



SCIENCE POLICY

Related Documents:
Science - Intent, Implementation and Impact
Design and Technology
Mathematics
Computing
PHSE

1. INTENT

Science is a way of making sense of the world. It provides explanations and reasons for everything that occurs in the world around us. The work of scientists over centuries has resulted in a body of knowledge and it is this scientific knowledge that needs to be passed onto the children. However, it is not just the acquisition of scientific knowledge that is important. The process of scientific investigation also needs to be taught and in fact it is through the process of investigation that children learn best. Therefore, science in the school is taught, on the whole, through experimental and investigative work. Wherever possible it should be meaningful and should relate to and extend their everyday experiences.

2. AIMS

Our aims in teaching science are to:

- stimulate the children's interest and curiosity in meaningful contexts
- acquire knowledge, skills and attitudes to develop a greater understanding of the world about them
- develop scientific strategies and skills through enquiry-based learning, exploration and investigation
- enable satisfactory outcomes to be reached
- develop basic scientific concepts
- enable the children to work co-operatively and to communicate scientific ideas to others
- develop safe use of appropriate equipment and materials

3. PRINCIPLES OF TEACHING AND LEARNING IN SCIENCE

The essential characteristics of good science activities should include:

- opportunities to ask and answer purposeful questions and discuss ideas
- focused exploration and investigation to acquire scientific knowledge, understanding and skills
- use of the outdoors to enhance scientific experiences
- first-hand experience
- use of thinking skills to challenge understanding
- use of simple secondary sources of information
- opportunities to make decisions and choices
- making cross-curricular links with learning in mathematics, design and technology and computing
- use of ICT to store, retrieve and present information
- correct use of scientific vocabulary

4. SCIENCE WITHIN THE NATIONAL CURRICULUM

Science is a core subject of the National Curriculum. The knowledge, skills and understanding covered in science in school are those laid down in the Programmes of Study. 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.

These are taught through 'Working Scientifically' and 'Enquiry' and clearly related to specific units of work from the Programme of Study.

Children in Y1, Y2, Y3 and Y4 follow the National Curriculum 2014. Children in the Early Years follow the Early Years Foundation Stage Curriculum and the related Early Learning Goals.

Science is also taught as a block annually during Science, Technology, Engineering and Maths Fortnight (STEM) throughout the school. Each year group are set challenges that are planned to ensure progression.

5. CROSS CURRICULAR LINKS

The teaching of literacy, numeracy and ICT is promoted strongly in science as part of this school's drive to raise standards in English and Mathematics. Science is used to extend and enable the pupils to practise the skills of language and literacy and numeracy.

- Computing: All pupils will regularly use ICT as a planned part of science teaching these include simulation and website work. It will be used to support the development of knowledge, skills and understanding, in particular those connected with the recording and processing of information.
- Technology: Much of the scientific skills and knowledge learnt by the children will be applied to problem solving situations through the designing and making of products.
- Geography: Use of scientific methods, e.g. fair testing, observing, recording, asking questions...in geographical fieldwork. Use of scientific knowledge of materials and physical changes in the study of environments and weather.
- Mathematics: The collection, recording and interpretation of data and information is essential to Science, e.g. measurement of length, temperature, weight and capacity, use of bar charts, Venn diagrams, tables etc. At both key stages the children are expected to use their knowledge and understanding of measurement and data handling at appropriate levels. In Science, they should be applying their numeracy skills at levels similar to those which they are using in their Mathematics' lessons.
- English: In EYFS and KS1, children are encouraged to use their speaking and listening skills to describe what they see and explain what they are going to do next. At KS2 the pupils are encouraged to develop their skills of writing to record their planning, what they observe and what they found out. In relation to Science, they should be applying their literacy skills at levels similar to those which they are using in their English work.
- Physical Education: Knowledge of physical changes and mechanisms in the body. Links to health education.
- Music: Use knowledge of properties of materials and of sound in understanding how musical instruments work.

6. STRATEGIES FOR THE TEACHING OF SCIENCE

There is no specialist teaching in science, it is taught by class teachers. The predominant mode of working in science is co-operative group work, although individual and class teaching are used when appropriate, e.g. introduction, demonstration.

Groups are organised in mixed or matched ability groups dependent upon the activity and the proposed learning outcomes. Relevant discussion is encouraged with appropriate vocabulary used at all times. Science is taught either through discrete units of work or cross-curricular themes. Wherever appropriate science should be taught through experimental and investigative work or 'Working Scientifically', i.e. first-hand experience.

