

Broughton Primary School

Science Policy

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| Author: | Mrs Anna Bewsher- Science subject leader |
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Science at Broughton Primary School:

This document is a statement of the aims, principles and strategies for the teaching and learning of Science at Broughton Primary School.

Science Intent Statement/Vision:

Through our Broughton Primary School Science Curriculum, we aim to support our pupils in developing a natural curiosity and promote enthusiasm and enjoyment of scientific learning and discovery. We engage children through stimulating hands-on, minds-on learning to create a love of science and pave the way for future study. We explore the world around us through cross-curricular learning, create and answer questions as we deepen our understanding. We want our pupils to develop scientific knowledge and conceptual 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. Through our progressive, enquiry-based framework, children will develop knowledge of scientists and take part in science events. Concepts taught should be reinforced by focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. Alongside developing their scientific skills, pupils will develop a strong sense of how science shapes many everyday things and how Science and STEM will impact on their future.

Science Principles at Broughton Primary School:

It is ‘hands on’

Child-led practical science learning is carefully planned for and sits at the heart of our curriculum. Practical lessons are fun, engaging and inclusive.

We make learning connections

We use prior and conceptual learning to help us make links with work we have already covered to help develop our understanding further and deeper

It creates more questions

We promote deep thinking, curiosity and extending learning. Dedicated time is given to allow children to carry out further enquiries to answer their own questions.

We learn with and from others

Dialogue is naturally promoted through collaborative work. Our children enjoy working in pairs and groups, giving them the opportunity to learn and develop their understanding together. All children study the discoveries and inventions of a wide range of scientists, linking their learning to the wider world and smashing stereotypes.

We persevere

As a core value of our school, perseverance is a necessary skill to problem solve, particularly in science. It is important not to be discouraged when faced with failure, to make discoveries, be creative and inventive.

We explore

Wherever possible, we encourage children to personalise their learning through exploring their interests, solving problems and building their understanding of the world around them. We utilise the outdoor environment to help deepen the learning in science.

Aims of study:

Our aims at Broughton Primary School are based on the 2014 National Curriculum and are intended to ensure that:

* Our school nurtures ‘science happy’ children with active and enquiring minds to help them understand the fascinating world around them
* Pupils will ask questions about scientific phenomena
* Pupils question and discuss the moral and social implications of science
* Pupils have fun
* Pupils will use science frames to make informed predictions, observations, measurements and conclusions
* Pupils will present our results in a variety of appropriate ways
* Pupils will carry out fair and safe investigations
* Pupils will use appropriate scientific vocabulary and ideas when describing scientific processes and phenomena
* Pupils increase their scientific knowledge and make links with other subjects such as Mathematical knowledge and skills
* Pupils are aware of how the lives and work of famous scientists have impacted on our lives and the lives of others
* Pupils will identify patterns in scientific data

Through Science lessons, we want to encourage:

* Open mindedness
* Perseverance
* Tolerance
* Curiosity
* Respect for peers
* Teamwork
* Respect for living things and the environment
* Confidence.

Implementation:

EYFS:

In EYFS, science is included within the Understanding the World area of learning. As with other learning in Nursery and Reception, children will mainly learn about science through games and play – which objects float and sink during water play, for example. Activities such as these will help children to develop important skills such as observation, prediction and critical thinking. In this phase, children are often introduced to individuals, concepts and ideas, building firm foundations for progressive learning in Key Stage 1.

Key-Stage 1 (Year 1 and 2) and Key-Stage 2 (Year 3-6):

The content of science teaching and learning is set out in the 2014 National Curriculum for primary schools in England. Within this, certain topics and areas are repeated across year groups, meaning that children may revisit a particular topic in each year of primary school but with increasing difficulty and with a different focus each time. For example, the area of animals, including humans is examined in every single year group, with a very clear progression of knowledge and understanding over the six years: In Year 1 this involves: looking at the human body, recognising animal groups and sorting these animals. By Year 6, this will have developed into knowing the internal structure of the human body in relation to circulation, classifying living things based on more complex characteristics and exploring scientific research into this classification.

The more detailed content for each year group is as follows:

Year 1:

* Plants (basic structure)
* Animals including humans (basic knowledge of parts of human body and comparing animals)
* Everyday materials (describing properties)
* Seasonal changes.

