

**HADNALL C OF E
(CONTROLLED)
PRIMARY SCHOOL**

**POLICY FOR
SCIENCE**

The Importance of Science

Science stimulates children's curiosity about phenomena and events in the world around them.

Through Science, pupils can learn to discuss and question science-based issues that affect their own lives and those of the society in which they live.

They may learn how major scientific ideas influence Industry and medicine and may improve the quality of life.

Scientific method is about developing and evaluating explanations through experimental evidence and modelling.

Aims and Objectives

- To give pupils the opportunities to develop scientific skills and strategies. (observation, hypothesis, design, investigation ,the ability to draw conclusions and communicate effectively).
- To develop attitudes appropriate to working scientifically. (Curiosity, co-operation, and sensitivity to living organisms).
- To develop basic knowledge and understanding of scientific concepts.
- To reach satisfactory outcomes.
- To apply scientific ideas to real-life outcomes.
- To work co-operatively and communicate ideas to others.
- To help develop an understanding of the relationship of scientific ideas to spiritual, ethical and moral dilemma.
- To stimulate the pupils` curiosity.
- To relate investigations to the interests and everyday experiences of the pupils.
- To appeal to both the boys and the girls and those of all cultural backgrounds.
- To help pupils understand the world around them through their own mental and physical interaction with it.
- To involve the use of simple and safe equipment and materials.
- To involve resources and strategies available to teachers.
- To contribute a broad and balanced science curriculum.

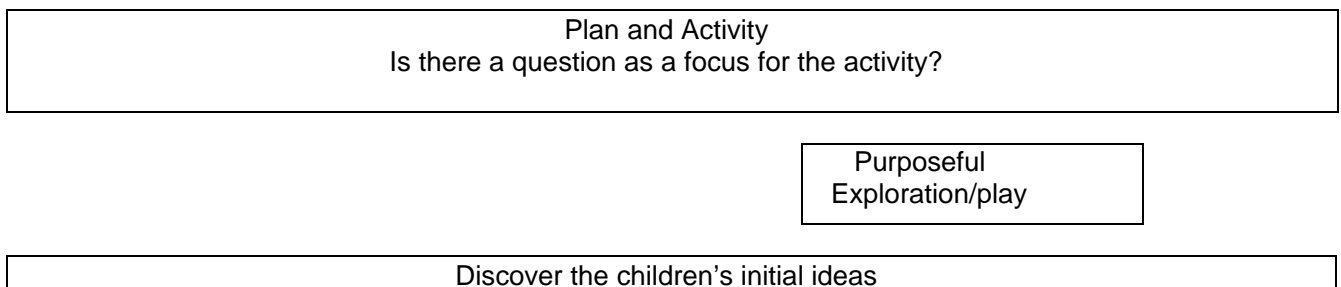
Ways of working

A range of stimulus, which could be used to begin a unit of science, include:-

- An exhibition.
E.g. Visit to an exhibition at a local museum.
- A visit to a site.
E.g. Wenlock Edge or Carding Mill Valley.
- A question from the teacher.
E.g. "Why did the plant die?"
- A child's question.
E.g. "Is my car the fastest?"
- A Story.
E.g. ("Mrs Lather's Laundry") which soap powder lathers best?
- A Letter.
E.g. From a traveller, which clothes should I take for my Round the World Tour?
- Another area of the curriculum.
E.g. which box makes the best musical instrument?
- A Visitor.
E.g. which material would keep the postman driest on a rainy day?
- Establishing what the children already know and what they want to find out.
E.g Brain-storming and concept mapping.

A WAY OF WORKING

This way of Working, developed by the Shropshire Primary Science Advisory Team, is based on a view of learning that starts with the premise that the experiences and ideas children bring to any new learning experience are of crucial importance. We must find out what those ideas are and encourage children to test them and then reflect on the new evidence to see whether it fits or conflicts with their previous ideas. The skills incorporated in the Way of Working are those required by SC1 i.e. planning hypothesising and predicting, designing and testing, interpreting and inferring, communicating.



Help children convert their ideas into action, questions to investigate

Ask the children to Predict- Hypothesise
(I think – because....)

Ask the children to plan a way to test their ideas/questions
(check for safety)
Try it. See if it works

Fair Test

What is fair?

Record Results

What did they find out?

How do their results compare with their predictions?
Have their ideas changed?
What do they think now?

Are there more ideas to test?

Continuous Element: Science Investigative Work

Whole investigation

Investigation is central to pupils' experiences in science and teacher planning should reflect this as a priority. Understanding of the investigational process can only be achieved through children taking decisions as they carry out their own investigations.

Illustrative Activities

Development of Process Skills

Illustrative activities develop Pupils' understanding of key Scientific ideas.

Illustrative models of whole Investigation can be used to Develop pupils' understanding of this process.

Summative assessment of Pupils' understanding of key scientific ideas is informed mainly by evidence from illustrative Activities.

Process skills underpin pupils' success in whole investigation.

