



Waterhouses CE (VC)
Primary School

Science Policy

Committee	Curriculum
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Celebrate Learning, Achievement and Friendship

Philosophy

At Waterhouses Primary School, we believe in the importance of science as stated in 'The National Curriculum for Science Programmes of Study': *"A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of 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. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes."*

As a Christian School we aim to enable all children to recognise, appreciate and develop specific concepts about their world, and of the implications of human actions. The beauty of God's world is explored through science in an attempt to deepen our understanding of the complexities and achievements within His magnificent creation.

Science stimulates a natural curiosity in young children about their world. We believe that it is important to enable children to actively learn by teaching them the skills they need to find answers to questions, so as to increase their scientific knowledge. As they progress through the school we seek to develop their ability to carry out their own, independent, enquiries and to become confident in expressing and explaining their own views. We aim to ensure that children are adequately equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Aims and Objectives

It is agreed that the main purposes of teaching science at Waterhouses Primary school are:

- 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.
- To equip children with the scientific knowledge required to understand the **uses and implications** of science, today and for the future.

Science teaches an understanding of natural phenomenon. It aims to stimulate a child's curiosity in finding out why things happen in the way that they do. It teaches methods of enquiry and investigation to stimulate creative thought. Children learn to ask scientific questions and begin to appreciate the way science will affect their future on a personal, national and global level.

Science at Waterhouses is taught in ways that are imaginative, purposeful and enjoyable for all pupils. Where possible, links within our Creative Curriculum are sought, ensuring pupils' learning is contextualised and purposeful. It is through such learning that teachers are also able to make links between science and other subjects - building on, in particular, core subject skills in literacy, maths and ICT. Teachers use skilful questioning and clear and accurate explanations to get the best learning from our pupils.

The Science National Curriculum

Science in the National Curriculum is divided into two main areas of learning:

- Working Scientifically (the nature, processes and methods of science)
- Scientific knowledge and conceptual understanding.

Working Scientifically (The nature, processes and methods of science)

'Working scientifically' is taught and assessed within the context of the science lesson (determined by the scientific programmes of study within the National Curriculum). 'Working scientifically' focusses on equipping children with a variety of techniques and approaches they can take in order to answer relevant scientific questions.

They should be involved in planning and carrying out a range of scientific enquiry including: 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.

As part of their scientific enquiry, children will be expected to apply their mathematical knowledge, including collecting, presenting and analysing data. They shall also be expected to demonstrate high standard literacy skills during written elements of science such as creative approaches to reporting results from scientific enquiries (letters, posters, poems etc.) and full investigation write ups (upper Key Stage 2).

Scientific knowledge and conceptual understanding

The programmes of study detailed in the National Curriculum will enable pupils to build up a secure body of knowledge. Through repetition of key areas of science throughout their primary years, pupils are able to make genuine progress in developing their understanding of key knowledge and scientific concepts.

There are three main content areas: Biology, Chemistry and Physics. These content areas are further divided into themes, with some key similarities differences in what is taught in each Key Stage. The National Curriculum outlines expectations to be achieved by the end of each Key Stage.

Key Stage 1

The principal 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. 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.

Children will learn about:

- Plants
- Animals including humans
- Everyday Materials
- Seasonal Changes
- Living things and their habitats

Key Stage 2

Throughout Key Stage 2, pupils are taught to broaden their scientific view of the world around them. They 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.

In lower Key Stage 2 (Year 3 and 4) children will learn about:

- Plants
- Animals including humans

- Rocks
- Light
- Forces and Magnets
- Living things and their habitats
- States of matter
- Sound
- Electricity

In upper Key Stage (Year 5 and 6) children will learn about:

- Living things and their habitats
- Animals including humans
- Properties and changes of materials
- Earth and Space
- Forces
- Evolution and inheritance
- Light
- Electricity

Foundation Stage

In the Foundation Stage, pupils are provided with opportunities to explore 'Knowledge and Understanding of the World' through teacher-directed and child-initiated activities. Through a seamless curriculum, children are encouraged to observe, explore and formulate ideas, interest and curiosity in the world around them, whilst working to achieve the outcomes of the Early Learning Goals. For more information, see Early Years Policy and Scheme of Work for Early Years.

