

Name of Policy	Science		
Last Reviewed	December 2015	Reviewed by	Whole Staff
Approved by		Owned by	Performance and Standards
Next review	December 2017		

## Introduction

This policy provides a clear background, which will support all the science work done in the school. It has been produced following extensive discussion by teachers and reflects the needs of children in this school both as they are expressed in the aims of the school and also in the 2014 statutory orders for National Curriculum Science.

## Purpose

This policy:

- Provides a corporate statement of purpose
- Ensures that each pupil's entitlement to scientific experiences is realised
- Provides a clear basis from which to plan programmes of work

It is not intended that this policy should limit spontaneity and dampen the enthusiasm of teachers. Instead it seeks to provide a framework which will maximise the strengths of individual teachers and ensure that pupils receive a high quality science education.

## Aims

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.

### Scientific knowledge and conceptual understanding

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary

and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content.

Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.

The scientific process can be summarised by the following sequence:

- Children observe the world around them
- They describe the work of scientists both present and past
- These observations raise questions in the child's mind
- Children plan investigations to answer the initial query and test the questions
- Children perform the investigation and collect data
- They interpret their data and analyse their results
- They draw inferences and conclusions
- They evaluate the investigation in relation to the initial questions
- They raise further questions arising from their investigation

### **Skills and Attitudes**

This is a sophisticated process and children will need to gain experience of each part before they will be able to tackle 'whole investigations' of this nature. The skills required to participate in whole investigations are planned through each unit of work. However, very young children can engage in this process and are given opportunities to do so.

Individual skills which are needed to support this investigative approach include:

- Observing
- Classifying
- Measuring
- Recognising patterns
- Obtaining information from a variety of sources
- Predicting
- Fair testing
- Interpreting
- Evaluating
- Communicating

### **Teaching Pedagogy**

### **Equal Opportunities**

Equality of opportunity is a fundamental right that must be allowed to all children regardless of race, culture, gender or special educational needs. Teachers should be aware of the contributions made to science by people from all over the world. Many units of work can incorporate a global perspective and opportunities can be taken to compare how science has helped to solve problems in a wide range of differing environments. Teachers will need to be sensitive to the different dietary habits of different cultures when looking at food and diet,

### **Special Educational Needs**

Children with learning difficulties should be expected to succeed and be provided with appropriate opportunities to succeed.

Able children should be given appropriate challenges so that they can fulfil their potential, e.g. through the use of Concept Cartoons. Open-ended activities can often be successful in challenging able children.

Successful teaching and learning will depend on the effectiveness of the differentiation as well as the extent to which:

- The learning process is broken down into manageable steps
- Assessment procedures are used to identify learning difficulties
- Children are aware of their own successes and progress
- Children are given opportunities to become independent learners
- Children are able to improve their self-esteem

### **Differentiation**

Each child will be given tasks appropriate to their own individual needs. No one teaching strategy will be sufficient in itself but teachers will use a variety of approaches as appropriate.

Children can be given:

- Different tasks
- Different resources to assist them
- Differing levels of support by the teacher and other children
- Open-ended tasks which will allow for a range of different outcomes

The grouping of children within the classroom is also an important factor when planning for differentiation.

### **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.

The school's approach to assessment can be summarised as follows:

- Assessment is planned and relates to the objectives chosen in lessons or units
- Assessment is a regular feature of classroom practice
- A variety of approaches can be used with 'fitness for purpose' the determining factor

## Safety

Science poses a number of potential dangers in the classroom as a result of its practical nature. The school has adopted the safety policy included in the 'Be Safe' document produced by the Association for Science Education. This document is pinned up in the Staff Room for ease of access.

Teachers will need to make reference to this document where they are performing new techniques or introducing particular activities for the first time.

When there is a potential safety risk, the teacher must write a risk assessment and show it to the Headteacher in advance of the lesson. The CLEAPSS website gives guidance for H and S activities.

Children should be made aware of safety requirements and encouraged to develop an awareness of risk as they undertake practical work.

Provided the guidance is adhered to there should be an extremely low risk of e.g. burns from batteries or glue guns.

## Resources

Many of the resources are stored in the cupboards outside Nile Class. A large proportion are heavy and stored at a height that makes them beyond children's reach. Therefore, **although we encourage independence in our children, the task of collecting these resources must be the responsibility of the teacher in advance of the lesson.**

The responsibility for maintaining an adequate supply of resources rests with the STEM Curriculum Team.

The effective management of these resources, whilst ultimately the responsibility of the curriculum team, is also the responsibility of each teacher who uses them.

Classroom teachers have the responsibility for returning all resources to the central store.

Secondary Schools may lend equipment to primary schools and links with the secondary school are enhanced by the Year 5/6 visits/visitors and AGT opportunities.

## Curriculum Organisation and Planning

Most of the learning about science will 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. The children will be taught to work scientifically.

Due to the mixed age classes at Stanton, there is a two year rolling programme at Key Stage 1 and Key Stage 2. Within each year a balance is maintained between the acquisition of knowledge and understanding and the development of investigational skills. The school uses Dimensions as a starting point for curriculum planning to ensure the breadth of the National Curriculum is taught and there is a progression of skills directly related to the Age Related Expectations of the National Curriculum.

### 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.

The children will be encouraged to be

- curious and ask questions about what they notice
- develop their understanding of scientific ideas by using different types of scientific 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.
- 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.

KS1 pupils will be taught the following topics:

- Plants
- Animals including humans
- Use of everyday materials
- Seasonal Changes
- Living things and their habitats

The children will be taught to work scientifically.

### Lower Key Stage 2

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. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

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

### Lower Key Stage 2

- Plants
- Animals including humans
- Rocks
- Light
  
- Forces and Magnets
- Living things and their habitats
- Animals including humans
- States of matter
- Sound
- Electricity

### Upper Key Stage 2

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. Throughout the notes and guidance, examples show how scientific methods and skills might be linked to specific elements of the content.

Pupils should read, spell and pronounce scientific vocabulary correctly.

Upper Key Stage 2:

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

### **Monitoring and Evaluation**

The STEM Curriculum team will monitor the implementation of the Science teaching and learning both when Science is an 'in focus' and 'light touch' subject identified on the school's M and E Cycle.

Any whole-school issues that emerge concerning science teaching and learning are considered by the Senior Leadership Team then raised at Staff and Key Stage Meetings.

### **Staff Development**

All staff are encouraged to participate in staff development both for the benefit of the school (and therefore the pupils) and for furthering their own professional development.

The sharing and discussion of standards of work, expectations, and assessment is encouraged and not only leads to personal development, but also builds staff confidence.