They should be taught within the context of an investigation. For example, learning how to

Use a thermometer as Part of an investigation to Find out which type of glove keeps hands warmest.

Summative assessment of pupils in science investigative work is informed mainly by evidence from whole.

Extending Initial Ideas

Pupils may be involved at this stage in investigative exploration and play e.g. discovering which materials are magnetic and prompting further questions of their own.

Children may need skill development of prior experience with some of the equipment. e.g. thermometers.

During this time the teacher will be making assessments regarding the pupils' level of scientific knowledge and thought.

Through discussion, pupils are encouraged to communicate and formulate their initial ideas.

Eliciting pupil's ideas:

How do you think we could make this work?

Why do you think that would work?

What do you think would happen if....?

Can you explain why you think that?

Can you tell me more about that?

Have you seen anything like this before?

Where?

Some pupils will need prompting and plenty of modelling before they will ask questions themselves and sometimes these questions will need remodelling into an appropriate investigative form.

Pupils will need experience of forming questions many times before they will begin to do this naturally. The complexity of the questions will vary according to the scientific maturity of the pupils.

Pupils are encouraged to make predictions based on their own experiences. A prediction is a thoughtful guess and should be accompanied by a reason, however, they might melt" i.e. The child has experience of heat melting some materials.

Hypothesizing is a generalization based on observation and previous experience. It is more sophisticated and will come later. E.g. "Plants need water to grow because they die if you don't water them".

Teaching and Learning Styles

- A variety of teaching and learning styles are used in science lessons, our principle aim being to develop children's knowledge, skills and understanding.
- This may be done through a variety of ways including whole class teaching and enquiry-based research activities.
- Pupils are encouraged to ask as well as answer scientific questions.
- Pupils have the opportunity to use a variety of data e.g. statistics, graphs pictures and photographs. They use ICT where it enhances their learning.

- They take parting speaking and listening activities, leading discussions and presenting reports to the rest of the class.
- Wherever possible 'real' scientific contexts are used. E.g researching a local environmental problem or carrying out a practical experiment and analysing the results.
- Teachers recognise that there are children of widely different scientific abilities in all classes and ensure that suitable learning opportunities are provided for all children by matching the challenge of the task to the ability of the pupil.

This can be achieved in a variety of ways:

- Setting common 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 pupils by ability in a room and setting different tasks for each ability group.
- Providing resources of different complexity, matched to the ability of the pupil.
- Using Teaching Assistants to support the work of individual pupils or groups of pupils.

Scientific Enquiry

- Scientific enquiry is taught through contexts taken from the programmes of study on Life Processes and Living Things, Materials and their Properties and Physical Properties.
- Pupils plan ways to investigate their ideas and questions by using planning boards. (See Appendix 1)
- They carry out their investigations, keeping a record of their results as they proceed in a variety of ways, including ICT. E.g. by writing, by drawings, tables, graphs, data-logging and diagrams. They learn to make and check measurements by repeating them where appropriate and looking for patterns.
- Pupils learn to consider what sources of information they will use to help their investigation and what equipment and materials they will need.
- They learn to make a fair test or comparison by changing one factor and observing or measuring the effect while keeping the other factors the same.
- Pupils learn to use simple equipment and to identify and control risks.
- They learn to make comparisons and identify simple patterns in observations and data and to draw conclusions; to predictions, to review their work and describe its significance and limitations.

Classroom Organisation

Science teaching and learning is delivered in the classrooms by a mixture of:

- Whole class teaching
- Collaborative group work
- Individual work
- Teacher-led/ child-led activities
- Independent work
- TA supported

Differentiation

- Differing abilities of pupils are taken into account by the class teacher e.g. SEN pupils / gifted and talented pupils.
- Pupil grouping, teacher questioning and level of adult intervention will be at appropriate levels.
- Pupil recording sheets may be designed specially to extend or give added guidance and support.
- Levels of autonomy or independence may be altered to allow for extension.

Planning

- The National Curriculum, Programmes of Study and Study and Stepping Stones from the Foundation Stage have been used to form the units of science to be taught.
- The units have been put together to make a rolling programme for KS1, Lower KS2 and Upper KS2
- Teachers plan 2 units of work per term and 6 units of work are covered each year. (Although in year 6 many units are revisited in preparation for transition to year 7).
- These units together form the Scheme of Work and were devised in conjunction with the LEA Raise Advisor for Science to ensure coverage, breadth and depth of scientific concepts, skills and knowledge.
- Teachers also plan together to ensure continuity for year groups and Key stages.
- Planning is given to the coordinator each term.

- Planning being easily accessible is helpful in the case of absence due to illness or access for monitoring by the Head and coordinator.
 - Teachers plan to an agreed format devised with the Raise Advisor.
 - Children are taught in two science sessions per week.
 - Children are taught in year groups
 - Foundation Phase
 - Year 1 + 2
 - Years 3 + 4
 - Years 5 + 6
- Each class has T.A. time allocated during science sessions to assist.

