

SUBJECT: Science

What are the aims and purpose of this subject?

We follow the National Curriculum for our science curriculum. Our aim is for the children to leave Year 6, with knowledge that has built up over their schooling and been retained – both with them being able to recall scientific knowledge from earlier primary years and also being able to apply themselves to year group content by drawing on and building upon prior knowledge. We want children to be able to apply themselves confidently as they enter Key Stage 3. By the time our children leave, we want them to be competent in recalling and applying knowledge from within the national curriculum units, with an ability to work and apply themselves scientifically.

Our curriculum has the same purpose as set out within the national curriculum: *A high-quality science education provides the foundations for understanding the world through the specific disciplines of biology, chemistry and physics. Science has changed our lives and is vital to the world's future prosperity, and all pupils should be taught essential aspects of the knowledge, methods, processes and uses of science. Through building up a body of key foundational knowledge and concepts, pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.*

Our curriculum also has the same aims as per set out in the national curriculum: *To ensure that all pupils:*

- *develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics*
- *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*
- *are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future*

In addition to this, within our school vision we want our children to leave us inspired to learn, independent and aspirational. Science is an exciting subject and we aim to ensure our children apply curiosity and discover their own answers to inspiring questions. We aim to ensure the children develop a deep understanding of the national curriculum content and apply their learning independently to become confident and aspirational for their future.

We aim to ensure that all our children with SEND access science at an appropriate level (both for challenge and support) and have full access to the curriculum. This means that they are involved in learning both disciplinary and substantive knowledge. We are aspirational for all children.

We take advantage of the annual British Science Week, which allows for stand alone scientific enquiry (which is otherwise fully threaded through the science curriculum) and this allows for inspiration and further development of the excitement around the subject. We also ensure that, during Science Week, children are exposed to scientists who enable us to challenge stereotypes around scientists. This is further developed in other subject areas, in particular in Year 6 when the children study the Islamic Golden Age in history.

We aim to keep up to date and our Science Lead attends science cluster meetings from which ideas are brought back into school.

What are the National Curriculum requirements for this subject?

National curriculum requirements are:

Biology: plants; animals, including humans; living things and habitats; and evolution and inheritance.

Chemistry: everyday materials; properties and changes of materials; and states of matter.

Physics: light; sound; forces and magnets; seasonal change; earth and space; and electricity.

Throughout these units, there is the requirement to build the children's competency at working scientifically via observing over time; pattern seeking; identifying, classifying and grouping; comparative and fair testing (controlled investigations); and researching using secondary sources.

How is this subject's curriculum organised?

Science at our school is sequential and builds on prior learning.

In our Early Years, Science is a broad and exciting subject. We ensure that a wide range of experiences are available to our children so that they can begin to develop their scientific knowledge. We provide many opportunities for our youngest children to find things out for themselves by making observations, carrying out simple experiments and sharing their discoveries. Our foundation stage staff provide children with opportunities for playing and exploring, active learning and creating and thinking critically. We are keen to develop our children's knowledge of phenomena; understanding of what is factual and what's imaginary; health and our bodies – knowing it's good to be active, wash our hands, brush our teeth etc; chances to play with materials (including water); and to engage with growing of plants – with the main points being about the children showing curiosity and thinking critically.

In Key Stage One, we teach through a lot of first-hand practical experiences and use of secondary sources. We begin to develop simple scientific language and continue to encourage

our children to be curious and ask questions. As per the national curriculum, the main focus at this stage is about enabling children to experience and observe phenomena, looking more closely at the natural and humanly constructed world around them. Our curriculum also allows for the children to begin to answer their own questions via enquiry; observe changes over time; notice patterns, group and classify; and carry out simple tests.

In Lower Key Stage Two, our curriculum is set out to enable the children to broaden their scientific view of the world with new scientific content being introduced and with a continued development of scientific vocabulary. Children learn via exploring, questioning, discussion, testing and observing relationships. They are encouraged to ask questions about what they observe and make decisions about which types of scientific enquiry are best (observing changes, noticing patterns, similarities, differences or change, grouping, testing, secondary sources). Within the curriculum children draw simple conclusions using straightforward scientific evidence. We also support them to be able to record and report findings.

