

TWEEDDALE PRIMARY SCHOOL

POLICY FOR SCIENCE

Review of the Policy

This policy provides guidance on teaching and learning at Tweeddale Primary School. It reflects the views of teaching staff and was agreed by the Local Governing Body on **10/03/21** .

The policy will be reviewed by the Head Teacher annually and by the governing body in **March 2024** or earlier if required. The implementation of the policy is the responsibility of the staff and will be monitored by the Head Teacher, Senior Management and individual curriculum coordinators.

Signed.....
Headteacher

Date.....

Signed.....
Chair of Governors

Date.....

Introduction

This policy reflects the ethos and practice within Tweeddale Primary School in relation to Science and provides guidelines to support both the teaching and learning. It has been written with due regard to the requirements of the National Curriculum and is aware of current good practice.

At Tweeddale we believe in the view of science outlined in the National Curriculum:

“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.”

(National Curriculum in England September 2014)

What is Science at Primary Level?

Science is the exploration of the world in an attempt to discover why, when and how it came to be. Learning science enables children to raise both their awareness and curiosity, to reach their own conclusions and try to make sense of them. Thus, the teacher’s role, through discussion and investigation, is an important one, guiding, encouraging and motivating the children to develop their own knowledge and experience of the subject.

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. 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 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. 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. Pupils should read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1.

Lower key stage 2 – years 3 and 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. 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 and 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. Pupils should read, spell and pronounce scientific vocabulary correctly.”

(National Curriculum in England September 2014)

Curriculum

Science remains a compulsory National Curriculum subject at all 4 key stages.

“By the end of each key stage, pupils are expected to know, apply and understand the matters, skills and processes specified in the relevant programme of study.

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. ... 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.

Working scientifically specifies the understanding of the nature, processes and methods of science... focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: *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.

The National Curriculum for science reflects the importance of spoken language in pupils' development across the whole curriculum – cognitively, socially and linguistically. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. They must be assisted in making their thinking clear, both to themselves and others, and teachers should ensure that pupils build secure foundations by using discussion to probe and remedy their misconceptions.”

(National Curriculum in England September 2014)

Expectations/Aims in Teaching Science

The National Curriculum 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

We aim to develop in all our children:-

- An enjoyable and positive attitude towards science.
- A curious, enquiring mind and the ability to question and argue rationally.
- Scientific concepts, strategies and skills.
- The ability to hypothesise, plan and undertake a fair test, observe, measure, interpret, and describe their findings using appropriate scientific vocabulary.
- The ability to work co-operatively and communicate their ideas to others.
- An understanding of the links between science and technology.
- To be aware of their own and others' safety.

We aim to:

- Build a framework through which we can ensure continuity and progression throughout the school.
- Provide equal opportunities for all children to take part fully and effectively in science.
- Allow children to achieve as high a standard as possible.
- Match learning experiences to the abilities and needs of the children, which are relevant to their interests and everyday lives.
- Instil not only the curiosity and excitement of scientific discovery, but also the sometimes uncertain nature of exploration.
- Develop pupils' knowledge and understanding of the world around them, through experience, exploration and interaction with scientific phenomena.
- Encourage the children to use a wide range of equipment, resources and materials correctly, accurately and safely.

Expectations

At the end of Key Stage 1 and 2 teachers assess and record children's progress and attainment in line with the National Curriculum Standards as either 'working at the expected standard' or 'not meet that standard'.

Schemes of Work

At Tweeddale Primary School science is taught either as a discrete subject or where relevant as part of a topic. We endeavour to make links across the curriculum.

Early Years

In Nursery and Reception, we follow 'Development Matters in the Early Years Foundation Stage' (DFE 2012), supporting children to meet the Early Learning Goals. Activities are developed around the children's interests, giving them opportunities to find out about the world they live in.

