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Science 2021 - 2023

Written by	Neil Kavanagh
Verified by	Alex Robbins
Approved by	The School Development Board
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Berkeley Primary School
Berkeley
Gloucestershire
GL13 9AZ
T: +44 (0) 1453 810254
Email : admin@berkeley.gloucs.sch.uk

Introduction

We at Berkeley Primary School recognise that a high-quality science education provides the foundations for understanding the world through the key concepts of biology, chemistry and physics. We have designed an approach to science (included in the appendix), that builds practical real-life, transferable skills. Science changes lives, and is vital to the future prosperity of the world. Building key foundational knowledge and skills will encourage pupils to recognise the importance of rational thought, whilst developing a sense of excitement and curiosity about natural phenomena. Pupils are encouraged to understand how these key concepts provide them with the knowledge to explain what is occurring, predict how things will behave and analyse causes.

Aims

We want the pupils at Berkeley Primary to develop:

- The ability to think independently and raise questions about working scientifically and the knowledge and skills that it brings.
- Confidence and competence in the full range of practical skills, taking the initiative in, for example, planning and carrying out scientific investigations.
- Excellent scientific knowledge and understanding which is demonstrated in written and verbal explanations, solving challenging problems and reporting scientific findings.
- High levels of originality, imagination or innovation in the application of skills.
- The ability to undertake practical work in a variety of contexts, including fieldwork.
- A passion for science and its application in past, present and future technologies.

EYFS

At Little Jesters and then in Reception, we provide engaging scientific activities and experiences for children through the Early Years Foundation Stage curriculum area of 'Understanding the World'. This involves guiding children to make sense of their physical world and community through opportunities to explore, observe and find out about people, places, technology and the environment.

Curriculum Coverage

From Year 1 onwards, the programmes of study for science are set out year-by-year in the 2014 National Curriculum for Science. We are however, only required to teach the relevant programme of study by the end of the key stage: Key Stage 1, Lower Key Stage 2 and Upper Key Stage 2. Within each key stage, school has the flexibility to introduce content earlier or later than set out in the programme, if appropriate. Our curriculum has been planned carefully to ensure all content is covered by the end of the key stage for each cohort.

Science is taught once a week and follows the sequencing that can be found in appendix 1.

Scientific Skills & Scientific knowledge

Alongside biology, chemistry and physics, working scientifically is a key concept. Teachers will teach these investigative skills through practical lessons.

At Berkeley, we believe that, throughout the academic year, teachers should plan units, (from their relevant year program of study), to fit their topics and the children's interests as appropriate.

Teachers use precise questioning in class to test conceptual knowledge and skills and assess children regularly to identify those children with gaps in learning, so that all children keep up.

The scientific method is a simplified way for children to ask and answer scientific questions by making observations and doing experiments. We use the Planning House template for our enquiries. This begins with children using a devised template in Key Stage 1. As the children's

knowledge and understanding increases, they will be able to evidence their work in different ways, whilst still using the template as a starting point.

Each unit must contain, at least, 1 investigation following this template.

Key Stage 1:	Lower Key Stage 2:	Upper Key Stage 2:
What do we want to find out? What will we do? What have we found out? Why?	What do we want to find out? What will we do and what do we need to use? What and how will we measure/observe? How will we make it fair? How will we record? What did we find out? Why?	What are we asking? What factor can we change? What factor will we measure/observe to collect your results? What is my plan? What factors need to be controlled to keep the test fair? How will we record our results? What is the best type of graph to use? What do the results show? Why?

In each lesson, only one or two investigative skill(s) should be selected, though the teacher may model how it fits in with the wider scientific method. For example, the teacher may plan the investigation and decide on the hypothesis, while the children focus on the skill of measuring and data collection.

Differentiation

The demands of the learning experience should be matched to the abilities and needs of all pupils and ensure appropriate challenge.

Assessment

Teachers will carry out regular formative assessments through discussion with pupils; observation of pupils; marking work; and other Assessment for Learning strategies. These will be recorded on Insight and focused on scientific investigative skills 'working scientifically'.

Effective assessment is about 'feedback' to inform the next stage of the curriculum as well as formal reporting.

Easy-speak recording devices to assess speaking and listening skills in Science, along with supporting SEN children, who find it challenging writing science down, will be used when appropriate.