In Upper Key Stage Two, the main focus is on deepening their understanding of a wide range of scientific ideas. They do this through exploring and talking about their ideas; asking their own questions about scientific phenomena; and analysing functions, relationships and interactions more systematically. Via our curriculum, the children encounter more abstract ideas and they begin to recognise that scientific ideas change and develop over time. They work on appropriate ways to answer scientific questions and draw on conclusions based on their data and observations, use evidence to justify their ideas and use their scientific knowledge to explain their findings. The emphasis on reasoning becomes more significant in this area of school, with the children being encouraged to explain their thinking and give detailed predictions and evaluations and the reporting and presenting moves to a further level of sophistication.

We ensure that our SEND children access Science with the appropriate level of challenge and support. All SEND children work through the planned curriculum and on each unit of work there are suggestions as to how a particular lesson can be better tailored to their needs – these suggestions are guidance which teachers will use as appropriate to ensure that children can access the lesson appropriately. We are aware that re-visiting prior learning is important and overlearning can be vital. Some concepts may be split into smaller chunks to allow children to grasp the fundamentals well. Our most complex SEND children (Pupils with an EHCP) may have 1:1 support or work in small groups.

Science is normally taught as a discrete subject from Key Stage One upwards, linking more to topics being covered in our Early Years. There are sometimes literacy links, with non-fiction texts being unpicked in shared reading. There are also meaningful links with maths, for example graphing of findings.

There are also trips that link to some science units – for example, visiting RHS Bridgewater when learning about Plants in Year 2.

Why is it organised like this?

Firstly, it has been organised as it has to ensure the full national curriculum requirements are met.

We teach the units as per suggested year groups within the national curriculum. We believe the children accessing the units as they do over the year groups support build up of knowledge, which they retain and apply.

The units are either taught in weekly teaching slots or blocked. Either way, the units are all taught throughout that year group. The build up of knowledge is clear and the units allow for the children to build on prior learning (for example – learning light is reflected from surfaces in year 3, then using this to build on when teaching the idea that light travels in straight lines to explain why objects are seen.)

Our SEND children are taught the same knowledge and skills, with adaptations being made to reflect the additional, sometimes, complex needs. It is our aim to ensure that all children develop a good understanding of the world around them, and to allow them to think scientifically on problems and issues which they may encounter.

In both Key Stages 1 and 2, the beginning of each unit starts with a chance for the children to recall learning from previous units. The beginning of each lesson begins with a recap on essential knowledge from the previous lesson. There is a final session used at the end of the unit to assess the children's essential knowledge of the unit.

We understand that the curriculum reflects the importance of spoken language in pupils' development. The quality and variety of language that pupils hear and speak are key factors in developing their scientific vocabulary and articulating scientific concepts clearly and precisely. Due to our significant EAL cohort and specific speech and language issues across school, we are very careful to ensure we focus on vocabulary in all subjects (including science). A vocabulary list is given to each child at the beginning of a unit and this is referred to throughout the teaching of the unit. Teachers are very clear that they must not take for granted that children understand the vocabulary, but also understand that teaching this well lower down school will also support their grasp of related concepts as they move up school.

How are knowledge, understanding and skills developed in this subject?

As described above, knowledge is built up via sequential learning.

As per National Curriculum: 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.

What does this subject look like...

in lessons?	in books / Seesaw?	in the environment?
Collaborative work Practical activities Research Discussions Investigation Use of physical resources Outside work where applicable Use of apps	Most lessons are recorded in books or on Seesaw. Each lesson has a title and within a unit there will be some evidence of marking questions to allow the children to further apply their knowledge.	Teachers are encouraged to have an up to date science display which has learning aids and also raises the profile of the subject. The school has one science display which is focused on practical science and Science Week, It celebrates how inspired our children have been.

How is this subject resourced?

Practical resources are clearly organised in the science cupboard which is accessible to all. All staff keep the resources well-ordered and the science lead oversees this. The science lead audits resources and uses available budget to address any needs that arise from audit. They also make use of available grants to further resource.