There are five enquiry types to be considered. These skills should be taught systematically:

- observing over time
- pattern seeking
- identifying, classifying and grouping
- comparative and fair testing (controlled investigations)
- researching using secondary sources

The teaching of science should engender a variety of teaching styles, all of which include elements of:

- development of scientific skills and routines
- development of positive attitudes and open mindedness
- discussion between pupil/peer and pupil/teacher
- appropriate practical work
- investigative work

These elements can be incorporated in the teaching of science through;

- whole class discussion/ teacher demonstration
- small group discussion/ investigation
- individual investigation

The planning and delivery of lessons should include elements of teaching styles to address all types of learners, e.g. the linguistic, the visual, the kinaesthetic, the auditory

6.1 Display

Science displays are evident within classrooms throughout the year. Displays should stimulate curiosity and the appreciation of science. It should relate/reinforce/reflect activities in the classroom. Captions should identify the learning outcomes and also be creative to capture children's interest. Statements relating to the Programme of Study should also be displayed. Displays should have impact, e.g. 3D as well as 2D. Children's work could include their verbal responses to questions/predictions. Ensure work displayed is broad and balanced – all children's work should be represented in some form. Displays should contain the key vocabulary for the unit of work being studied.

6.2 Outdoor Learning

Outdoor learning is encouraged to be part of science teaching whenever possible. It provides children with the opportunity to observe, experience and explore the world around them. Each class has access to the garden slot as well as use of the school grounds and local area.

6.3 Scientific Vocabulary

In the early years, language is particularly important as there is less emphasis on written recording and more on practical experience, investigating and discussion.

Pupils should be taught to:

- KS1: use simple scientific language to communicate ideas and to name and describe living things, materials, phenomena and processes.
- KS2: use appropriate scientific language and terms, to communicate ideas and explain the behaviour of living things materials, phenomena and processes.

6.4 Homework

Science homework may be set when appropriate.

7. INCLUSION, SEND AND EQUAL OPPORTUNITIES

7.1 SEND

As in all aspects of the curriculum, teachers must be aware of SEND with Science. All children have an entitlement to a full part in the Science curriculum. Access needs to be designed by the teacher according to the child's special needs. Many children may need support with literacy and recording of task. Assumptions should not be made about children's conceptual understanding of science on the basis of their levels of literacy.

The teacher is responsible for presenting tasks using resources that support accessibility. Physical access to resources such as fieldwork may need special consideration for some children (see Health & Safety for guidelines on children with physical/behavioural needs).

7.2 EQUAL OPPORTUNITIES

Equality of access is not necessarily achieved by exposing all children to the same task in the same context:

- Gender: Neutral presentation of tasks and resources – use toys and contexts familiar to all children. Reference to real life contexts that actively supports girls. Consider research that shows girls tend more to the natural sciences than physical sciences and use all girl groupings for physical science if it is appropriate.
- Differentiation: All children have an entitlement to access the National Curriculum at their own ability level. It is not the role of the able child to support the less able child.
- Role Model: All staff need to present a positive image of science and their own attitude to it. Over confidence or lack of confidence on the part of teachers will influence children's expectations of their own success.
- Social Circumstances: Teachers have to be careful not to assume previous knowledge and experience (e.g. visits to zoos or flights in aeroplanes), but yet to build on the wide range of experiences and general knowledge that many children have.
- Cultural Expectations: Many cultures, including our own, may have low expectations of girls' need or ability to take advantage of the science curriculum. Sensitivity as to the presentation of the curriculum is necessary.

8. PROGRESSION AND CONTINUITY

When planning for the science curriculum, we intend for pupils to have the opportunity, wherever possible, to learn through varied systematic investigations, leading to them being equipped for life to ask and answer scientific questions about the world around them. As pupils 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. Pupils should work scientifically by investigating, explaining and analysing phenomena, making predictions, questioning the world around them and solving problems.

Our scheme of work (mixed age, based on a two-year cycle) ensures that children have a varied, progressive and well-mapped-out science curriculum that provides the opportunity for progression across the full breadth of the science national curriculum for KS1 and KS2. Science is vital to our future prosperity and it is important that our children are engaged with all aspects of science. All pupils will be provided with the foundations to understand the specific disciplines of biology, chemistry and physics and to develop an understanding of the world around them at an age-appropriate level.