Scientific Language

The national curriculum for science reflects the importance of spoken language and the need to use technical terminology accurately and precisely. Throughout the key areas of learning in both key stages, children should be specifically taught using an extended specialist vocabulary that they too can use with increasing confidence.

Curriculum Provision

Science is a core subject of the National Curriculum and pupils undertake some science activity every week at both key stages. The school's curriculum for science is implemented by individual class teachers under the guidance of the science leader, using the resources available.

In both Key Stages, pupils will have frequent opportunities to develop their skills in, and take responsibility for, planning investigative work, selecting relevant resources, making decisions about sources of information, carrying out activities safely and deciding on the best form of communicating their findings.

Children will be expected to write up at least one scientific investigation for each unit of work covered (The written investigation follows the structure detailed in appendix 1, where guidance on how the investigation process can be differentiated and delivered can also be found.) Teachers use the 'Post-it note' method of planning scientific enquiry and science planning boards are used throughout the school to ensure consistency in the teaching and learning of planning an investigation, and to support the children with their written reports.

Written work in science is to be differentiated to ensure that there are opportunities for children of all abilities to develop their investigative skills. Children are increasingly challenged as they move up through the school, ensuring progression in the investigation and reporting of scientific studies.

As a mixed intake school, we have a two year rolling programme of study. When each unit of work is undertaken in detailed in appendix 2. Scientific enquiry is taught as an integral part of the lesson and all lessons should include some aspect of scientific enquiry (this is usually detailed in the teacher's medium term planning).

Learning across the Curriculum

As a core subject of the National Curriculum, Science is, generally, taught as a discrete subject. However, when the opportunity arises, teachers may seek to make links to other subjects through our Creative Curriculum. The Science curriculum provides an excellent opportunity to develop language and communication and numeracy skills. We aim to incorporate ICT within the teaching of science and consideration should be given to how this may be done within each unit. Cross-curricular links are identified on the medium term unit plans.

Special Educational Needs; Inclusion; Equal Opportunities; Education for culturally diverse society

At Waterhouses we remain committed to an inclusive, broad and balanced curriculum for all pupils. In science, the National Curriculum is the starting point for planning a curriculum that meets the specific needs of individuals and groups of pupils. When planning, teachers will modify, as necessary, the National Curriculum programmes of study to provide all pupils with relevant and appropriately challenging work at each key stage, in order to provide a more inclusive curriculum which:

- A. sets suitable learning challenges;
- B. responds to pupils' diverse learning needs;
- C. overcomes potential barriers to learning and assessment for individuals and groups of pupils.

In all classes there is a range of scientific ability, we provide suitable learning opportunities by differentiating the challenge of the task to the ability of the child. We achieve this through:

- Setting common tasks that are open ended and can have a range of outcomes.
- Setting tasks of increasing difficulty where we do not expect all children to complete all tasks.
- Grouping children by ability and setting different tasks for each group.
- Providing a range of challenge through the provision of different resources matched to ability.
- Using TAs to support the work of individual pupils or small groups.

Assessment Recording and Reporting

A variety of strategies, including questioning, discussion, concept mapping, and marking are used to assess progress and pupils understanding. This information is used to inform subsequent planning. Written or verbal feedback is given to the child after every lesson to help guide his/her progress. Expectations of children's learning are clearly set out at the beginning of each unit of study.

Each teacher will complete a summative assessment sheet at the end of each topic and an on-going assessment sheet for scientific enquiry for each pupil. Assessments will be made against the end of key stage expectations outlined in the National Curriculum, supplemented by the Chris Quigley Essentials curriculum that teachers use for planning. These summative assessment sheets will be passed up with the class as it progresses through the school to ensure progression in the children's knowledge and understanding relevant to their level of attainment.

At Waterhouses, we also track attainment and progress using the Leek Education Partnership (LEP) numerical tracking system. This system, jointly devised by all Science Leaders within the LEP, ensures continuity in assessment between schools at key pupil transition points. The LEP system provides users with a further assessment tool to check whether pupils are on track to meet expected end of year/key stage expectations and supports self-evaluation.

An annual summary for parents on pupils' achievement in science will be included in the child's annual school report. Parents' consultation evenings will be another opportunity to discuss individual pupil progress.

