

Science Curriculum Rationale



At Abbey Lane Primary School, our vision is to provide children with a Science curriculum that enables children to explore and discover the world around them. To accomplish this, we aim to provide lessons rooted in scientific enquiry with practical hands-on experiences that encourage a deeper understanding and curiosity with questioning. Children at Abbey Lane are naturally curious and passionate about learning. We aim to provide a stimulating and open-minded curriculum that nurtures children's natural curiosity, independence and their on-going knowledge and understanding of the world around them. Our objective is to provide hands on, enquiry based activities, which consolidate prior knowledge, encourage deeper understanding, and the joy of exploration, all rooted in scientific vocabulary. We believe it is vital to promote and develop transferrable skills such as observation, communication and team work to evolve the whole child as a lifelong learner.

INTENT	IMPLEMENTATION	IMPACT
<p>Alignment to the National Curriculum</p>	<p>Pedagogical Approaches</p>	<p>Approach to assessment</p>
<p>The Science curriculum at Abbey Lane begins with the EYFS framework, particularly the 'Understanding the World' strand, and then follows the National Curriculum programme of study as a basis for its content and framework, this ensures cohesion and progression. We draw on resources from Explorify, Motilab and STEM. These resources supplement the National Curriculum, ensuring teachers recognise the core knowledge and vocabulary all children must master. Our curriculum nurtures children's natural curiosity allowing them to ask questions and develop the skills needed to answer them, whilst ensuring that children will learn scientific skills through practical first hand experiences whenever possible. Each topic will be based around a knowledge organiser that outlines the vocabulary and knowledge that all children must master.</p>	<p>In Science, the children will gain knowledge of scientific concepts and deepen their understanding through 'working scientifically'. These skills are built into lessons, with strands running alongside scientific content. We use a range of engaging ways to deliver the curriculum, including; group work, real-life practical experiences, problem solving, questioning and making links to other areas of the Abbey Lane Primary School curriculum.</p>	<p>A range of formative assessment strategies are used to systematically check for understanding and establish how well children are doing in making sense of the material. Focussed assessment tasks, such as specific recall activities like quizzes, are used to enable teachers and children to monitor the depth of understanding. Live feedback techniques help all children to move forward, deepening their understanding or gaining fluency.</p>
<p>End points</p>	<p>Teachers' Expert Knowledge</p>	<p>Performance Data</p>
<p>Through our Science curriculum, pupils are equipped with the skills, vocabulary and knowledge of processes through which Science is achieved and applied. By the time pupils move on to secondary school, they will be able to answer their own Science questions independently through well developed working scientifically skills: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. The end points for working scientifically, set out in the National Curriculum for Y2 (where the focus is observation and exploration) and moving towards Y4 (scaffolded enquiry), are the stepping stones towards this goal.</p>	<p>It is essential that teachers have the required level of expert knowledge so that explanations are clear, accurate and responsive, and children's misconceptions are anticipated and addressed as they arise. Teachers looking to improve their curriculum knowledge and delivery are signposted to reading and specialist training courses, for example STEM learning opportunities locally or nationally or to reading or using the support materials supplied by Explorify and STEM. It is essential that teachers have the required level of expert knowledge so that explanations are clear and accurate, and children's misconceptions are anticipated and addressed.</p>	<p>Data is submitted for Science at the end of KS1 and KS2. The school tracks progress towards these in every year group termly to ensure children are on target for national expectation. Gap analysis provides information for future planned topics. Specific recall activities like quizzes, are used to enable teachers and children to monitor the depth of understanding of core substantive knowledge and vocabulary and the strength of its retrieval. This, in conjunction with formative strategies enable teachers to make judgements against National Curriculum standards.</p>
<p>Sequencing</p>	<p>Promoting Discussion and Understanding</p>	<p>Pupils' Work</p>
<p>The Science curriculum has been sequenced in order to ensure progression of knowledge and skills in biology, chemistry and physics. We ensure that as pupils make progress, they develop secure</p>	<p>Children share observations and findings and help one another to make connections in their learning and so develop a deeper understanding. Discussion</p>	<p>Pupils' work, in written and photographic forms, in individual books, is used to secure and demonstrate children's learning. It informs teacher assessment, both formative and summative, and is</p>

understanding of each key block of knowledge and concepts before progressing to the next stage. Our assessment of children's knowledge at the beginning and end of topics allows us to accurately develop scientific knowledge, which is continually built upon as the children progress through school as well as effectively using AFL strategies to identify gaps and misunderstandings during each session.

Addressing Social Disadvantage

We recognise that children come to us with different amounts of science capital (knowledge, attitudes, skills and experiences) but all children have a right to know and remember the core knowledge and vocabulary identified in our curriculum. We are committed to ensuring all children master this substantive knowledge and use regular opportunities for retrieval practice to close this gap. Additional Science capital is gained through activities such as trips and science visitors. Support is in place for disadvantaged families to ensure equity when accessing experiences in and out of school so that all children have the opportunity to engage in these.

Local Context

Our curriculum aims to allow children to explore their local environment, discover an understanding of the scientific processes and experience science happening in the real world. This can be seen through lesson experiences on our site, such as using the woodland area, and through linking with outside organisations on scientific projects (to enhance children's science capital) such as Sheffield Hallam University.

(both pupil to pupil and pupil to teacher) has an important role in the development of scientific ideas and opportunities to discuss questions using a variety of techniques, such as probing, recall or open to name but a few, should be taken when they arise. Effective questioning will allow children to make links between concrete or abstract examples and the wider world. Essentially, through these opportunities for Science talk, core knowledge is fully understood. Practical experiences are provided, encouraging questioning and allowing children the opportunity to use scientific skills to discover answers through investigation.

Knowing More and Remembering More

Opportunities for retrieval practice are included in Science lessons to ensure knowledge is transferred into long-term memory. Retrieval activities may require children to remember learning from the previous lesson, previous topic or even previous year to ensure the retrieval strength of powerful knowledge is high. The knowledge organisers may contain vocabulary from previous year groups to encourage repetition of certain vocabulary and concepts. This is then built on and developed during the topic. Throughout all topics, there are opportunities provided for children to use learnt vocabulary to verbally explain and as part of written responses e.g. explanation, response to a photograph, labels/annotations on diagrams and pictures.

Teacher Assessment

Formative assessment is essential in the implementation of the science curriculum to ensure that all children have schemas of understanding which will move them on their journey from novice to expert. This may take the form of mini quizzes, testbase questions or through observed practical investigations to test knowledge and understanding. A wide range of AFL and questioning ensures that misconceptions are dealt with swiftly during taught lessons.

Talking to Pupils

used by subject leaders as part of the monitoring process. Greater independence in written work and formulating their own lines of enquiry is evident in the higher year groups.

The subject leaders talk to pupils about their learning as part of the monitoring process to gauge attainment and enthusiasm. Children's books and knowledge organisers are used to guide discussion and provide the subject leader with the necessary information to measure how much core knowledge and vocabulary has been remembered and understood as well as the wider links that pupils are able to make between Science, other subjects and the wider world. At Abbey Lane our curriculum will be having an impact if children will have developed a love and passion for questioning and investigating scientific ideas and concepts.