

Science



Intent - What are our curriculum aims?

At Stocks Green Primary School, our science curriculum is designed to meet our curriculum aims which are to:

- recognise children's prior learning
- provide first hand learning experiences
- promote Creativity
- make connections between subjects and real life
- promote safe, equal, Caring and enjoyable relationships and discussing real-life situations appropriate to the age and stage of pupils.
- encourage the children to develop interpersonal skills
- build resilience and become creative, critical thinkers
- understand their own strengths and areas for development and know how to face challenges
- promote responsibility for learning and future success

Further to this, we have specific aims for pupils leaving our school having experienced our science curriculum. We aim for every pupil to develop essential scientific enquiry skills that deepen their understanding and knowledge of scientific concepts. Throughout our science curriculum we foster in every child a strong curiosity about the world around them, encouraging ambitious questioning and investigative thinking. We aim for the pupils to be equipped with the scientific knowledge, concepts, and skills needed to understand the applications and implications of science in both the present and the future. We also aim for them to become confident in working methodically and scientifically, using a variety of methods to present and communicate their findings. Above all, we want pupils to cultivate a genuine enthusiasm for scientific learning and discovery.

We ensure that pupils develop a secure understanding of broad scientific concepts. As a school, we aspire to foster curiosity by helping pupils explore the science that shapes our world and understand how scientific discoveries over time have influenced health, technology, communication, and many other aspects of our daily lives.

We also recognise the vital role of scientific enquiry skills in developing young scientists. We encourage pupils to think critically, analyse scientific data with accuracy, and draw thoughtful, evidence-based conclusions from their findings.

Throughout our science curriculum, pupils have the opportunity to combine two distinct types of knowledge to ensure their substantive and disciplinary knowledge are building with context and purpose.



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We aim for every science lesson to help children **know more and remember more** of our carefully designed curriculum. Our science curriculum goes beyond the scope of the National Curriculum, offering a rich variety of engaging topics and well-structured units that follow a clear sequence of learning and retrieval questions. This is supported by high-quality scientific workshops and educational outings. The progression of knowledge, skills, and vocabulary is systematically planned to ensure that, by the end of Year 6, pupils are well-prepared for the next stage of their education. Science teaching at our school is designed to equip pupils with essential disciplinary knowledge and enquiry skills, while fostering a lasting curiosity and enthusiasm for understanding the world around them.

Our **curriculum pedagogy** is based on four distinct stages which aim develop children's knowledge over time as well as provide them with opportunities to apply that knowledge and express what they have learnt.

Engage

Engage in memorable experiences that stimulate children's curiosity, leading them to ask questions and talk about their prior learning.

Develop

Develop new skills and knowledge by delving deeply into a theme, where children make links, create, explore, make, read and write.

Innovate

Innovate by returning to prior knowledge and skills so that children can use and apply these in new contexts (in and out of school).

Express

Express what has been learned by providing opportunities for children to reflect, test their knowledge and celebrate their achievements.

Throughout our curriculum, we actively encourage children to experience science first-hand through a wide range of creative, exciting, and enriching experiments. Our science provision extends beyond the classroom and includes practical workshops, outdoor learning opportunities, and the exploration of local habitats. We also regularly welcome guest speakers who share their knowledge, skills, culture, and expertise, further enriching the pupils' learning experience.

Implementation – How do we achieve our aims?

Lesson design and curriculum delivery

We believe that science should be taught consistently every week across the school to ensure continuity and depth of learning. The most effective approach to teaching science is through a spiral curriculum, which builds on pupils' prior knowledge and reinforces key concepts over time. Revisiting prior learning and carrying out retrieval practice is an important aspect of learning and supports pupils to commit their knowledge to their long-term memory. We therefore include prior-knowledge in every lesson.

In the Early Years Foundation Stage (EYFS), science learning is embedded within the "Understanding the World" area, with a particular focus on the Natural World. Children explore their immediate environment and compare it with different settings, while also investigating natural processes such as melting ice or the formation of shadows. They observe plants and animals closely, identifying their features and discussing their findings. This approach encourages curiosity through observation, questioning, and developing an early understanding of the world around them.

In Key Stage 1, and Key Stage 2, we follow the Primary Science Scheme of Work by Education People. Aligned with the goals of the National Curriculum, this scheme provides pupils with opportunities to explore scientific concepts and phenomena, helping them explain the material world and fostering a sense of excitement and curiosity about the natural world. In addition, pupils engage with the processes of scientific enquiry, gaining insight into how scientific knowledge is developed and validated. By integrating both substantive knowledge (the content of science) and disciplinary knowledge (the methods of science), this programme ensures that pupils build their understanding with meaningful context and purpose.



