

Ashleigh Primary School and Nursery, Wymondham

"We are all stars, Ashleigh makes us shine"

SCIENCE POLICY

Persons Responsible: Science Coordinator

Date of Policy: September 2015 Next Review Due: September 2018

Adopted by Full Governing Body

Signed

Date

Chair of Governors

Review completed

Review completed

Review completed

Science Policy

Purpose:

This policy provides a background which will support the delivery of science based learning across the school, and which may be achieved in either a cross curricular or discreet approach to teaching. It has been produced following both discussions by teachers and observations of children's learning.

EXPERIENCE - DISCOVER - INSPIRE - MOTIVATE - PLAY - LEARN - ENQUIRE

Key Stage 1 - Years 1-2

The principle 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 science 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. Pupils should read and spell scientific vocabulary at a level consistent with their increasing work reading and spelling knowledge at Key Stage 1.

Lower Key Stage 2 - Years 3-4

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.

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

Upper Key Stage 2 - Years 5-6

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.

Pupils should read, spell and pronounce scientific vocabulary correctly.

Science is not only a body of discreet knowledge but also a significant method of enquiry. It is our way of both understanding and explaining natural and physical phenomena within our environment. Children should be provided with a broad range of opportunities to *explore*, *discover* and *investigate* the world around them. Children will learn to become independent scientific thinkers through practical exploration and investigation and further develop both their scientific knowledge and skills.

In the delivery of a broad and exciting science curriculum our aim is to develop enquiring minds and a scientific approach to investigation, enabling children to gather those important experiences needed to both question and understand the world around them.

Aims and Purposes of Teaching Science

National curriculum aims

To develop **scientific knowledge and conceptual understanding** through the specific disciplines of biology, chemistry and physics.

To 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.

Children are equipped with the scientific knowledge required to understand the **uses and implications** of science, today and for the future.

Additionally children should be given the opportunity to:

Develop an interest in, and adopt a positive attitude towards, science encouraging a sense of curiosity and excitement.

Develop both their thinking skills and ways of finding out information, and extend their ability to interpret and communicate their findings to others.

Acquire knowledge and understanding of scientific ideas and processes, learn skills and progressively apply them in other contexts.

Have access to a broad and stimulating education through a well-planned approach to science teaching.

Be educated for life, e.g. continuing health education.

Have extensive use of the 'outdoor environment', encouraging an ethos of safe and careful practical work.

Take part in whole school science events such as interactive science days or visitor activities/presentations.

Knowledge and understanding

Children should:

Develop an enquiring mind and a scientific approach to problem solving.

Develop the ability to observe, explore, order and record their observations using all their senses, fuelling their curiosity.

Develop a continuing respect for the environment.

Learn to use previous experiences and existing knowledge to develop their understanding of further scientific ideas.

Attempt to make sense of events, seek explanations thinking logically about ideas and concepts.

Processes and Skills

Children should:

Be encouraged to ask questions, make predictions/hypotheses, carry out investigations, and explain their results using a scientific vocabulary.

Key skills:

- Observe the world around them.
- Attain and refine their practical skills.
- Discuss and plan investigations to answer their initial question, and test their hypothesis drawing upon previous knowledge and experience.
- Perform the investigation and collect data in groups, pairs or individually.
- Interpret the data and analyse the results.
- Draw inferences and conclusions.
- Evaluate the investigation in relation to the initial question(s).
- Raise further questions arising from their investigation.
- Begin to carry out and recognise when a test or comparison is unfair.
- To use all equipment safely and correctly.

Of course this is a sophisticated process and children will need to gain experience of each part before they are able to tackle 'whole' investigations. However no matter what age, children can engage in this process and should be given appropriate opportunities to do so.

Individual skills:

- Observing
- Classifying
- Sorting
- Measuring
- Recognizing patterns
- Predicting
- Fair testing
- Interpreting
- Communicating -

(Sharing and evaluating ideas, knowledge and experiences as part of a whole class group, small group or partner work).

(As children talk about and evaluate their own and others work and also both verbal and pictorial communication e.g. pictures, graphs, writing, diagrams etc. and also the use of ICT in recording and researching).

Values and attitudes

Curiosity

Open mindedness

Perseverance and tolerance

Co-operation, working positively with others, sharing ideas and listening to others views and opinions

Responsibility

Critical awareness

Children should:

Develop care and respect for the environment, including living things, themselves and others and understand the consequences of their actions upon it.

Consider the safety of both themselves and others at all times.

Teaching, content, organization and planning

The overall aim is to develop a positive attitude towards science promoting curiosity and enjoyment, where science should be taught in a creative and practical way.

