

Science at The Mill Academy



Intent

At The Mill Academy we recognise the importance of Science in every aspect of daily life. As one of the core subjects taught in Primary Schools, we give the teaching and learning of Science the prominence it requires. Our curriculum has been carefully designed to ensure the National Curriculum is being fully met, whilst giving pupils the opportunity to build on their prior knowledge and make links between subjects. Our Key Driver “be resilient” will be fulfilled annually by pupils whilst conducting a range of investigations, designed by our science leader, which are at the forefront of our curriculum. It is our intention to deliver a Science Curriculum, which develops the learning of science skills alongside a questioning mind about ways in which Science influences everyday life, giving it purpose and context.

Our investigative Science will encourage children to ask their own questions and are given opportunities to use their scientific skills and research, to discover the answers. Ultimately, this will help all children to understand the world they are growing up in and provide them with life skills to better access it. As our Key Driver states “be creative” so we enable pupils at The Mill to become creative thinkers, therefore growing up into adults who strive to seek solutions to problems and answers to life’s questions.

We strive to develop our children’s curiosity and excitement about the natural world, encourage respect for living organisms and the physical environment of their earth. Our Key Driver is to “be world-wise”, so by empowering and informing pupils to use their knowledge and skills to understand how Science can be used today and, in the future, they are better equipped to make sustainable choices to protect our precious world.

We endeavour to promote a joy and excitement for learning, which our children can use in all other areas of the curriculum as well as raising their personal self-confidence. Learning about key scientists from a range of times of history, and backgrounds can offer further inspiration for our young scientists. Topics are revisited and teachers use precise questioning during high quality lessons, which ensure progression by building upon the vocabulary and skills taught previously. We have expertly planned to create involvement via numerous “WOW moments” and for our pupils to be able to approach unknown and unexplainable phenomenon with awe and wonder, through practical hands-on experiences.

Implementation

The science curriculum at The Mill Academy is based upon the 2014 Primary National Curriculum in England, which provides a broad framework and outlines the knowledge and skills taught in each Key Stage. Each class have a series of science pathways, one per half term, that have been developed to ensure progression of knowledge, vocabulary and working scientifically skills from EYFS right up to Year Six, including key scientists in different fields.

Exploration is vital to learning Science and from the EYFS through to KS2 at The Mill Academy, Science should wherever possible be a practical experience. During EYFS the Specific Area of "Understanding the World" contains the Science objectives to be covered. Pupils should be learning scientific knowledge and vocabulary and 'working scientifically' appropriate to their developmental age. From Year One to Six, our science pathways ensure coverage and repetition of working scientifically skills, providing new vocabulary and that to be reapplied from previous year groups, in accordance to our new science vocabulary progression documents.

To ensure high standards of teaching and learning in science, we implement a curriculum that is progressive throughout the whole school. Science is taught weekly, which may be taught as discreet lessons or as part of topic work. Teachers must have the same expectations during science lessons that they would have when teaching English or Mathematics and that any mathematical task is pitched at an age-appropriate level to ensure sufficient challenge. It is vital that any mathematical or English barriers should not impede a child's scientific learning, therefore learning topic-specific vocabulary is a central part of our half-termly science pathways. The vocabulary children will need for each area of science are identified on the school's progression document and this builds upon the vocabulary they have learnt in earlier years. The key vocabulary will be emphasised at the beginning of each unit of work and through a variety of teaching approaches, then will be reiterated throughout subsequent lessons.

When teaching science, teachers should follow the science pathway documents, designed and created by our experienced science lead. These include diverse learning experiences to embed new concepts, such as drama, and develop in tandem the pupil's working scientifically skills. Each lesson will have a particular focus, which will develop over each pathway and throughout the year into increased confidence of the enquiry process, and the specific skills involved. When launching each pathway, a list of class questions will be generated in the first lesson and each week one of the questions will be investigated, weaving scientific enquiry skills into each session as the science lead deems appropriate. Some investigations will require several weeks to develop, others will be quick.

At the Mill Academy, we provide a variety of opportunities for science learning inside and outside the classroom. Learning outside of the classroom is an essential part to learning science, so we encourage children to observe and immerse themselves in their local environment to apply their learning practically to real-life situations.

Evidence will be kept in several places: Evidence of work for KS1 and 2 should be in children's Science books. Specific evidence of science learning covered each term will be audited to determine how skills are progressing over key stages, supporting the Science Leader to monitor science learning throughout school. There are posts documenting learning with examples of work on our school's twitter platforms using the #themillscience.