Personal, Social and Health Education (PHSE) and Citizenship

Science makes a significant contribution to the teaching of personal social and health education. This is mainly in two areas. Firstly, the subject matter lends itself to raising matters of citizenship and social welfare. Secondly, children benefit from the nature of the subject in that it gives them opportunities to take part in debates and discussions. The pupils organize campaigns on matters of concern to them; Science promotes the concept of positive citizenship.

Spiritual, Moral, Social and Cultural 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 was created. 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 discuss, for example, the effects of smoking and the moral questions involved in this issue. We give them the chance to reflect on the way people care for the planet and how science can contribute to the way we manage the earth's resources. Science teaches children about the reasons why 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.

Inclusion and Equal Opportunities

It is our school's policy to provide whatever support is needed to offer an appropriate science curriculum for pupils who have differing needs/abilities. E.g. SEN pupils, more able pupils, gender-specific groups, ethnicity groups.

Links to Other Subject Areas

The school acknowledges the importance of linking science with other subject areas, especially, Maths, ICT and English. The medium and short term planning cross references with these other subjects and works towards raising the standards in all these subject areas by using and applying skills learned in a wide range of applications.

English

Science contributes significantly to the teaching of English in our school by actively promoting the skills of reading, writing, speaking and listening.

Mathematics

Science contributes to the teaching of mathematics in a number of ways. The children use weights and measures and learn to use and apply numbers. Through working on investigations they learn to estimate and predict. They develop the skills of accurate observation and recording of events. They use numbers in many of their answers and conclusions.

Information and Communication Technology (ICT)

Children use ICT in science lessons where appropriate. They use it to support their work in science by learning how to find, select, and analyse information on the Internet and CD-ROMs. Children use ICT to record, present and interpret data and to review, modify and evaluate their work and improve its presentation. They also use e-mail to communicate their mathematical findings with other children in other schools and countries.

Monitoring

- This takes place as part of a planned whole school approach.
- The Science coordinator monitors the planning against the programmes of Study in the National Curriculum, time allowance etc.
- Each term teachers give copies of their planning to the coordinator (or planning made available on the learning platform)
- Each term there is a different focus of monitoring – Book Trawl, Pupil interviews or teaching.
- Appropriate feedback is given both to the head and staff.
- LEA / Raise Advisor for science also contributes to the monitoring.

Assessment

Takes place in a variety of contexts:

- Pupils are assessed informally E.g. APPIS Materials or Concept Mapping.
- Pupils are assessed at the end of each Unit of science, a copy of which is given to the coordinator.
- These assessments affect teacher' short and medium term planning and also provide information for the Annual Reports to Parents.
- Teacher Assessments are made at the end of Key Stages.
- The Sat results are published to parents with end of year reports.
- SAT tests take place at the end of KS2.
- The SAT results are published annually in the School Brochure.
- Currently APP materials are being trailed for level 2/3 pupils in anticipation of their use.

Foundation Stage

- There is a clear progression between the exploratory / sensory Experiences of the foundation stage and the statutory investigative experiences of Year One pupils.
- In Class 1 pupils cover the same blocked unit of science at the same time, providing opportunities for both teacher- led and child-led activities.
- The sustained involvement of the children is helped by the quality and quantity of the play resources available.
- The children are encouraged to make independent and responsible choices.
- The previous experiences of the children are built on and they are challenged and stimulated by activities such as role-play, finding-out areas and interactive displays.
- Opportunities are provided which encourage and allow for wonder, awe, absorption and reflection.....

Time Allocation

- KS1 - 2 hours per week
- KS2 - 2 – 2.5 hours per week

Equipment

- Teacher's resources stored in G.P room.
- Science equipment is stored on the Science Shelves in G.P room.

Health and Safety

Teachers' planning refers to any health and safety considerations that become apparent in the risk assessment.

The Role of the Co-ordinator

(See also Policy for being a Coordinator)

In addition to the responsibilities outlined in the Co-ordinators generic job description, the science Subject Leader will:

- Take the lead in policy development and the production, review and revision of schemes of work to ensure progression and continuity.
- Support colleagues, answering queries, giving assistance with any additional planning as required.
- Monitor progress in science and advise the Head teacher on action needed.
- Take responsibility for the purchase and organisation of central resources for science.
- Keep up to date with developments in science education and disseminate information to colleagues as appropriate.

Evaluation and review

The work in science will be reviewed in depth at school/staff development meetings and at a meeting of the Curriculum committee of the Governing body.

This policy and the schemes of work will be reviewed at that time and revised as necessary.

APPENDIX 1

Example of Planning Board

The question I am investigating;

What will I change?

What will be measured?

The independent factor

The dependant factor

How we will measure:

Tip: Dependant factor **always** up vertical axis on a line graph

What will stay the same?

What will stay the same?

Control factors

Control factors

What will stay the same?

What will stay the same?

Control factors

Control factors

My prediction / hypothesis;

My plan for the table of results;