Key Stage 1 & 2

In KS1 and 2 we follow the Kent Primary Science scheme of work for science. This scheme of work provides teachers with long and medium term plans that are clearly linked to the National Curriculum programme of study. Within each unit, staff are not only expected to develop the children's scientific knowledge and understanding, process skills and attitudes to scientists, but also supports the progression of other areas of the child's development. The scheme is divided into units, each unit building on previous work, ensuring children make progress as they move through Key Stages 1 and 2.

The school's curriculum map (appendix A) shows how the units are distributed across the year groups which promotes curriculum continuity and progress in children's learning.

Planning

Each week it is expected that the minimum of 1 hour in KS1 and 1½ hours in KS2 will be taught, this may be over 2 separate sessions.

Teachers follow the school's curriculum map for the long term plan and use the Kent Primary Science units as the medium term plans. Each of these units has been assigned to a particular year group in line with the guidance from the National Curriculum (2014).

The units provide teachers with a clear knowledge and skills focus. We follow the guideline that in KS1 there should be a balance of 50% subject knowledge and 50% skills and KS2 60% subject knowledge and 40% skills.

Short term planning (appendix B) is produced collaboratively by year group teachers, using the Kent Primary Science medium term plans as a basis and adapting and differentiating the activities as necessary. It is then the responsibility of individual teachers to take into account the needs of individual children in their particular class. Year groups are to hand in their short term plans at the beginning of each half term. The Subject Leader is available to support teachers with planning.

Teaching & Learning

At Tweeddale Primary School class teachers are expected to present science in 'hands on' contexts, which are relevant to the children's experiences and allow them to develop their skills, knowledge and vocabulary. These 'hands on' activities provide opportunities for scientific discussion, and for pupils to ask questions, hypothesise, find out and explain. However, where it is not possible for 'hands on' activities teachers endeavour to carry out practical demonstrations.

Learning Support Assistants work as directed by the teacher to support the particular group or individual they are working with and are briefed beforehand.

A session normally begins with whole class introduction, children then have the opportunity to work individually, in pairs, or in small groups. They use a variety of means for communicating and recording their work.

Many of the Kent Primary Science scheme units include opportunities for children to carry out the whole process of investigating an idea by 'planning experimental work', 'obtaining evidence' and 'considering evidence'. We use planning proformas, for each year group which can be adapted, these can be found on the schools network under 'Staff Resources>Coordinator folder'.

Inclusion

At Tweeddale Primary School we recognise and value diversity. We aim to prepare pupils for life in a diverse society by showing respect for and valuing differences between people and by valuing the contributions to science made by people from other cultures.

We believe that a broad and balanced science education is the entitlement of all children. All pupils regardless of ethnic origin, religion, social and cultural background, language, gender, ability or aptitude undertake the full range of activities. Teacher assessment determines the depth to which individuals and groups go during each unit of work. Planning shows how activities have been adapted or extended for the needs of pupils and, where appropriate, how they relate to Learning Support Plan (LSP).

Pupils should be given the opportunity to develop:

- Spiritually* – through curiosity of themselves and the world around them.
- Morally* – to consider moral dilemmas caused by the use of science.
- Socially* – to relate and work with others and to understand the local, national and global impact of science.
- Culturally* – to consider how cultural traditions may give people different scientific opinions.

The Learning Environment

All KS1 and KS2 classrooms should have a science working wall. A decorated 'unit target poster' should be displayed on this wall which includes information about what the children are learning about (knowledge) and what they are learning to do (skills) (See appendix C for an example). The key vocabulary for subject knowledge and skills should also be displayed. Resources for the unit of work being covered should be appropriately accessible. Other sources of information should be available.

Assessment & Record Keeping

Assessment draws on a range of evidence of what pupils know, understand and can do in the different aspects of subjects in the curriculum. *(Note for inspectors: use of assessment information during inspections 2014/15)*

At Tweeddale Primary School assessment is ongoing in order to inform the next stage of a child's learning in science and marking is carried out in line with the Marking Policy.