Science provides excellent opportunities to enhance the learning of more able pupils through planning lines of enquiry, asking opened ended problems, analysing results and drawing conclusions based on scientific findings. We also believe it is important that parents are involved in their children's science learning in an ever-evolving world. Every year, we shall have a "Science Week," where the subject lead plans simple, engaging practical activities for the children to complete with their parents at home, alongside in-school tasks. This encourages them to ask questions about the world and demonstrates how they can think scientifically and investigate using simple everyday objects. This emboldens families to engage with scientific activities themselves at home, to start the dialogue and help support children's learning and enthusiasm. In addition, this aids raising the profile of science both within and outside school, familiarises them with a more diverse set of famous scientists in a real life context.

CPD will be offered to staff where needed, alongside online training units to develop their own subject knowledge. The Science Lead will deliver regular CPD sessions to keep colleagues up to date with primary science innovations.

Impact

Within science at The Mill Academy, we strive to create a supportive and collaborative ethos for learning by providing opportunities for children to question and investigate to discover answers for themselves and take their learning in a direction they are interested in. The evidence collected shows that the standard of science teaching and learning and the enrichment opportunities offered to the children is very high, that our science curriculum is of great quality, well thought out and demonstrates progression. We focus on advancement of knowledge, understanding and skills and discreet vocabulary development also form part of each of our innovative and fun year-group planning, within each half termly science pathway, designed and developed by our Science Leader.

The impact is for all pupils to develop a sense of excitement and curiosity and provide them with the necessary skills and knowledge to become young scientists. We measure the impact of our curriculum through these methods:

- Assessing children's understanding of topic linked vocabulary before and after the unit is taught.
- Marking of written work in books.
- Summative assessment of pupil via discussions about their learning.
- Images and videos of the children's practical learning.
- Interviewing the pupils about their learning (pupil voice) carried out by Our Science and Wider curriculum leaders.
- Moderation staff meetings where pupil's books are scrutinised and there is the opportunity for a dialogue between teachers to understand their class's work.
- Annual reporting of standards across the curriculum to parents.
- The science subject leader will continually monitor the impact science teacher is having on the children's learning, to ensure the progress of knowledge and skills is being taught in accordance with our science planning pathways.

The Mill Academy's Science Curriculum ensures:

- *EYFS pupils are KS1 ready by the time they leave the Early Years:*

Rainbow (FS1) and Sunshine (FS2) classes prepare the children for KS1. Children have explored the three strands of Understanding the World: The World, Technology and The World to prepare them for more formal learning in Y1.

- *Assessment in KS1 and KS2 is used to support next steps:*

Focusses primarily on depth of understanding, not just superficial knowledge recall, but also on knowledge and understanding of key vocabulary and each pupil's ability to use this language appropriately within context. Our assessment for learning practices involve pupils continuously with their learning and allow us to evaluate the continued enjoyment and confidence of individual pupils during different topics within our science curriculum.

- *Pupils are secondary ready by the end of Year Six:*

Criteria from both the primary and secondary National Curriculum are blended to correctly prepare pupils for expectations required by secondary schools. Our broach, rich Science curriculum ensures all pupils, including disadvantaged and SEND acquire the knowledge and Science capital they need to be ready for the next Key Stage and to ultimately succeed in the STEM based world they live in, preparing them for secondary education.

- *Working scientifically is developed effectively through progressive skill steps from EYFS to Year Six.*
- *English and Maths are developed in tandem:*

Through skills and knowledge well-matched to year group expectations within our progression documents. Developing cross-curriculum blended learning is vital for problem solving skills necessary for STEM approaches.

Strategies to support children with SEN

At The Mill Academy, in Science, we use a number of evidence-based strategies to support children with SEN. Strategies include:

Scaffolding

Support for SEN children with learning vocabulary; this may include flash cards, word mats, word banks

Visual aids, stories and pictures to support learning

Hands – on and multi -sensory experiences

Support in writing sentences eg, missing words rather than writing the whole sentence when doing essay writing

All scaffolding follows a 'I do, you do, we do' approach.

Explicit Instruction

Pupils may be supported in their thought process in Science

Pupils will be given specific opportunities by adults to practise specific skills that are barriers to learning.

Visual aids and concrete examples (where necessary) will be used to support learning.

Cognitive and Metacognitive Strategies

Tasks may be 'chunked' into smaller steps.

Visual prompts may be used to aid learning

Story maps can be used to explain e.g. how our digestive system works

Depending on ability, children with SEN may be asked to evaluate their own progress and discuss what they can do to move their learning forward.

Flexible Grouping/Fading

Temporary groups may be established to support learning a particular concept.

Pre-teaching and support with new learning.

Use of technology

Tasks set may include useful apps/websites to move learning forward as well as multi – sensory experiences including outdoor areas.

Books for Science

<https://schoolreadinglist.co.uk/books-for-topics/science-fiction-stem/>

<https://www.booksfortopics.com/booklists/topics/science-maths-computing/>