



Itchen Abbas Primary School

'Growing Hearts and Minds'



Subject Development and Rationale

Science

Intent of our Science Curriculum

Itchen Abbas is a rural village on the River Itchen about 4 miles north of Winchester. Most people who live in the community were born in the UK and migration and immigration into the area are low. Therefore, the community does not have a high level of diversity and children are not typically exposed to diversity within their daily lives. In recent years, since Covid, the school has seen more children join the school from abroad. However, most are white middle class with parents who were working abroad and children attending British Schools. A small number of families new to the school are from Ukraine and are refugees.

According to the 2011 census, Itchen Abbas has a higher education level than the average for England. The percentage of adults in higher paid, managerial and professional jobs is above average and this manifests into high expectations and ambition for children from their parents. Many parents work in the science industries for example, as doctors and surgeons.

Therefore, through our science curriculum, we aim to:

1. Provide children with opportunities to operate as scientists, engaging in rich scientific problem solving.
2. Enable children to develop secure, meaningful and memorable scientific knowledge and understanding.
3. Provide opportunities for children to develop their inquisitive minds, foster their curiosity, and to promote their sense of awe and wonder.
4. Motivate children by engaging in 'real' and purposeful science.
5. Develop children's understanding of the significance of science for the world today, and for the future.
6. Enable children to develop a deep understanding of their local environment.
7. Teach children how to work in a safe manner, learn from mistakes in a safe environment and develop their ability to manage risks.
8. Ensure that all children are successful in science and are ready to move to the next stage of their learning.

Implementation of our Science Curriculum

The implementation of science is supported by:

Scheme of Work

When planning science, teachers use the Hampshire Learning Journeys which are based on the science National Curriculum and promote rich scientific problem solving. For each unit, these clearly define the substantive scientific ideas (knowledge and understanding) to be taught by teachers.

For each unit, substantive knowledge is broken down into knowledge blocks, ensuring that key scientific ideas build upon each other in a logical order. This allows children to make links to the scientific knowledge they already have and deepen their understanding.

The science leader has produced a 2-year cycle curriculum map that outlines the coverage of all units and ensures progression of key scientific ideas throughout KS1 and KS2 and also within year groups. The curriculum is designed in such a way that ensures that new knowledge and skills build upon what has been taught before.

As a school, we have an emphasis on scientific problem solving in lessons. We teach science to 'do science' and to ensure that children remember their learning.

Problem-solving activities are used throughout the curriculum. These include using scientific ideas to predict what might happen, using scientific ideas to hypothesise why something happened, planning experiments to find out what happens and drawing conclusions from evidence about what happens. Teachers use the problem-solving model to consider the precise knowledge they want children to understand/ remember and which problem(s) will require the children to apply this knowledge. By adopting this approach, children are given regular opportunities to commit their learning to their long-term memory and apply their understanding fluently.

In addition to problem solving activities, Children are given opportunities to re-visit scientific ideas through the regular use of retrieval practice activities for example the use of visual prompts and questioning i.e. 'what does this scientific image conjure up?'

As a school, we ensure that sufficient time is dedicated to the teaching of science and it is taught weekly to every year group, ensuring that children are given opportunities to apply their understanding to a wide range of contexts. This ensures that children can revisit previously taught knowledge, deepen their understanding and master the science curriculum.

Disciplinary knowledge (the skills of working scientifically) are embedded throughout our curriculum. These are divided into the following areas: Knowledge of scientific methods, knowledge of apparatus and techniques, knowledge of data analysis and presentation, knowledge of how scientists use evidence to develop explanations.

To support children when working scientifically, children are taught how to use scientific scaffolds including sketch graphs, annotated diagrams, a model for writing conclusions and the planning mind map. These are modelled progressively across KS1 and KS2 so that children can apply them with increasing independence as they progress throughout the school. The science leader works with teachers to plan for problem solving activities, including the use of scaffolds (how and when to use).

For every unit, teachers use the Hampshire 'keeping safe in science' safety cards and these are referenced on planning. Children are involved in considering risks and ways to keep safe through involvement in class discussions. When working outside of the classroom, children work together to produce their own code of conduct.

Throughout science lessons, children are encouraged to raise their own questions based on their interests and fascinations. Children consider different ways that their questions can be answered and are given opportunities to answer/ explore these for themselves.

Key Vocabulary

Key vocabulary is highlighted on each scientific learning journey and this is taught explicitly to the children. They are taught that some vocabulary has a different meaning in the context of science. Vocabulary cards relevant to each unit are displayed in the classroom for children to refer to regularly. These include definitions, visual representations, examples of the word, non-examples of the word and synonyms as appropriate. Children are encouraged to use the correct scientific vocabulary in both their written and verbal work.

The science curriculum at Itchen Abbas is enriched through:

- Trips and visits to support topics for example, visits to the planetarium at Winchester Science Centre and Manor Farm.
- Visitors into school to share their scientific expertise/ job roles in the field of science (STEM)
- Quality texts from the Schools Library Service to support children's learning in class and own scientific research
- Specially planned activities during British Science Week
- Regular opportunities to work outside of the classroom and study living things in the local environment
- The use of high-quality scientific equipment and ICT

Support for Staff and Subject Knowledge Development

- The subject leader keeps up to date with science updates from HIAS.
- The subject leader shares examples of good practice with staff members at staff meetings and also through regular discussions.
- The subject leader consults with Hampshire as well as the National College to develop their own expertise. We also have good ties with our feeder secondary school, Henry Beaufort, and local primaries and have developed networks to support our curriculum development.
- The subject leader consulted with HIAS to develop a curriculum map for mixed age classes that ensures progression across and within Key Stage phases.
- Subject leaders have compiled a support for SEN document which supports teaching in identifying how to support children with additional needs so that all children have access to the full curriculum.
- Medium Term Plans are planned by teachers based on the Hampshire Learning Journeys. This is supported and evaluated by the subject leader.