In the Foundation Stage assessment is continuous and in line with the Foundation Stage Profile which is completed by the end of the Foundation Stage, prior to entering Key Stage 1.

In Key Stage 1 and 2 staff are expected to follow the assessment recommendations from The Kent Primary Science Scheme of Work. For each of the units teachers are to complete an assessment record sheet (e.g. appendix D), recording children's achievements during their studies for both the knowledge aspects within a particular unit, and the requirements from working scientifically. These record sheets and the intended learning objectives included in the units of study will enable teachers to identify what the children need to know or be able to do next, as well as support them at different times in the year to make summative judgments as to the children's attainment. Those children meeting expectations will be graded as **E**, those above as **A** and those below as **B**. For those children who have been graded **A** and **B** teachers will make a note of the reasons for this. The completed assessment sheets need to be copied at the end of each unit and handed to the Subject Leader for analysis. At the end of the year teachers are expected to pass copies of the assessments on to the next teacher providing the receiving teachers with valuable information.

At the end of Key Stage 1 and 2 teachers assess and record children's progress and attainment in line with the National Curriculum Standards as either 'working at the expected standard' or 'not meet that standard'.

A written record of achievement outlining progress in science is sent to parents annually.

Resources

The science equipment is stored centrally in the science resource room. Printed materials are kept within the drawers and year specific books are kept in the classrooms. Each classroom in KS1 and KS2 also has a science box with general resources, it is the class teacher's responsibility to ensure the items are returned back to the box by the end of each year. The outdoor science/nature area equipment is kept in the outdoor cupboard located in the nature area.

The responsibility for organising, setting up and maintaining the resource area is that of the Subject Leader. However, the whole staff are responsible for ensuring that broken or used up equipment is reported to the Subject Leader so that repairs, replacements or new orders can be made. It is also the borrower's responsibility to return items to the correct storage area, in the condition in which they were found, when no longer required. Dangerous items such as Alka-Seltzer and Milton must not be kept in the resource area and must be locked away.

N.B. Under NO circumstances are children allowed access to the science resource area except for the front end of the room for booster work when they are accompanied by an adult.

Health and Safety

When children are engaged in a variety of practical activities, including open-ended investigations, there is always the possibility that something could go wrong, therefore, vigilance is needed.

To ensure that science at Tweeddale Primary School is very safe and to minimise risk individual teachers will need to undertake their own specific risk assessment. The Kent Primary Science Scheme of Work units point out specific health and safety issues in relation to each lesson, these are generally consistent with advice given in 'Be Safe!' Points of safety are then included in the planning and the children are made aware of the hazards and risks involved and are taught to recognise and take action to control them. During teaching teachers will supervise all activities and the safe use of equipment is promoted at all times.

Staff also refer to the guidelines laid out in the 4th edition of the 'Be Safe' book (ASE 2011) which outlines safety issues, copies of which can be found in each class resource box, other classrooms, the staffroom, resources area and also with the Subject Leader. All staff are expected to be familiar with its contents and to follow its guidance.

The LEA maintains a subscription to CLEAPSS school science service (Brunel University, Uxbridge). This organisation produces a termly newsletter, 'Primary Science and Technology' and a wide range of guides about primary science, copies of these are kept in the science resource area. They also provide a helpline number: 01895 251496 and internet support which teachers can use for health and safety advice and other issues concerning science.

When using the Nature Area staff are to follow the 'Nature Area Safety Rules' (appendix E)

Using the above advice it is up to the individual teacher to do their own risk assessment.

Monitoring & Evaluation

The implementation of the policy is the responsibility of the staff and will be monitored by the Subject Leader and the Head Teacher. The Subject Leader monitors the Science planning each half term to ensure that the Programmes of Study are covered. Work scans and display audits are carried out to monitor coverage, standards and progress across the school. Where possible, lesson observations are carried out to gain an insight into teaching across the school and to support staff. A check list for teachers to remind them of the expectations is given out at the start of each academic year (Appendix F).