Year 2:

* Plants (what plants need to grow)
* Animals including humans (needs for survival, food and hygiene)
* Use of everyday materials (explore and compare materials for uses)
* Living things and their habitats (explore variety of habitats, simple food chains)

Year 3:

* Plants (life cycles)
* Animals including humans (nutrition, skeleton and muscles)
* Rocks (fossils and soils)
* Light (reflection and shadows)
* Forces and magnets (magnetic materials, attracting and repelling).

Year 4:

* Animals including humans (digestive system, teeth and food chains)
* Living things and habitats (classification keys)
* States of matter (changes of state, evaporation and condensation)
* Sound (vibration, pitch and volume)
* Electricity (simple circuits, insulators and conductors).

Year 5:

* Animals including humans (human development from birth to old age)
* Living things and their habitats (life cycles and reproduction in humans and plants)
* Properties and changes of materials (dissolving, separating materials, reversible and irreversible changes)
* Forces (gravity, air resistance, water resistance, friction)
* Earth and Space (Earth, Sun and Moon, the solar system).

Year 6:

* Animals including humans (circulatory system, diet and exercise, healthy living)
* Living things and their habitat (classification, characteristics of plant and animal groups)
* Light (how it travels, how we see, shadows)
* Electricity (voltage and power in circuits, circuit components, symbols and diagrams)
* Evolution and inheritance (how living things have changed over time, fossils, dinosaurs, adaptation to environment

Alongside these areas runs the Working Scientifically element. This focuses on the skills the children need to become accurate, careful and confident practical scientists. Children are expected to master certain skills in each year group and there is a very clear progression of these set out for each school to refer to. For example: In Year 1 a child may have to ask questions, carry out a simple test, record simple data and then try to answer questions. By Year 6, they should be able to plan and carry out a fair test by using equipment accurately and taking exact readings or measurements. They are also expected to be able to draw conclusions from their results and record them using a range of graphs and charts.

We recognise that there are children of a wide range of academic ability within every class and we aim to provide suitable and beneficial learning opportunities by matching the challenge of the task to the ability of the child. We achieve this in a number of ways:

• Setting common tasks which are open-ended and can have a variety of responses.

 • Setting tasks of increasing difficulty. Not all children are expected to complete every task all of the time.

• Children may be grouped by ability within the classroom with different tasks set for each ability group – provision should be in place to both support the children with special educational needs and of a lower ability and stretch the more able children.

• Providing resources of different complexity depending upon the ability of the child.

• Using classroom teaching assistants, when available, to support groups.

Science Curriculum Planning:

At Broughton Primary School, Science is taught through dedicated Science Weeks, which take place on a half termly basis. In Key Stage 1 children follow their National Curriculum year group topics. Teachers follow a two year rolling-curriculum in both lower and upper Key-Stage 2 which allows all pupils to cover all topics set out in the National Curriculum, particularly important on occasions when classes are organised as mixed year groups c;lasses.

Class teachers use a range of planning schemes, such as Hamilton Trust, Developing Experts, Explorify, Ogden Trust and Thinking, Talking, Doing Science. Our planning structure ensures the children develop scientific knowledge and understanding through enquiry focused games, research and practical investigations. Individual lessons may vary in structure depending on the needs of the class and the topic they are studying at the time. Where individual children have barriers to learning, they are provided with tailored support to enable them to succeed.

Through annual monitoring tasks, the Science subject leader reviews planning and teaching to ensure the coverage of objectives and skills is consistent across the school. Some of these monitoring tasks include:

* Learning reviews based on work in the children's books and our online learning platform (Seesaw)
* Interviewing pupils from a range of year groups
* Questionnaires for pupils and staff
* Lesson observations/learning walks
* Subject leader and class teacher TEAM teach opportunities

Science Capital:

*‘The concept of science capital can be imagined like a 'holdall', or bag, containing all the science-related knowledge, attitudes, experiences and resources that you acquire through life. ... That is, the more a young person has, the more likely they are to plan to continue with science in the future.’*

 – ‘Enterprisingscience.com’

As a school it is our duty to challenge Scientific stereotypes and create Science in context that is relevant to our children lives and local area, enriching their ‘Science Capital’ exposure.

