout the year. We use planned topics and capitalise on un-planned moments that present themselves to talk about living things, materials and changes.

Cross-Curricular links

At Bidford we believe it is important that meaningful links are made with other curriculum subjects. English, maths, art, history, geography, design and technology all have an important part to play in developing scientific skills. Science lessons provide many contexts in which children develop their language and literacy skills. Children observing and describing scientific processes need to be able to explain their ideas verbally and in writing. Science provides opportunities for exploratory and investigative talk and questioning, and for teaching fiction and non-fiction texts. Maths plays an important part in managing data from investigations or measurements from experiments. An understanding of materials, electricity and forces links to their use in technology, whilst geography overlaps with a study of seasonal change, rocks and evolution. History charts the impact of scientific discovery on the development of civilizations and the work of individual scientists in developing social change.

Wellbeing and SMSC

We provide an education that gives pupils opportunities to explore and develop their values and beliefs, spiritual awareness, high standards of personal behaviour, a positive caring attitude towards other people, an understanding of social and cultural traditions and an appreciation of the diversity and richness of other cultures, including British Values of democracy and equality.

All curriculum areas have a contribution to make to the child's spiritual, moral, social and cultural development and opportunities for this are planned in each area of the curriculum. Science provides pupils with an understanding of how to support their mental and physical health and managing risk. It provides pupils with an insight into how scientific discoveries and inventions have supported community development and wellbeing. Questioning and awe and wonder as the basis of scientific discovery supports pupils' spiritual development and wider curiosity about who they are and the meaning of life.

Community cohesion and British Values

Through our Science planning, links are made to Community Cohesion by looking at the importance of Science in our local area and how this has impacted the local community's development and the wider British nation. Understand how societies and nations grow and develop and how communities are built around the establishment of shared values, rules and cultural practices.

6. Management of science within the school

The science subject manager is responsible for:

- Compiling, carrying out and evaluating the school science action plan.
- Maintaining and updating the subject leader folder.
- Coordinating subject assessment and monitoring.
- The organisation of science resources within the school.
- Keeping informed of changes and updates in science teaching, for example by attending Leading Learning Network and Ogden Trust meetings and feeding back information to the rest of the staff.
- Supporting the Senior Leadership Team in the monitoring of standards in children's work and of the quality of teaching science.

7. Health and Safety

In organising fieldwork, visits, demonstrations or the use of equipment staff need to consider issues of health and safety and pupil safeguarding, referring to the relevant policy and documentation. They will also explain the reason for safety measures and discuss any implications with the children. Children will always be encouraged to consider safety for themselves, others and the environment and the resources they use, when undertaking Science activities.

The following considerations are carried out to prevent children from being put to unnecessary risk:

- All tools and practical equipment are kept in good condition, stored safely and well-organised
- Children are provided with appropriate training in the use of equipment and are supervised where appropriate.
- Work areas are appropriately arranged to manage investigations i.e table covers/ aprons to prevent spillage or damage to resources or clothes.
- Allergies and potential health risks are considered with all fieldwork and visits.

Staff follow CLEAPSS documentation and advice on managing the safety of science and technology activities.

All trips/visits must be risk assessed and an EVOLVE risk assessment form completed and signed by the Educational Visits Coordinator (EVC). Follow guidance in the Educational visit policy regarding arrangements for all trips.

8. Safeguarding

All activities in science will be managed within the guidelines stated in the school Safeguarding policy. All additional adults/volunteers supporting Science activities must be informed of their safeguarding duties and checked with the office/safeguarding leads for their suitability before being asked.

The use of digital devices and the internet by staff and pupils will be managed within the guidelines stated in the online safety policy.

9. Assessment and Recording

Teachers assess children's work in Science by making formative assessments as they observe them or engage them in discussion during each Science lesson. On completion of a piece of work, the teacher marks the work and comments as necessary, identifying where appropriate, good examples of work, key spellings related to the learning, misconceptions and areas to improve or questions.

Records of children's investigative work takes place in the format of written pieces, diagrams, tables, graphs and charts, maps, photographs. Children are asked to self-assess their knowledge of key vocabulary prior to each unit of work, and then after, where they are given the opportunity of commenting on their successes and suggesting where improvements could be made. Opportunities are provided for children to discuss and evaluate work with their peers.

At the end of each unit of work, the teacher makes a summative judgement about the skills and performance of each pupil if they have yet to attain, met or exceeded the unit objectives linked to the national curriculum. A conglomeration of this data, along with subject milestones are used to assess/ record pupil's attainment at the end of the year (recorded on subject attainment tracker). This information is tracked on an 'Aiming High' document and data is passed on to the following teacher. (Due to the rolling program, year 3 tracking sheets are passed onto year 4 and year 5 tracking sheets are passed onto year 6).

Staff use a subject milestones progression map to check their progress against key stage benchmarks. Key Stage teams complete a termly subject review, which supports improvement in planning and resourcing of subjects. The subject leader completes a periodic monitoring of planning, pupil work and attitudes and completes an annual subject action plan/review and end of year subject report to support the monitoring of standards in the subject.

Photographs are taken as a record of children's practical work and children are given an opportunity to reflect on their learning. The Science subject manager keeps assessed samples of children's work in a portfolio to support staff's understanding of the expected standards across the year groups.

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. Pupils in Y6 and Y2 are teacher assessed against the national expectations and their attainment submitted as part of the statutory pupil assessment timetable.

There are no requirements to level pupils' work. Assessments are made against performance descriptors (published 2015).

Sample SATs are used in year 6 to gather a National Picture for attainment in science.

Collating evidence through day-to-day and periodic formative assessment will support accurate judgements on attainment. Teaching staff:

- track pupil progress against the curriculum objectives.
- ensure pupils have opportunities to review objectives not yet met - misconceptions should be addressed early-on to enable progress to be made.
- provide opportunities for open-ended tasks (exploration and scientific enquiry) linked to topic work or pupil generated questions provide opportunities for pupils to apply their scientific enquiry skills.

10. Resources

Science resources are located in the Lower Key Stage 2 corridor in labelled cupboards:

SC1 Scientific Enquiry

SC2 Biology

SC3 Chemistry

SC4 Physics

Oversized equipment

Resources are purchased, maintained and organised by the science subject manager. Resources within school should be age appropriate and checked for faults during annual electrical testing and auditing. Teaching staff should consult the science subject manager or head teacher before purchasing or using additional equipment. A risk assessment may also be required to ensure health and safety standards are maintained.

11. Monitoring and review

Monitoring of the standards of the children's work and of the quality of teaching of Science is undertaken to ensure that pupils make the best possible progress. The annual Science action plan outlines yearly subject improvement tasks and reviews the previous year's actions. Subject leaders conduct termly/ yearly monitoring activities looking at standards, planning and pupil experience. Governors meet periodically with subject leads to review the intent, implementation and impact of their work.

Monitoring of the standards of the children's work and of the quality of teaching of Science is undertaken to ensure that pupils make the best possible progress. The annual Science action plan outlines yearly subject improvement tasks and reviews the previous year's actions. Subject leaders conduct termly/ yearly monitoring activities looking at standards, planning and pupil experience. Governors meet periodically with subject leads to review the intent, implementation and impact of their work.