Our full Science curriculum approach can be found on

<https://www.berkeleyprimary.org.uk/media/DOC6183F8F36B71A/Science%20curriculum%20Approach.pdf>

Health and Safety

During planning, teachers need to consider and minimise risks for all activities and systematically teach pupils to take responsibility for determining the risk to themselves and others. **All staff follow** COSHH risks assessment guidance in the 'Be Safe' publication kept in the staffroom.

Parental Involvement

Any science trips undertaken should be planned with due regard to the school policy on taking children on outings.

Following the guidelines in the whole school policy, parents may be involved in class based work if they can offer a particular skill or extend and compliment the class teacher's skills and knowledge.

Organisation

The class teacher will normally be responsible for delivering Science, in their single-aged classes. Children will be encouraged to work in whole class activities, small groups and through individual tasks, but the focus will be on encouraging co-operative working. This will be determined by the age, task and ability of the pupils.

A wide range of teaching and learning styles will be used, with focus on investigative activities. Teachers are encouraged to teach science in creative ways using different teaching styles to cater for different ways of learning.

Recording & Evidence

Science work and evidence will be recorded in a variety of ways, appropriate for the science learning taking place and will be up to the discretion of each individual teacher.

For practical activities, recording should be encouraged through (but not limited to):

- pictures, videos,
- post-it notes,
- talking tin recordings, drawings,
- blogs

For appropriate written work, recording should be creative whenever possible through:

- models
- posters
- animations
- songs

as well as more formal written evidence including (but not limited to):

- investigation plans,
- tables of results,
- written conclusions etc

These can be recorded in science books, displays, the website and, when relevant, in theme books.

Vocabulary

Vocabulary is a main driver at Berkeley Primary School. Any new scientific vocabulary, be it during science or theme lessons, will be added to a glossary in the back of children's books. This will be continually referred to ensuring knowledge is embedded and children have a rich and growing vocabulary.

Links with other subjects:

At least one non-fiction unit of Literacy, in each year-group should be focused on teaching children how to write scientific texts and writing up scientific investigation work.

Strong links could be made between instructional writing and writing scientific methods or planning investigations; discussion writing and scientific conclusions; explanation texts and writing up results / linking results with Key Concepts.

Excellent teaching methods, taught in Literacy should also apply in Science lessons e.g. when introducing scientific vocabulary, reading scientific texts and learning how to write scientifically. For example, when learning to write scientific questions, good models of 'what a good one looks like' should be used and writing frames given to support children.

Pupils will be taught to use a wide range of appropriate recording methods which will include the use of ICT. The strong practical mathematical links will be seen as an opportunity for teaching and should be explored at the planning stage. Wherever possible, Science will be linked into the Creative Curriculum topic. Spiritual development is encouraged by reminding children of the wonder of science and the effect of scientific discoveries of the modern world.

Links with the outside world:

Teachers will make explicit links between science learning and how it can be applied in outside in the daily-life, where appropriate. Links will also be made through relevant trips, visitors and clubs. We are hoping to appoint science ambassadors across the school to encourage and share the love of science across the school by the end of the year. They will help with the organisation of science resources, assist teachers in setting up their classroom for science lessons and try out new science equipment.

Resources:

Science resources are kept in drawers on shelves labelled individually in a locked cupboard, with adult access only. Teachers are encouraged to use Purple Mash, British Science Association website resources, Learning Resources Partnership materials and other online resources to support lessons.

Equal Opportunities:

All children have equal opportunities to reach their full potential across the Science curriculum, regardless of their race, gender, cultural background, and ability, or of any physical or sensory difficulties. We have built a culture in science lessons where differences are valued. At Berkeley Primary School, diversity is one of the main drivers of our curriculum and we learn about famous scientists from all backgrounds and cultures wherever possible.

Monitoring and Evaluation:

Throughout the school year, teachers will assess whether children are working at/above or below the expected level for their age based on their understanding and application of the content of the National Curriculum 2014. Progress and attainment is reported to parents through parents' evenings and end of year reports.

The role of the subject leader is to:

- Co-ordinate the teaching of science within the school.
- Be responsible for the development of science in school.
- Monitor the effectiveness of science in school.
- Support teachers in their planning and strategies for classroom management.
- Disseminate new information.
- Provide or organise staff training.