Throughout the school year, the subject leader will assess the pupils' learning in science through additional monitoring procedures such as book scans, lesson observations and pupil interviews. The subject leader will also undertake a subject review annually where further lesson observations, books scans and data monitoring will assess the impact of teaching throughout the school and any new initiatives that may have been employed.

The Role of the Science Leader

The role of the Science Curriculum Leader at Waterhouses is to develop and manage science throughout the school:

- to organise, monitor and evaluate the policy and scheme of work for science across both key stages;
- to ensure progress and to raise pupils' attainment;
- to monitor that work planned, delivered and assessed is in line with the scheme of work;
- to contribute and monitor progress in science as agreed in the S.D.P.;
- after consultation with staff, to decide on priorities within the school budget and order necessary resources;
- to organise, allocate and monitor science resources;
- to support and provide guidance to all staff on matters relating to science;
- to attend in-service training and update sessions relating to science, and report relevant information to staff;

Resources

Learning resources are kept in a store cupboard adjacent to the staffroom. Resources are organised in boxes, which are clearly labelled. The quality and quantity of resources needs to be maintained and the children should value the school's equipment. It is the responsibility of all teachers to return resources to the correct location after use. Any damage or losses should be reported to the science leader.

Teachers are encouraged to make full use of practical resources alongside ICT resources, such as the internet, interactive programs on interactive whiteboards and ICT hardware for monitoring changes in the environment. The library contains a good supply of science topic books. Visits will be organised as and when they are appropriate to the area of study. These may include trips to farms, zoos, parks and museums, such as: The Manchester Museum of Science and The Potteries Museum and Art Gallery.

Health and Safety

The general teaching requirement for health and safety applies as well as additional guidance for teachers from the ASE (Association for Science Education) in the form of the booklet, *Be Safe!*

Children are encouraged to consider the safety of themselves and others at all times. In order to assist the children with this, they have a set of key health and safety targets with links to the key stage-related programmes of study in the National Curriculum for science at the front of their books. Before conducting scientific enquiries, the children are encouraged to consult and consider their health and safety guidelines.

Appendix 1 – Guidelines for planning a science investigation

- At least one science investigation must be planned and carried out for each unit of work undertaken.
- To begin with, model for the whole class how to write the plan for the investigation and how to effectively record and evaluate their findings (Post-it note planning boards should be used to support this). To enable cross-curricular links with Literacy, use shared writing and guided writing sessions to model for the children how to write an effective plan and recount of an investigation.
- Provide children with the opportunity to plan investigations in groups and independently.
- Encourage children to use scientific vocabulary when planning and recording their investigations.
- Also provide children with the opportunity to study written investigations and ask them to interpret the results (e.g. in tables and graphs) and draw scientific conclusions from them.

The Written Investigation

All investigations should be written up using the following headings as a framework for planning. For children in Key Stage 1 and lower ability children in Key Stage 2, the headings can be changed according to the guidelines detailed below.

Our Investigation Question - What we aim to find out.

Prediction - Try to make this a comparative statement.

Equipment - Include a list of equipment using the correct scientific terminology.

Method - An account of what will be done to carry out the investigation. This should include an annotated or labelled diagram.

Fair Test - This should include what factors will be kept the same and what factors will change.

Results - To include a table of results/ graph/ photographs or brief description of observations.

Conclusion - What we found out. Interpret the information in the results section and try to use a comparative statement to answer the investigation question.

Foundation Stage/ Key Stage 1

Towards the end of the Foundation Stage and at the beginning of Key Stage 1, plan investigations as a whole class, or in groups, with the teacher leading discussion, and modelling the planning and recording for the children. The following headings could be used.

What do we want to find out?

What do we think will happen?

What will we use?

What will we do? (Include a labelled diagram)

What did we find out?

Towards the end of Key Stage 1/ Early Key Stage 2

Towards the end of Key Stage 1 and at the beginning of Key Stage 2, aim to use the following headings as a framework for planning investigations - whole class, in groups and moving towards some independent planning.

Our investigation question

What we think will happen/ Our prediction

What we will do (Include a labelled diagram)

Equipment

How we will make it a Fair Test

Our Results

What I found out

Key Stage Two

In Key Stage 2 children should be able to use the headings outlined in the Written Investigation section of these appendices. For lower ability children, you may refer to Key Stage 1 guidelines, or differentiate the framework accordingly using writing frames or cloze procedures.