



## Intent:

At Birchfield Primary School, our vision is to give children a science curriculum which enables them to confidently explore and discover the world around them, so that they have a deeper understanding of the world we live in. Science is ever changing and is fundamental for a prosperous future, which we strive to facilitate, and stress the importance of when delivering the teaching of the processes, methods and knowledge of this vital area. We aim to create fun and stimulating science lessons that nurture children's natural curiosity and their on-going development. We achieve this by ensuring that children are exposed to quality first teaching, investigating scientific phenomena and real-world problems, and by applying scientific skills. At Birchfield, Science is delivered through a hands-on, enquiry-based curriculum which promotes questioning, challenge, working practically, investigating, evaluating, making choices, working independently and using scientific vocabulary. Children also develop an understanding of how important and relevant science is to their lives, now and in the future through enterprise, Science Days and STEM activities.

A key element to our teaching is the building of fundamental scientific knowledge and concepts that can be added to and developed each year to allow our students to advance their rational thinking skills in addition to developing a sense of curiosity and excitement about science. Students are encouraged to understand how science can be used to explain what is occurring, predict how things will behave, as well as analyse the causes they observe or record. Students at Birchfield are constantly exposed and immersed in key scientific vocabulary, increasing student's knowledge and understanding of not only the specific matter they are currently studying, but of the world they live in. Fundamentally, science in our school is about developing our student's ideas and scientific thinking by allowing them to investigate and study the environment and world around them, regardless of their gender, ethnicity or ability which we achieve with a balanced and broad science programme of study.

## Implementation:

At Birchfield we ensure high standards of teaching and learning in science, we implement a curriculum that is progressive throughout the school. We use both the EYFS framework and the National Curriculum to shape the content and expectations of our curriculum. Subject content is carefully sequenced to best suit the needs of our children and to compliment effective learning strategies. Our curriculum design is based on evidence from cognitive science; three main principles underpin it:

- Learning is most effective with spaced repetition.
- Interleaving helps pupils to discriminate between topics and aids long-term retention.
- Retrieval of previously learned content is frequent and regular, which increases both storage and retrieval strength.

In addition to the three principles, we also understand that learning is invisible in the short term and that sustained mastery takes time.

To ensure that knowledge is embedded in long term memory, spacing and retrieval will be used to reactivate prior knowledge at regular intervals. This re-sequencing of topics supports the embedding

of knowledge into the long-term memory more effectively. At the beginning of each unit reference will be made to what has been previously learnt to elicit prior knowledge. The topics are interleaved throughout the school in all year groups ensuring progression of knowledge and skills and we will ensure that where a topic has been taught previously, prior knowledge is checked and misconceptions addressed before moving on.

At Birchfield we promote independence for all students to take responsibility in their own learning, therefore we have implemented self-assessment KWL grids, which the children use as a working document to track their achievements and progress at the beginning, during and at the end of a topic. The KWL grids are used to understand whether or not children have remembered their learning from past years but also to assess starting points for concepts that are completely new to them. This takes account of pupil voice, incorporating children's interests. Plans are adapted to ensure that learning is suitable for every learner. Pupil voice is used to further develop the Science curriculum, through questioning of pupil's views and attitudes to Science to support the children's enjoyment of science and to motivate learners. 'Awe and wonder' displays are present in each classroom to influence the children to ask engaging questions and to promote, through discussion, the chance to find out the answers whether through research and acquiring knowledge, to testing things out themselves.

Through teacher modelling and questioning we want our children at Birchfield to wonder and be amazed by the world around them. Key scientific language is modelled and taught throughout lessons enabling our children to be familiar with and use vocabulary accurately. New key terms are introduced carefully with supporting explanations in line with Rosenshines Principles of Instruction. We are committed to providing exciting, hands on and practical experiences for all our children. In turn this will help promote independent learning, curiosity and a love for enquiry and knowledge. Working scientifically is a thread that runs through all units of work however, a specific skill is focussed upon [for half a term](#). All skills may be used throughout the year but by focussing on explicitly teaching one every half a term, we will develop the children's skills and ensure progression.

Teachers are also encouraged to plan trips and visitors to enhance our children's learning experience when possible. Once a year, the whole school works off a timetable and participates in a 'Science day'. A theme runs across the school, with children investigating a Science/STEM question. This enables children to immerse themselves in science and its vocabulary. They will learn about scientists, make real life links and work through the steps of a scientific investigation. The work is displayed across the school to share.

## Impact:

The successful approach to the teaching of science at Birchfield Primary School will result in a fun, engaging, high quality science education that provides children with the foundations for understanding the world that they can take with them once they complete their primary education. By the end of Key Stage Two, all children will have developed scientific enquiry skills in the five key areas: Observing changes over time, noticing patterns, grouping and classifying things, finding things out through secondary sources of information and modelling. We want children to be immersed in Science to reinforce the skills that they have previously learned, but then want to build on them by challenging their thinking further. Through enrichment opportunities such as workshops, trips and extra curricular activities, children develop the understanding that science has changed our lives and

that it is vital to the world's future prosperity. We measure the impact of our curriculum through the following methods:

- Children enjoy and are enthusiastic about science.
- Children are confident to use and explain scientific vocabulary.
- Children are able to question ideas and reflect on knowledge.
- Children retain knowledge that is pertinent to Science with a real life context.
- Children are able to articulate their understanding of scientific concepts and be able to reason scientifically using rich language linked to science.
- Children demonstrate a high love of mathematical skills through their work, organising, recording and interpreting results.
- Children work collaboratively and practically to investigate and experiment.
- Children achieve age related expectations in Science at the end of their cohort year.