When designing our curriculum, we have sought to focus on 3 main areas:

- **Knowledge:** What do we want our children to learn and remember? How should we sequence the learning in order to ensure progression? Develop scientific knowledge and conceptual understanding through the specific disciplines of Biology, Chemistry and Physics.
- **Concepts:** Develop understanding of the nature, processes and methods of Science through different types of science enquiries. We have planned units to embed and cover each area of the national curriculum.
- **Skills:** How will we teach our children to become effective participants of the world? What skills do they need to learn to understand the content? Develop the essential scientific enquiry skills to deepen their knowledge and engage in life-long science.

By following the Scheme of Work progression and continuity should be assured, as this has been built into the scheme:

- Long term planning is the Scheme of Work.
- Medium term planning takes the form of the units of work and is undertaken by year groups – usually half termly.
- Short term planning (weekly and daily) is undertaken by year groups and individual teachers.

9. ASSESSMENT

Assessment is three-fold; summative, formative and self-assessment. Self-assessment is part of every lesson with the use of marking stickers. Assessment takes place at the end of each unit for Years 1 to 4 using a variety of questions from a range of sources. Teachers also update the Science Assessment Trackers as a formative tool. Teachers then use this information to make an overall judgement at the end of the year using the terminology 'working towards', 'expected standard' or 'greater depth'. Attainment and progress are reported to parents in the end of year report and the trackers are passed on to the next teacher. Science written work is marked in line with the marking policy, the focus being on the correct use and spelling of key words. Diagrams, graphs and tables should be labelled correctly and neatly and marked accordingly.

10. RESOURCES

Resources needed for 'Units of Work' are collated and stored within the appropriate classroom. Staff are made aware of any new resources in school. Science resource audits are regularly completed by staff to ensure resources are in good order and any 'out of stock' or damaged items can be replaced.

11. HEALTH AND SAFETY

Safe practice as indicated in The Association of Science Education publication, "Be Safe!" must be promoted at all times. Activities are carefully planned whilst considering health and safety issues. If there is found to be a possible risk then the activity will either be adapted or will not take place. Some specific health and safety issues are mentioned in the scheme of work for Science, however, these do not cover every situation that can arise. Ultimately, it is the responsibility of the class teacher to ensure that all Science activities take place safely.

12. SMSC

12.1 Spiritual Development

Science provides opportunities for children to develop an understanding of the natural, material, physical world they live in, reflecting on their part in it and exploring questions and feelings.

12.2 Moral Development

Through science, children will have the opportunity to recognise needs, responsibilities and see the need to draw conclusions using observation.

12.3 Social Development

The children will be given the opportunity to see how experimental evidence can influence decisions and help form opinions and that different interpretation of evidence can be used in discussing social issues.

12.4 Cultural Development

Children will be helped to recognise how scientific discoveries and ideas have affected the way people think, feel, create, behave and live, and how cultural differences can influence the extent to which scientific ideas are accepted, used and valued.

12.5 PSHE and Citizenship

Children, through science, will be helped to recognise:

- the need to keep healthy
- to know what is harmful if not used properly
- to improve, care and know what harms the environment
- rules for keeping safe and about others who can help them to stay safe
- the need to understand human changes both physical and emotional

12.6 Health & Safety

When working with tools, equipment and materials in practical activities and in different environments, including those that are unfamiliar, pupils will be taught:

- about hazards, risks and risk control
- to recognise hazards, assess consequent risks and take steps to control the risks to themselves and others
- to use information to assess the immediate and cumulative risks
- to manage their environment to ensure the health and safety of themselves and others
- to explain the steps they take to control risks

13 MONITORING AND REVIEW

Monitoring of the standards of children's work and of the quality of teaching and learning in Science is the responsibility of the Science Subject Lead and Head teacher. The Science Subject Lead is also responsible for supporting colleagues in their teaching of Science, for keeping informed and up to date with current developments in the subject, and for providing a strategic lead and direction for Science in the school. The Science Subject Lead provides the Head teacher with feedback to evaluate the strengths and weaknesses in the subject and indicate areas for further improvement. The Science Subject Lead is responsible for monitoring the teaching and learning and providing feedback to staff, ordering resources to support the various curriculum areas, liaising with our federated school and the community, providing INSET for staff and day to day support for the teaching of Science, reviewing samples of the children's work, updating policies and action plans, developing own knowledge and expertise and leading new initiatives across school.

This policy will be reviewed at least every two years.