Science is a core curriculum subject where either a discreet or cross curricular approach to teaching and learning may be adopted. This approach has the advantages of combining complementary knowledge and skills. Foundation stage science is delivered via the area of learning entitled 'Understanding the World'. It emphasises a hands on approach to finding out about and exploring the world around us and includes ICT links. 'Development Statements and Early Learning Goals' as stated in the Early Years Foundation Stage document are specific and should be achieved using a flexible teaching approach, appropriate to the age range.

These should be delivered and achieved through the delivery of a broad curriculum and range of learning opportunities.

At Key Stages 1 and 2, planning meets with National Curriculum requirements, and teachers work together to plan the key stage science curriculum.

It is the responsibility of individual teachers to select the approach which is most effective in achieving the learning objective in any particular lesson. A balance should be sought between guided practical work and investigational work, between whole class and group work and the use of first and second hand sources of evidence.

Whatever the stage opportunities should be wide and cover as many aspects as possible. An equitable balance should be achieved between the acquisition of knowledge and understanding and the development of investigatory/enquiry skills. Promoting scientific investigation and enquiry is at the core of our philosophy and therefore should be developed at every opportunity.

Curriculum maps for Science can be found on the school website.

Monitoring and Assessment:

Assessment is important in that it provides information about children's achievements which can then be used to inform the planning of future work. Assessment of science can take different forms and can either be informal or formal through e.g.

- Discussion
- Observation
- Completed work
- Specific assessment tasks
- Formal testing

Teachers will assess children's science learning throughout the year by observing, questioning, listening and formally setting assessment tasks where appropriate.

Assessment will be a part of every lesson. Learning objectives and success criteria are discussed at the beginning of each lesson or activity, further discussions between the child and teacher or marked work provide further evidence of the children's understanding and this then informs future learning and planning.

The Science co-ordinator undertakes monitoring activities that include the collection and evaluation of planning, classroom observations, overseeing the continuance of the whole school progressive tracking sheets. When appropriate the co-ordinator may work across year groups. Class teachers also complete written observations where appropriate during group work. Additionally, samples of observational and investigative work representative of progress and differing levels of achievement are held by the science co-ordinator. Foundation stage assessments also include photographic evidence and the collation of evidence versus development statements and learning goals through observation and questioning during practical investigations.

Continuity:

The long term plan/curriculum map will ensure that continuity is achieved between years and between key stages. Meetings of staff within the school will ensure that opportunities are provided to discuss this important aspect of the children's education in science.

ICT:

It is important that ICT is used appropriately in science. Suitable use of ICT includes:

- Use technology purposefully to create, organize, store, manipulate and retrieve digital content
- Data logging equipment e.g. temperature, sound
- Graphing programmes
- Internet research
- Word processing tools
- Specific science related software e.g. C.D Roms
- Use search technology safely and respectfully

Resources:

The responsibility of maintaining an adequate supply of resources rests with the Science co-ordinator. These will be stored in the Indigo class cloak room. All equipment is labelled appropriately. Additionally there is a wide variety of books in the PPA room for staff to access to support planning and in the Library for staff and children to use. All staff have a copy of the resources list, any items borrowed should be returned to the appropriate place and any damages or breakages should be reported to the co-ordinator.

Each year group is to maintain a running resource list which is when requested, passed to the co-ordinator who will manage the ordering of new equipment. The effective management of these resources, whilst ultimately the responsibility of the co-ordinator, is also the responsibility of each teacher who uses them.

The school provides environmental areas suitable for specific scientific study:

- The pond
- The school garden
- Wildlife area
- School field

Safety:

Science poses a number of potential dangers as a result of its practical nature. Teachers will in the planning of their activities ensure that issues of safety are treated with the highest priority. Any risks should be considered and managed appropriately. Teaching staff should explain any risk to the children and other members of staff, discussing safety measures and any possible implications. Children should be encouraged to foster a consideration of safety for themselves, others and the environment.

Equal opportunities:

Equality of opportunity is a fundamental right that must be afforded to all children regardless of race, culture, gender or special educational needs. All children irrespective of

gender, cultural background or educational needs are to be encouraged to take an active and cooperative role in all science activities.

Special Educational Needs:

Planning should be clearly differentiated to ensure that each child can achieve the learning objective and experience this success at a level which is appropriate to them.

More able:

The more able children should be challenged and motivated by appropriately differentiated activities to both extend and further their learning.

Support staff:

Teaching assistants and support staff enrich the learning experience of individuals and groups of children whom they work with and, wherever possible, will be included in the planning of science activities with the children. Support staff should be made aware of the learning objectives to ensure that they best support each child to achieve the learning objective at the appropriate level.

The environment and the local and global community:

A long established and continuing ethos of the school is to promote a concern for our environment where we apply the principles of conservation and preservation, waste reduction and recycling and a concern for the preservation of the world around us. This should be included as part of the science curriculum developing the children's knowledge, understanding and concern and care for our environment.