

Curriculum Statement for Science

INTENT - What do we aspire for our children?

'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.'

National Curriculum 2014 (updated January 2021).

What is our Rationale for Science?:

At Hotwells, we follow the [National Curriculum for Science](#) and, alongside this, we aim 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.
- Develop young scientists who can communicate their understanding both verbally and in written form through a rich vocabulary and the necessary oracy skills.
- Develop a culture of scientific values and skills where asking questions, working collaboratively, testing hypotheses and reflecting on lines of enquiry is part of the everyday life of the classroom.
- Develop young scientists who feel empowered and passionate to engage with science beyond their time in primary school.
- Have access to a broad range of scientific experiences.

What are our aims for Science at Hotwells?:

At Hotwells Primary School, our main aim is to foster and promote children's curiosity and excitement to understand the world around them through scientific investigation. We encourage children to observe, ask

questions, make predictions/hypothesise and collaborate to conduct scientific enquiries. Through these investigations, children gain a rich understanding of how our world works and an awareness that exploration is key to make new discoveries.

At Hotwells, our overarching aims are:

We are Ambitious:

- Children are proud of their learning and they're able to articulate their success.
- We want to foster and promote children's curiosity and excitement to understand the world around them through scientific investigation.
- Children are encouraged to challenge misconceptions through scientific enquiry.
- They will analyse and evaluate scientific evidence to reach conclusions and communicate these clearly.

We are Creative:

- Children are inspired to become the next generation of scientific thinkers through investigation and solving problems creatively.
- Children become creative problem solvers by learning how to design and execute investigations to answer scientific questions.

We are Local and Global Citizens:

- Pupils explore the world around them and learn how scientists have contributed in helping shape the world we live in.

What will our children learn at Hotwells?

Our Science curriculum is knowledge and vocabulary rich, ensuring children gain a deep understanding of fundamental scientific knowledge and concepts as well as embedding key science specific vocabulary and vocabulary. In addition, children are encouraged to develop their scientific curiosity and understanding by working scientifically. It is our intention that pupils become a little more expert as they progress through the curriculum, accumulating and connecting substantive and disciplinary scientific knowledge.

Our curriculum follows the principles of instruction, is guided by understanding how the memory works and cognitive load theory. Our science curriculum is delivered through a series of modules which are deliberately spaced throughout the academic year with opportunities to introduce and revisit key concepts. This approach enables staff to deepen pupil understanding and embed learning.

Long Term Overview:

	Autumn 2021	Spring 2022	Summer 2022
Year 1	Seasonal Changes and Daily Weather Introduce Plants – (Trees) Animals, including humans	Materials Revisit Animals, including humans	Plants Revisit Plants, Animals including humans, Seasonal change and weather
Year 2	Living things and their habitats Animals, including humans	Use of everyday materials Revisit Living things and their habitats/materials	Plants Revisit Living things and their habitats /Animals, including humans
Year 3	Rocks Animals, including humans Revisit Rocks	Forces and Magnets Light	Plants
Year 4	Living Things and their Habitats States of Matter	Animals, including Humans	Electricity Sound
Year 5	Properties and Changes of Materials Animals, including Humans	Earth in Space Forces	Living Things and their Habitats Forces continued
Year 6	Living Things and their Habitats Light	Animals, including Humans Animals, including Humans (Water Transport)	Electricity Evolution and Inheritance

Disciplinary Skills Progression: Working Scientifically

Knowledge organisers are used to map out the key knowledge for each unit. These are used because they convey the core knowledge in one place; act as a reference point for pupils and teachers; can be used to support questioning and retrieval; highlight key vocabulary and reduce split attention effect.

As well as ensuring pupils are taught key knowledge, each module is designed to offer pupils the opportunity to undertake scientific enquiries and develop their skills as a scientist in asking questions, planning and carrying out experiments, collecting and analysing information and drawing conclusions. The working scientifically objectives are clearly displayed on each of our Science modules for both Key Stage 1 and Key

Stage 2 and an overview can be seen [here](#).

In addition to working scientifically, our children will be taught key scientific terminology and knowledge will be built upon throughout their school journey as a scientist. Whilst at Hotwells Primary School, children will learn about plants, animals including humans, materials, seasonal change, habitats, rocks, light, forces, states of matter, sound, electricity, Earth and space and evolution and inheritance. The children will be taught about key scientists in history and how they made their discoveries, as well as learning about up to date research and new discoveries that are shaping our future. Key issues facing our planet today, such as climate change, are addressed through science and link to other curriculum topics. We discuss our impact on the earth and how this affects animals and their habitats and how Science can help change the future of our planet.

IMPLEMENTATION - How will we deliver the curriculum?

We follow the CUSP Curriculum for Science. Our Science curriculum is taught across each year group in weekly lessons. The modules enable pupils to study knowledge and vocabulary in depth and demonstrate their understanding. Each module builds upon prior learning and these are strategically planned throughout the academic year with opportunities to introduce and revisit key concepts in order to further deepen pupil understanding and embed learning.

What will Science look like in EYFS?

In Early Years, Science is taught through Knowledge and Understanding of the World. The children learn about the scientific world around them in their play and adult led activities. Our curriculum is designed to enable children to make sense of their physical world and community. Children are encouraged to be scientists by:

- Finding out about and showing curiosity and interest in features of objects, events and living things.
- Describing and talking about what they see, including noticing similarities and differences.
- Showing curiosity and asking questions about why things happen and how things work.
- Showing understanding of cause-effect relations.
- Noticing and describing patterns.
- Showing an awareness of change.
- Explaining their own knowledge and understanding, and asking appropriate questions of others.
- Investigating objects and materials by using their senses.

