

Why we teach Science at Coton Green

At Coton Green, we passionately believe that science should be inspirational, exciting and investigational. We encourage children to ask and answer questions about the world in order to develop their understanding of the world. We nurture their curiosity and teach essential Working Scientifically skills to make them better informed, deep thinkers and active investigators. By learning about Science through 'hands-on', engaging investigations, children at Coton Green will develop into informed adults, who can use what they know about science to help them make sense of the world. By linking science with other areas of the curriculum, we ensure that our teaching of Science is placed in a 'motivating, real-life context', through which children can also develop and improve skills across the rest of the curriculum, including English and Maths.

Through our provision of high quality science teaching and learning, we will ensure that children at Coton Green experience inspiring science that builds their understanding of the value and place of science in their lives. This will lay a foundation for their future studies, enabling them to make well-informed decisions in our increasingly technical world and give them access to a wide range of rewarding careers.

How we teach Science at Coton Green

Our progressive learning journeys for science are interwoven with cognitive science concepts, which ensures that children are taught the 'right' knowledge sequentially, making explicit links between content where relevant. The planning ensures that children will experience regularly planned opportunities for spaced practice, when key content will be re-taught. It also ensures that children will have frequent opportunities to practice retrieval of key information. The learning journeys set out opportunities for children to apply and practice key content and skills in a variety of contexts, so that they can store knowledge appropriately in their long-term memory. The development of this knowledge-engaged science curriculum, with an emphasis on hands-on learning, detailed exploration opportunities, and chances to apply knowledge and understanding through developing working scientifically skills, will result in children knowing more and remembering more, which aligns seamlessly with the government's revised national curriculum, published in 2014.

Key Features of our Curriculum

The aims of the national curriculum are that all children will develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics. They will also develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them. Children must be equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future. The curriculum is separated into two parts, which must not be taught separately.

The nature, processes and methods of science

'Working scientifically' specifies the understanding of the nature, processes and methods of science for each year group. 'Working scientifically' should be embedded within the content of biology, chemistry and physics, focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions. These types of scientific enquiry should include: observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources. Children are expected to seek answers to questions through collecting, analysing and presenting data. 'Working scientifically' will be developed further at secondary school, once children have built up sufficient understanding of science to engage meaningfully in more sophisticated discussions of experimental design and control.

The national curriculum sets out expectations for teaching and learning of scientific knowledge and understanding and the 'Working Scientifically' skills by key stage and year group. This has been distilled into our Science Learning Journey, which sets out what children are expected to be able to do by the end of each year.

Scientific knowledge and conceptual understanding

The programmes of study describe a sequence of knowledge and concepts. While it is important that pupils make progress, it is also vitally important that they develop secure understanding of each key block of knowledge and concepts in order to progress to the next stage. Insecure, superficial understanding will not allow genuine progression: pupils may struggle at key points of transition (such as between primary and secondary school), build up serious misconceptions, and/or have significant difficulties in understanding higher-order content.

Pupils should be able to describe associated processes and key characteristics in common language, but they should also be familiar with, and use, technical terminology accurately and precisely. They should build up an extended specialist vocabulary. They should also apply their mathematical knowledge to their understanding of science, including collecting, presenting and analysing data. The social and economic implications of science are important but, generally, they are taught most appropriately within the wider school curriculum: teachers will wish to use different contexts to maximise their pupils' engagement with and motivation to study science.

The Early Years Foundation Stage Curriculum

A love of science is fostered and instilled in all our children. During the Early Years Foundation Stage, children's progress is assessed against the Early Learning Goals at the end of Reception. Our children are provided with learning experiences which help them make sense of the everyday world around them, whilst developing skills of observation and questioning.

Cycle A	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
KS1	Animals Including Humans (1)		Plants (2)		Seasonal Change (1)	Everyday Materials (1)
Lower KS2	Rocks (3)		Animals including Humans- Nutrients, Skeletons and Muscles (3)		Sound (4)	Living Things and Their Habitats (4)
Upper KS2	Animals including Humans (5)	Evolution and Inheritance (6)		Living Things and Their Habitats (5)	Animals including Humans (6)	Forces (5)
Cycle B	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
KS1	Animals Including Humans (2)		Plants (1)		Living Things and their Habitats (2)	Uses of Everyday Materials (2)
Lower KS2	Animals including Humans-Teeth and Digestion (4)	Electricity (4)	States of Matter (4)	Light (4)	Forces and Magnets (4)	Plants (3)
Upper KS2	Properties and Changes of Materials (5)	Earth and Space (5)	Electricity (6)	Light (6)	Living Things and Their Habitats (6)	
	Biology		Physics		Chemistry	

How well are pupil's learning?

Assessment: Formative assessment is used in every lesson to inform next steps in learning and ensuring gaps are closed and foundations are secure to ensure new learning can successfully take place. Teachers use spaced retrieval and low stakes testing to assess knowledge and understanding. Knowledge organisers and thinking maps also play a key role in assessing sustained learning.

Summative assessment is used at the end of each topic to inform the teacher of knowledge gained and to identify areas that need additional teaching. Summative assessments will be repeated to identify knowledge retained and to identify areas that need to be focused on using retrieval practice. All summative assessments will be used to direct teacher assessment at the end of the year to inform the next teacher of each child's starting point in terms of knowledge and skills.

Monitoring: Monitoring is undertaken by the subject lead, as well as members of the senior leadership team. It can be made up of one or a combination of: pupil conversations, professional discussions with staff, and learning walks (all of which would involve looking through evidence of learning in books). Leaders monitor the quality of teaching, providing feedback to ensure that teachers are providing high quality Science lessons. Feedback is then given promptly with the intent of developing practice, followed by a discussion if clarification is needed or to plan CPD that would be beneficial.

Moderation: Moderation of teaching provision is currently ongoing within the ATLP quality circle. Through the Year 3 pilot programme, teaching has been moderated by comparing books and children's work. This has informed subject leaders about potential areas for development within the teaching of science in Year 3. In terms of moderating attainment within Science, both assessment and moderation are very much in developmental stages. Once assessment methods have been finalised, moderation will be developed in accordance with other ATLP schools, to develop moderation across the partnership.

How are teachers supported to deliver the curriculum?

The long and medium term plans have been developed as a result of the work done by the ATLP Science Quality circle which has been blended with school-specific curriculum design by the curriculum lead. This means that there are resources available for staff to draw upon created by the quality circle that have been made using their understanding of cognitive science. Where needed, planning support is given by the subject lead.