BROAD HEATH SCIENCE POLICY

Rationale

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 at Broad Heath should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key knowledge and concepts, children 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.

For children to achieve well in science, they must not only acquire the necessary knowledge, but also understand its value, enjoy the experience of working scientifically, and sustain their interest in learning it. Pupils at Broad Heath need to discover the concepts revealed through observing scientific phenomena and conducting experimental investigations for themselves. Then they are more likely to continue to study science and use that learning for work, for family, and to contribute as informed citizens.

Aims & Objectives

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.

Organisation

Science at Broad Heath is taught by class teachers in mixed ability groups. Every year group will have 2 hours of science lessons each week with a large focus on scientific enquiry and practical investigation. We follow the new curriculum and have broken the programmes of study into half-termly units, including a new practical STEAM unit for each year group to undertake during one of their half terms.

Key Aspects of the Curriculum

The three key aspects of the science curriculum for the current government are:

• 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 nature, processes and methods of science

'*Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. It should not be taught as a separate strand. 'Working scientifically' should be embedded within the content of biology, chemistry and physics, 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.*

• Spoken language and scientific vocabulary

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.

Planning

Teachers at Broad Heath will plan two hours of science lessons each week which are saved on the shared Google Drive the week before for the Head and Science Co-ordinators, in order to be monitored. At the beginning of each half term, teachers will devise a medium-term plan which indicates key objectives in order to ensure the learning journey is clear. The long-term plan is provided by the science co-ordinators which outlines the units and the order in which they are to be taught. This order is adaptable to allow cross-curricular links where appropriate.

Assessment

Assessment by teachers is the most appropriate form of assessment for Science in primary school. One of the key aims of science at this stage is to enable children to 'work scientifically', something that cannot be assessed by written tests alone. In order for our children to show their competence in this area, they need to be in situations where they are raising questions, planning investigations, observing, measuring, analysing, arguing and evaluating. They must also be engaged in supporting their conclusions with argument and evidence and in working with and learning from others.

Teachers can observe pupils when engaged in science investigations and ascertain their understanding by listening, questioning and looking at their work. Scientific vocabulary and factual knowledge can also be assessed efficiently through written evidence in the children's books. Teachers should use formative assessment as part of their everyday practice to help pupils achieve learning outcomes.

Science assessment at Broad Heath is supported by a set of scientific skills per year group which children are to achieve by the end of the year. These are then broken down into terms to allow us to gauge where children are working in relation to age-related expectations. Each term, teachers will submit data, in the form of 'ages', which will be monitored and analysed by the Science Co-ordinators and Management Team.

Teaching & Learning Styles

A variety of teaching styles are used to teach science at Broad Heath. The main focus is to provide practical and investigative activities that enable the children to develop their knowledge, understanding and skills through first-hand experience.

This will involve:

- Whole class teaching
- Child-led enquiry and investigative work
- Enquiry based research activity
- Discussion between pupils/teacher
- The opportunity to use a variety of data such as statistics, graphs, pictures and photographs etc.
- Use of ICT to enhance learning
- Role play
- Presenting reports to the rest of the class
- A wide range of problem solving activities
- Carrying out practical experiments and analysing the results

Health & Safety

Health and safety issues will be considered, and appropriate risk assessments will be put in place when planning science work. Schemes of work are annotated to identify areas where particular care is needed.

The school has adopted the (Association for Science Education) ASE "Be Safe" publication as the detailed guidance for all staff. In addition, Coordinators have access to the (Consortium of Local Education Authorities for Provision of Science Services) CLEAPSS helpline if required.

The "Be Safe" booklet which is kept by the Science Coordinators should be consulted by teachers before engaging on any scientific activity that could be hazardous such as:

- Use of chemicals
- Heating and Burning
- Electricity
- Care and maintenance of animals
- Pond dipping
- Growing microorganisms.

All teachers must check *Be safe!* from time to time and use it when planning their science activities. Where relevant guidance cannot be found in *Be safe!,* staff should consult [CLEAPSS]

CLEAPSS, The Gardiner Building, Brunel Science Park, Uxbridge UB8 3PQ (*Tel:* 01895 251496; *Fax:* 01895 814372; *E-mail:* science@cleapss.org.uk; *Web site*: www.cleapss.org.uk) for the purpose of obtaining risk assessments and for general advice on health & safety matters in science.

Monitoring & Review: The Role of the Science Coordinators

Science Teaching and Learning is subject to continual review, evaluation and monitoring.

The Science Coordinators are responsible for this and will:

- Monitor the standards of the children's work and the quality of teaching in Science.
- Analyse data to consider trends or concerns.
- Be responsible for the support of colleagues in the teaching of Science.
- Provide a strategic lead and direction for the subject in the school.
- Produce an annual evaluation of the strengths and weaknesses of the subject which indicates areas for further improvement.
- Be responsible for the Science input to the School Improvement Plan.