What will Science look like in Key Stage 1 and Key Stage 2?

Our lessons are underpinned by evidence research and cognitive science. The whole curriculum is 'Connected', 'Cumulative' and 'Coherent' and the progression is carefully sequenced.

It is expected that every Science lesson will include:

- Prior knowledge being drawn upon.
- Explicitly taught vocabulary.
- Explicitly taught content.
- Knowledge notes used to scaffold for EAL/SEND and our lower attaining children.

Lessons are delivered using the CEEAAC approach and each lesson uses elements of this model:

C	Connect	Teachers will Connect to the prior learning or knowledge.
E	Explain	Teachers will Explain the intended knowledge, content or vocabulary.
E	Example	Teachers will model the intended knowledge by giving an Example of the new learning.
A	Attempt	Pupils will Attempt or 'have a go' at the new learning with scaffolding, e.g. Using Knowledge Notes and Knowledge Organisers.
A	Apply	Children will Apply their new learning independently so that this is consolidated, connected and embedded.
C	Challenge	Pupils are Challenged to deepen their knowledge and make connections with their prior learning.

Children use Knowledge Organisers at the start of a unit to introduce a topic and the key vocabulary. Click on the following links to see an example of a [Key Stage 1 Knowledge Organiser](#) and a [Key Stage 2 Knowledge Organiser](#). Relevant vocabulary is explicitly taught throughout the module and will be used by the pupils. Modules are structured into a series of Learning Questions that children will find out the answer to through subsequent lessons, an example of which can be found [here](#). When answering each learning children will use a Knowledge Note ([click here](#) to see an example) to structure their learning and to support their understanding of the topic. The knowledge note is dual coded which includes both written and visual prompts for the children. This supports the learning of all children in the class and enables everyone to feel successful.

How will we support our learners with SEND in Science?

First and foremost, we support our pupils with SEND through **Universal Quality First Teaching**. High quality teaching is the first step in responding to pupils who have special educational needs ([SEND Code of Practice, 2015: 6.36-6.37](#)). We aim to ensure that *all* pupils access a broad and balanced curriculum and that this curriculum is not narrowed in any way for our pupils with SEND.

Some pupils will need support that is **additional to** high quality teaching. For this, we focus our support using the strategies from the [Education Endowment Fund SEND guidance](#) (EEF, 2021). This is included below:

Explicit Instruction	Cognitive and Metacognitive Strategies	Scaffolding	Flexible Grouping	Using Technology
<p>Provide clear instructions in small manageable steps</p> <p>Allow children to spend longer on the 'attempt' part of the lesson.</p> <p>Use a range of techniques to support understanding particularly through modelling the language .</p> <p>Teachers will give guided practice to those children who need it to support with remodelling, re-explaining and re-phrasing.</p>	<p>Children will use retrieval practice to connect to the prior learning.</p> <p>Core content from the lesson sequences will be chosen.</p> <p>Core vocabulary will be carefully considered and used.</p> <p>Children may be given a small task at a time so as not to overload their working memory.</p> <p>Worked examples will be provided to support with their independent learning.</p> <p>Pre-teaching and pre-reading can be used as a technique.</p>	<p>Scaffolding will be temporary support that is removed when no longer required.</p> <p>Scaffolding can be verbal, visual or written.</p> <p>Differentiated tasks may be provided which are accessible for the child.</p>	<p>Groups are allocated temporarily and are not predetermined.</p> <p>Pre-teaching can be used as a technique here to support</p>	<p>Technology can assist in the teacher modelling through demonstrating worked examples</p> <p>Quizzes, apps and websites support the learning</p> <p>Software can be used to demonstrate pronunciation.</p>

Furthermore, a very small number of pupils will require **Specialist** provision whereby they will have a high level of support, and carefully considered targets, in order for them to be able to access the curriculum alongside their peers.

How will we use Assessment?:

Formative Assessment:

Formative assessment is a range of evidence-informed strategies that teachers can use to make inferences about their pupil's progress/attainment/knowledge acquisition and support their learners to make progress.

Pupils will be assessed formatively as each lesson progresses. Pupils will be given tasks, the teachers will collect evidence, from which they will draw conclusions and then adaptations will be made as a result of that evidence.

Strategies that might be used are:

- Making explicit the learning intention and success criteria
- Eliciting evidence of pupils' prior knowledge
- Feeding back at the point of learning
- Inclusive Questioning i.e. cold call, mini whiteboards
- Retrieval practice i.e. cumulative quizzing

Summative Assessment:

The curriculum is a progression model: we will know whether students are making progress if they are learning more of the curriculum. The CUSP curriculum is designed to ensure sequencing of core knowledge, vocabulary, substantive concepts and disciplinary knowledge. They will know more, and remember more with the taught curriculum content. Essentially they will be able to do more with this knowledge in carefully designed learning tasks. This will be assessed using the Book Study approach; talking with pupils and looking at their books systematically to reveal:

- Content and knowledge
- Vocabulary
- How the pedagogy and taught curriculum helps/hinders their learning.

IMPACT - How do we know our curriculum is effective?

Pupil Voice:

We understand that pupils are the best way to show how effective our curriculum is. Pupil voice will demonstrate:

- Children's ability to talk about the 'why' behind their learning and build upon previous knowledge.
- That all children make progress regardless of their starting points.
- That children are inspired by their Science lessons and have the confidence to talk about their learning.
- That children will be curious learners who want to know more and understand more about science.

High Quality Outcomes:

We will monitor our curriculum through book studies and discussions with pupils. These will:

- Demonstrates pride and effort.
- Show an increasing understanding of scientific concepts and knowledge.
- Demonstrate a clear sequence of learning.
- Show that the vocabulary has been clearly taught and understood.