What will Science look like in the classroom?

* Pre-assessment at the start of each unit using a vocabulary concept map (carried out as a group task in Key-Stage 1 and independently in Key-Stage 2)
* A range of lesson starter activities and low stakes quizzing used during introductions–10 minute thinking/talking activity and also opportunities to review previous learning and consolidate knowledge
* Modelling of specify key vocabulary and description of its meaning.
* Emphasis on practical work and investigations that are engaging and create awe and wonder, inspiring young minds to investigate independently or with appropriate scaffolding
* Teachers demonstrate how to use scientific equipment, and the various Working Scientifically skills in order to embed scientific understanding.
* Working Scientifically skills are embedded into lessons to ensure that skills are systematically developed throughout the children’s school career and new vocabulary and challenging concepts are introduced through direct teaching. This is developed through the years, in-keeping with the topics.
* Wherever possible, teachers try to find opportunities to develop children’s understanding of their surroundings through high-quality enrichment activities
* Progression in understanding is measured and reviewed through end-of-unit vocabulary concept map

Impact:

How will this be measured?

 Pupils will:

* Look forward to Science lessons and talk enthusiastically about the subject
* Be resilient and inquisitive, and will not be afraid to ask questions or to make mistakes
* Be keen to ask 'how?' and 'why?' questions about the world around them, and are able to make scientific links
* Show a progression of learning and understanding, with appropriate vocabulary
* Speak confidently about their experiences of practical investigations and are able to make sensible predictions and draw conclusions using their scientific knowledge
* Possess the skills to plan and carry out investigations in science, and can use the results to draw conclusions
* Confidently use a range of methods to communicate and present their scientific findings
* Show awareness of how to keep themselves and others safe when using scientific equipment and materials

Pupils books will show:

* A varied and engaging curriculum which develops a range of Scientific skills.
* Pupils have had opportunities for practice and refinement of skills.
* Clear progression of skills in line with expectations
* That pupils, over time, develop a range of skills across all of the areas of the Scientific curriculum.

The subject leader will:

* Monitor standards in Science to ensure the outcomes are at expected level.
* Provide ongoing CPD support based on the outcomes of subject monitoring to ensure that the impact of the curriculum is wide reaching and positive.
* Review and update documentation as required

Assessment:

At the start of every topic unit, children are asked to complete a vocabulary concept map, to provide definitions of key vocabulary and make links between them. In Key-Stage 1, children will complete this task as a group led by their class teacher but pupils work independently in Key-Stage 2. This task is repeated at the end of the unit as the means to measure progression of learning throughout the unit.

Teachers assess pupils as they observe them during lessons and mark their work following this, annotating with appropriate comments if necessary. Teachers highlight the Lesson Objective in books to denote whether the pupil has achieved the objective:

* Green – achieved objective
* Orange – close to achieving target/work unfinished so insufficient evidence
* Pink – more practice/discussion needed to achieve objective

Pupils are encouraged to engage in regular ‘thinking and talking’ activities, during which the teachers will informally assess their scientific understanding.

At the end of every science unit, teachers access FFT and consolidate all of the assessments above to state whether a child is:

* Working at a pre-keystage level
* Not meeting age-related expectations
* Working at age-related expectations
* Working beyond age-related expectations

SEND:

It is important for teachers to plan work in science which facilitates high expectations, matches children’s needs and helps them to make progress. Pupils with SEND may be defined as those with:

* Physical and sensory difficulties e.g poor co-ordination, restricted mobility, hearing problems
* Learning difficulties e.g problems with literacy, numeracy, memory
* Emotional and behavioural difficulties e.g narrow concentration span, ASD, ADHD
* English as a second language

Teachers implement and develop strategies to support SEND pupils whilst supporting inclusion in science. Teachers plan for appropriate pace and use a range of kinaesthetic /multi sensory tools to promote enjoyment and progress. Knowledge and skills can be developed in small steps through practical activities. Paired and group work in science is widely used and can foster interpersonal and communication skills. Carefully matched work suited to the child’s own needs and range of learning can promote confidence and stimulate an interest in future learning, leading to a better understanding of the world around them.