How this Subject Works Alongside Others

At Itchen Abbas Primary School, we value science as a core subject which contributes to the whole curriculum and, by its practical and enquiring nature, is related to other subjects in the curriculum. Curriculum links include:

- English- the language of science: Children are taught the meanings of scientific language for example force, evaporation, solution, eco-system, process etc in order to develop their scientific vocabulary. Children are encouraged to articulate their thinking about scientific concepts clearly and precisely using the correct terminology. Through reporting on findings from enquiries (including both oral and written explanations), children are provided with real life opportunities to apply and develop their writing/Speaking and Listening skills.
- Mathematics- When working scientifically, children are required to collect, analyse and present data and this provides excellent opportunities for children to apply and develop their

mathematical skills. The application of mathematical skills includes measuring time, weight, length and volume; calculating averages; representing data graphically; plotting and interpreting graphs and using them to make predictions.

- Geography- children learn about the processes involved in the water cycle as part of their unit on 'Solids, Liquids and Gases', and are also encouraged to observe and measure weather patterns when studying changes in the local environment.
- History- Children learn about the contributions made by scientists of the past – discoveries, inventions etc to improve our lives.
- Music- children learn about different sounds and explore how to make them using different instruments.
- P.E-children are able to make links between different movements and forces.
- Children apply their ICT skills regularly in science lessons for example using the internet to carry out research, using digital cameras to make observations, using apps to take accurate measurements, gathering data from databases and using software to present their findings.
- Where possible, planning facilitates opportunities to make cross curricular links with other topics for example, when children learn about electrical circuits in KS2, they apply this to Design and Technology by designing and making doorbells for pets. When children learn about pitch and volume in their UKS2 unit on sound, they are able to apply this when creating graphic scores in their music unit on 'dynamics, pitch and texture'.

How science promotes SMSC and British Values:

- Science supports spiritual development by providing many opportunities for children to think and spend time reflecting on the amazing wonders which occur in our natural world.
- Science supports moral development by showing children that different opinions need to be respected and valued. There are many moral and ethical issues that we cover in science including discussions about the impact of human activity on the environment.
- Science supports social development by providing opportunities for pupils to develop team working skills and to take responsibility when carrying out experiments. Pupils must take responsibility for their own and other people's safety when undertaking practical work.
- Science supports cultural development by looking at how scientists from a range of cultures have had a significant impact globally.
- Science promotes British values by providing children with opportunities to take the views and opinions of others into account when following a line of enquiry. Children understand the importance of safety rules when working scientifically and understand there are consequences if rules are not followed. Pupils are encouraged to make choices when planning investigations and work as part of a team to carry them out.

Early Years

In Early Years, science is taught through a topic-based approach which is developed each year through the children's interests. Teachers plan short topics based on the needs and interests of the children. Children can achieve these through continuous provision with enhancements adjusted to the children's needs, through child-led or adult-led activities. The Early Years Leader has developed progression maps which identify which skills will be taught at which stage to support children's scientific development so they are ready for year 1 learning. We anticipate seeing science in the Early Years through the following areas and specific goals:

<p>Communication and Language</p>	<ul style="list-style-type: none"> • Listen attentively and respond to what they hear with relevant questions, comments and actions when being read to and during whole class discussions and small group interactions; • Make comments about what they have heard and ask questions to clarify their understanding;
-----------------------------------	--

	<ul style="list-style-type: none"> • Participate in small group, class and one-to-one discussions, offering their own ideas, using recently introduced vocabulary; • Offer explanations for why things might happen, making use of recently introduced vocabulary from stories, non-fiction, rhymes and poems when appropriate; • Express their ideas and feelings about their experiences using full sentences, including use of past, present, and future tenses and making use of conjunctions, with modelling and support from their teacher.
Understanding the World	<ul style="list-style-type: none"> • Explore the natural world around them, making observations and drawing pictures of animals and plants; • Know some similarities and differences between the natural world around them and contrasting environments, drawing on their experiences and what has been read in class; • Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.

Impact of our Curriculum

Assessment and Progression

- Progression documents inform teachers of the level at which each class need to be working to achieve age expectations in science. This is for both substantive and disciplinary knowledge.
- Teachers assess children’s knowledge and understanding of key scientific concepts throughout units and also through substantive knowledge assessments at the end of units.
- Teachers track children’s working scientifically skills across the EYFS, KS1 and KS2
- Teachers record assessment data on our science curriculum assessment records. These are analysed by the science leader and then used to inform future planning.

Monitoring and Pupil Voice

- Subject leaders evaluate the understanding of conceptual knowledge through pupil voice of different groups of children and abilities. This supports the subject leaders evaluation of the subject.
- Subject leaders regularly scrutinise children’s work in books to evaluate impact of teaching, advise the teacher on even better if and identify next steps in CPD
- The subject leader considers how teachers have adjusted their lessons and supported children with additional needs so that all children have appropriate stretch and support.