

Menston Primary School Science Curriculum Statement

Quality of Education in Science

Science in 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" (*Science programmes of study: key stages 1 and 2, National Curriculum in England 2013*).

The National Curriculum for science aims 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 this report, we aim to explain the intent and implementation of our new Menston science curriculum and how it helps us to meet these 3 main aims of the National Curriculum.

National Curriculum Aim: Developing scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics



Using the correct subject-specific vocabulary is important for children's scientific learning to allow them to express their understanding scientifically. As a result, we developed knowledge organisers for the children to set out clearly the vocabulary and key knowledge they needed to be fluent with by the end of each unit. Children use the vocabulary on the knowledge organiser and staff focus on the key vocabulary that children need to learn. Our next steps are to develop a retrieval model to ensure that the key information is regularly revisited and practised to ensure deeper learning.

National Curriculum Aim: Developing 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

"The school science curriculum sets out what it means 'to get better' at science. Expertise in science requires pupils to build at least 2 forms, or categories, of knowledge. The first is 'substantive' knowledge, which is knowledge of the products of science, such as models, laws and theories. The second category is 'disciplinary knowledge', which is knowledge of the practices of science. This teaches pupils how scientific knowledge becomes established and gets revised. Importantly, this involves pupils learning about the many different types of scientific enquiry. It should not be reduced to learning a single scientific method. In high-quality science curriculums, knowledge is carefully sequenced to reveal the interplay between substantive and disciplinary knowledge. This ensures that pupils not only know 'the science'; they also know the evidence for it and can use this knowledge to work scientifically" (*Ofsted Research review series: science, 2021*).



The National Curriculum sets out five key types of scientific enquiry that children are expected to learn in key stages 1 and 2. In Key Stage 2, we use the colours and symbols created by the Primary Science Teaching Trust for our planning and in pupils' books:



Problem-solving is a skill used by the Primary Science Teaching Trust in addition to the five key enquiry types. We also use this enquiry type to encourage meaningful cross-curricular links, as well as to meet the third scientific aim of the National Curriculum (understanding the uses and implications of science).

In Key Stage 1, the same colours are used on planning and staff developed pictures to use with younger children:



Our Menston science curriculum puts enquiry at the heart of all science lessons. Every science lesson now includes an element of scientific enquiry, linked to the substantive knowledge in the lesson, using one of the 5 main enquiry types. This is captured on the left-hand page in children's books (an enquiry page). Across each unit, we aim to balance different enquiry types. Below is an example which shows how our medium-term planning proforma works:

Intent: What will they	Implementation:	How will they learn it?
learn?		
Lesson objective	Working scientifically	Lesson outline
appliances that run on electricity	Loemitying and classitying: How would you group these devices? Follow-up question: How would you group the electrical devices based on where the electricity comes from? (mains/battery)	What is electricity? Where does it come from? What are oppliances? Which electrical appliances can we spot in the classroom?
Constructing a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers	Comparative testing: Does a circuit need a cell to work? Does every circuit need a switch? Does it matter which way round the buzzer's wires are connected?	 Identifying and naming simple components and their functions, What is a circuit? Outdoors: human circuit, Make a simple circuit with a bulb and cell, Difference between picture and scientific diagram (circuit symbols not introduced until V6). Include a switch un your circuit.
Identifying whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery	Researching: What is inside a battery and how does it work? What did Thamas Edison invent and how does it work?	 What does a circuit need? (complete loop with a battery) Using circuit diagrams, which are complete circuits and why? Predict then investigate with equipment.
Recognising that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit	Pattern seeking: What types of materials make good conductors of electricity?	 Human circuit: Demonstrate how switches work, Types of switches, Make your own switches using materials provided and explain how they work,
Recognising some common conductors and insulators, and associate metals with being good conductors		

We have developed units on an agreed medium-term planning template for Years 1 - 6. Feedback from staff and pupils has been overwhelmingly positive with teachers expressing greater confidence in teaching high quality science. Our next steps are to use an instructional coaching model to develop practice, as well as sharing good practice between staff using informal observations. We also need to work on assessing science consistently and accurately across school. The approach to teaching science at Menston Primary School will result in a practical, engaging, high quality science education that provides children with the foundations for understanding the world around them and preparing them for their next steps.

Formative assessment is used as the main tool for assessing the impact of Science, as it allows for misconceptions and gaps to be addressed more immediately.

Children Menston Primary School will:

- demonstrate a love of science and an interest in further study and work in this field
- retain knowledge that is pertinent to science in real life contexts
- be able to question ideas and reflect on knowledge
- be able to articulate their understanding of scientific concepts and be able to reason scientifically using relevant scientific vocabulary
- implement mathematical skills through their work, organising, recording and interpreting results
- work collaboratively and practically to investigate, explore and experiment
- achieve age related expectations in science at the end of their cohort year

Curriculum Enrichment

National Curriculum Aim: Equipping children with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Whilst understanding the uses and implications of science is embedded in our curriculum, we wanted to ensure that our children have further chances to develop their cultural capital in science, as well as raising aspirations and awareness of STEM careers. To support this, we plan an annual Menston Science Week for children across the school. This includes a birds of prey show for every phase from Foundation up to Upper Key Stage 2 and a 'Science Meet and Greet Event'. This aims to introduce children to a range of STEM careers and to develop their understanding of science in the real world around them. Adults from the community kindly volunteer their time to support this event. Our next steps are to develop our school offer for trips and visitors relating to STEM across school. Year 1 have enjoyed a visit to Harlow Carr to further embed their science learning on plants. Year 2 visited Tropical World as part of their science work on animals.