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Mapping concepts

'In science, pupils need their knowledge to be organised around the most important scientific concepts, which predict and explain the largest number of phenomena' (Ofsted research review series: science). Therefore, within this scheme, ten big ideas have been identified, underpinned by key concepts. As they move through this scheme of work, pupils will build comprehensive schemata for each of these big ideas so that new knowledge connects with prior knowledge and can be committed to the long-term memory.

Concepts- Big ideas

1	2	3	4	5	6	7	8	9	10
There is a relationship between how things are (structure) and the way things work (function).	Living and non-living things can be grouped in a variety of ways.	Living things move through different stages of growth and development.	Everything on Earth exists in one of three states: solid, liquid, gas and the state of matter can change.	Living things have common life processes to survive; lifestyle choices impact survival and health.	Changing the movement of an object requires a force (push or pull) to be acting on it.	Living things depend on each other and on the environment; this can be positive or negative.	Living things have changed over time.	Energy makes things happen and can be seen by its effects; it can be transferred (but is not used up).	The movement of the Earth affects the times of day; the Sun is at the centre of our solar system.

Progression and sequencing

Our Science Curriculum has a **clear progression of knowledge and skills that outlines the substantive, disciplinary knowledge and key vocabulary**. Knowledge and skills in this scheme of work have been carefully sequenced across units and years because we know that, when knowledge is well structured, it becomes meaningful, flexible and easier to access.

The scheme recognises that disciplinary knowledge extends beyond practical tasks. Pupils will understand the underlying methods and the reasoning scientists use to investigate the world and build reliable explanations. The disciplinary knowledge covered includes methods for formulating and answering scientific questions, use of apparatus, techniques, and accurate measurement, skills in analysing and interpreting data and understanding how evidence is used to support or refute explanations.

By carefully selecting the most effective substantive contexts in which to teach disciplinary concepts, our scheme supports pupils in developing secure conceptual understanding that they can apply in practical and investigative work.



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Misconceptions

Throughout our science curriculum, we proactively identify and plan for common misconceptions to support effective learning. Each unit within this scheme of work highlights potential misconceptions, enabling teachers to address them in a timely and strategic way. Scientific knowledge is introduced through carefully sequenced steps, with particular emphasis placed on concepts where misconceptions are most likely to occur.

Learning about famous scientist

To enrich scientific learning, the school believes that children should have the opportunity to study the work of famous scientist. Learning about the role models in science can inspire children to see as exciting and meaningful. Additionally, studying the lives and work of scientists helps children understand that science is a process of investigation, not just a collection of facts. It shows that knowledge develops over time through questioning, testing and refining ideas. We believe that highlighting the scientists from diverse backgrounds is essential for challenging stereotypes about who can pursue and succeed in science. By showcasing a wide range of voices and experiences, we promote inclusion and help all pupils see that science is a field open to everyone – regardless of gender, race, or background. Furthermore, exploring the challenges, mistakes, and ethical dilemmas faced by scientists encourages children to think critically and to consider the responsibilities that come with generating and applying scientific knowledge.

Building vocabulary

We know how important it is to teach children correct subject vocabulary. Within our curriculum we've built **consistent use of progressive vocabulary** across each of the lessons and concepts. For instance, in the topic Animals including Humans, vocabulary used in Year 1 includes name so of the basic body parts – like leg, shoulder, head etc., whereas in Year 6 the vocabulary has advanced to: organ, blood vessels, veins, capillaries living cells etc.

High quality resources and Creative outcomes

The high expectations for pupils outcomes and provides opportunities for them to showcase the knowledge and skills within the classroom or in their books. Learning is captured through the use of knowledge floor books and, where appropriate, scientific outcomes can be found in other subjects – for example art. Pupil learning is captured through pupil voice, assessment for learning and retrieval practice. We **define progress in science as children 'knowing and being able to do more'**. Our science curriculum provides opportunities to see what knowledge children have retained and what skills they have mastered through carefully planned retrieval practice which help teachers to make judgments about each child's progress and attainment.



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Impact – How will we know we've achieved our aims?

Assessment against end points

The impact of our curriculum can be seen through the pupil's ability to develop the ability to formulate and follow scientific enquiries. They are also able to use their developing scientific knowledge and vocabulary to make increasingly accurate predictions and conclusions based on the evidence available to them. They will be able to make links using their prior knowledge and skills to hypothesise about the results of scientific enquiries. Staff assess pupils against the progression document at the end of sequences of learning by exception. Assessment takes place through a formative approach in all lessons and cumulatively builds up a picture of the children's learning. This is recorded on Arbor and analysed by the science subject leads to further develop and enhance our curriculum to ensure it meets its stated intents.