



ST JAMES
C.E. PRIMARY SCHOOL

DREAM • BELIEVE • LEARN • ACHIEVE

SCIENCE CURRICULUM POLICY

At St James Primary School we aspire for every single child to succeed. Through our Christian vision we thoroughly believe that all children have the potential to thrive regardless of their starting points, personal context, and characteristics. Our children learn through a supportive and purposeful curriculum, linked tightly to national curriculum objectives, that demonstrates that:

"With God there is no limit to what you can do. There is no obstacle you can't overcome. Through Him all things are possible." (Matthew 19:26).

Our staff are committed to developing a love of learning, whilst developing the skills and values to support the all-round development of every pupil. St James C of E Primary School is a special place where we dream, believe, learn, and achieve.

Intent

We believe that Science enables children to develop their curiosity and sense of enquiry, questioning their understanding of the world around them and extending their knowledge. Through building up a body of key foundational knowledge and exploring scientific concepts, pupils will develop a sense of excitement and wonder about natural phenomena. The teaching of science begins in the Early Years supporting pupils to understand the world around them.

At St James, we lay the foundation for a progressively deepening knowledge and understanding of scientific ideas that will be useful to children in later life. The embedding of scientific enquiry skills allows our children to use a variety of approaches to answer relevant scientific questions, bringing more meaning to the world in which they live. The progression of substantive and disciplinary knowledge is well mapped for children and is available with further information on the school website:

<https://www.st-james-farnworth.bolton.sch.uk/science>

We strive to inspire children by studying the achievements of diverse and notable scientists through history and how they continue to influence the world around us. We also try to provide a range of enriching activities, where possible, such as science visitors and trips.

Implementation

Science teaching at St James will reflect the philosophy of the National Curriculum, covering both scientific knowledge and scientific enquiry skills.

Work is planned to ensure progression of substantive and disciplinary knowledge in each phase, appropriate to the children's ages and abilities. For each topic, teachers use intent documents, which include Statutory and Non-Statutory National Curriculum objectives, which ensures planning is progressive, inclusive and comprehensive. Teachers will use formal as well as on-going teacher assessment to adapt their planning where appropriate to meet the needs of all pupils. Leaders have created documents that clearly map out the progression of substantive and disciplinary knowledge so that knowledge is built upon as pupils move through the school. Leaders have also selected concepts in science, that pupils revisit so that learning builds over time. The concepts for science which children revisit with new learning so that concepts are deepened, are: growth, senses, force, classification, light, properties and environment.

Children are taught National Curriculum topics across phases due to the structure of classes at St James CEP. The overview for teaching is available on the website and also in Appendix 1.

To ensure a broad and balanced curriculum, children will receive weekly, discreet Science lessons, which will include practical learning experiences. Lessons also allow children to use skills across the curriculum such as reading, writing and maths skills. We create cross-curricular links with other subjects to ensure lessons are purposeful and relevant to the world in which they live. Children will utilise discussion in their lessons to develop their substantive knowledge, to explore their own and other's thinking and clarify misconceptions. This also allows them to instil the importance of effective communication and expression of findings.

All children access the Science curriculum and it is not narrowed at any point. Teachers make appropriate adaptations to teaching so that all pupils can reach the ambitious end points teachers set for them. Teaching staff use techniques of scaffolding, explicit instruction, cognitive and metacognitive strategies, flexible groupings and technology to support learners.

The national curriculum specifies what disciplinary knowledge pupils will need to know and remember through the 'working scientifically' sections of the programmes of study.

There are at least 4 content area through which pupils make progress when learning disciplinary knowledge:

1. **Knowledge of methods that scientists use to answer questions.**
2. **Knowledge of apparatus and techniques, including measurement.**
3. **Knowledge of data analysis.**
4. **Knowledge of how science uses evidence to develop explanations.**

Research shows that disciplinary knowledge is often framed as only 'skills' in school curriculums and pupils are assumed to pick up these skills by 'doing'. Therefore, in order to inspire curiosity and critical thinking, we will develop children's scientific enquiry skills through practical activities, where pupils will have regular opportunity to explore different kinds of scientific enquiry, we have identified 5 areas that pupils which are:



Research and using secondary sources



Identifying, classifying and grouping



Pattern seeking



Observing over time



Comparative and fair testing

All children are made aware of Health and Safety considerations when undertaking work in Science. All investigations are carefully planned by staff to ensure safety is paramount and that any risks are assessed beforehand. They are also encouraged to show respect for living things and the physical environment.

Long Term Memory

Knowledge empowers and nourishes children, it belongs to the many, not the few. A knowledge rich curriculum has the power to address issues of social disadvantaged and leaders at St James CE Primary have high ambitions so that all pupils can take full advantage of opportunities, responsibilities and experiences in later life.

Learning can be defined as alteration in long term memory, with this being the case leaders have implemented strategies taken from cognitive science to enhance and support pupils in the transfer of new knowledge into their long-term memory.

Teaching staff have drawn on research focussing on Cognitive Load Theory, and teachers understand that pupils working memory is limited and that new content should be introduced to pupils in small and manageable steps to avoid overloading the working memory.

Research from Oliver Caviglioli has also been considered and leaders utilise strategies of dual coding to support pupils in integrating new knowledge into long term memory. By providing simple images to pupils when new content is introduced, they can use both visual and auditory strategies to process the information, forming a greater link with long term memory. Spaced retrieval is also a strategy employed by teachers to enhance pupils' retrieval and in turn secure knowledge into long term memory. Lessons typically begin with a daily retrieval opportunity and additional retrieval sessions are planned over the year.

Learning is a long-term process and teachers utilise four main strategies to support pupils in being successful and confident learners. The agreed strategies are:

- Knowledge organisers (Topic and Science)
- New content in small, manageable steps
- Images to support new learning
- Spaced retrieval practice

For each topic, children are provided with a 'Knowledge Organiser', these are one of the strategies use in school to improve long-term memory. They are used in class and at home to develop the retention of scientific knowledge and understanding and are regularly referred to throughout the year. Children are encouraged to revisit previous learning in other ways, such as quizzes and vocabulary games, to further embed their learning.

Teaching & Learning

Each teaching session in science, follows the agreed school policy of teaching and learning, and is planned to support pupils long term memory development. There are 5 stages in each session:



Activate- teachers activate the appropriate schema and make long term links to learning that occurred in the past.



Vocabulary – teachers explicitly teach vocabulary that pupils need a deep understanding of to support their learning.



Retrieve – pupils complete a retrieval task relating to more recent learning such as self-testing key information from their knowledge organisers.



Teach – The teacher presents new information clearly and in manageable chunks.



Apply – pupils apply their learning by demonstrating their skills gained.

Assessment

Teachers use formal as well as regular on-going teacher assessment to adapt their planning where appropriate to meet the needs of all pupils. End of unit attainment is tracked so that leaders can ensure pupils are making at least good progress through their learning.

Teaching staff utilise strategies of verbal feedback to support pupils with their learning. Whole class feedback grids are utilised to capture areas of work to praise and share, misconceptions and teaching points, presentation and adaptations used to support pupils.

Reading

Pupils have regular opportunity to engage with texts which are academic and support their knowledge acquisition. Teachers ensure texts are age appropriate and teachers explicitly clarify any new vocabulary to support pupils learning.

Impact

Children at St James have a positive attitude and enthusiasm for Science. By the time they leave school, they will have acquired a solid understanding of the world around them and the skills required to become confident problem solvers and critical thinkers, appropriate to their abilities and needs. They will be able to make firm connections between knowledge gained in school and their experiences in life, which will inspire them to question and investigate new concepts.

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