



Science at Ashton Gate Primary School



Science is the study of the world around us, including living things, materials, energy, and the Earth and space. Science is about asking questions, observing, and investigating so we can understand how things work.

Intent

At Ashton Gate, all pupils are encouraged to explore and investigate the world around them through problem solving, real-life contexts, and hands-on experiences. We believe that science matters and that scientific thinking is for everyone, fostering a community of scientifically literate learners. Children are encouraged to be curious, to ask questions, and, where appropriate, to follow their own lines of enquiry. Scientific knowledge skills and vocabulary are carefully sequenced to ensure clear progression across the school, with regular teaching that allows pupils to build securely on prior learning and develop confidence as young scientists.

Our School Drivers

Science learning at Ashton Gate primary school develops our school drivers in a range of ways.

Cultural diversity

- Introducing scientists from various ethnicities, genders, and backgrounds.
- Using stories and visuals to show that *anyone* can be a scientist.
- Linking science topics to cultural festivals or traditions (e.g., the science of fireworks during Diwali, light during Hanukkah, or why certain types of tree make are used as Christmas trees).
- Showing that science is a shared human endeavor, not limited to one culture or country.

Independence

- Encouraging inquiry and curiosity as children learn to ask their own questions about the world and seek answers through investigation.
- Science challenges children to develop their problem-solving skills by thinking critically, testing ideas, and making decisions independently.
- Pupils take responsibility for designing experiments, choosing materials, and following methods safely and accurately when planning and carrying out investigations.
- Students learn to collect data, create tables or charts, and draw their own conclusions rather than relying on adults to explain outcomes.
- Science builds confidence through discovery. Success in finding things out for themselves helps children trust their abilities and develop a sense of ownership over their learning.

Equity

- Providing equitable access to resources and opportunities to ensure all children, regardless of background or ability, can take part in experiments, investigations, and discussions.
- Using explicit vocabulary instruction and dual-coding through the use of images to reduce language barriers and ensure all children have the knowledge they need to be successful in each lesson.
- Differentiated knowledge organisers and knowledge notes (shown below) used to support learning.
- Building confidence and agency for all pupils by helping all children see themselves as capable scientists who can ask questions, test ideas, and contribute knowledge equally.

Growth mindset

- All pupils are encouraged to 'Rise High Together' and use their Ashton Gater characteristics in science lessons.
- The cumulative nature of the CUSP curriculum allows for revisiting previous concepts, knowledge and vocabulary to ensure that it is embedded in long term memory.
- The CEEAAC model uses learning loops to check for understanding and learning is repeated throughout lessons and units.
- Scaffolding and retrieval practice help close gaps, giving all pupils the tools to succeed.

The CUSP Curriculum

Our science curriculum is taught using CUSP. This is an evidence-led curriculum, which goes beyond the expectations of the National Curriculum, where knowledge is built cumulatively and is retrieved regularly to increase the chance that it will be stored in long term memory. Substantive and disciplinary knowledge is mapped out over the curriculum and can be seen in the overviews below.

Substantive knowledge - this is the subject knowledge and explicit vocabulary used to learn about the content.

Examples of Cumulative End Goals – By the end of Year 3

	BIOLOGY	PHYSICS	CHEMISTRY
	Pupils develop an understanding of the concept of BIOLOGY through:	Pupils develop an understanding of the concept of PHYSICS through:	Pupils develop an understanding of the concept of CHEMISTRY through:
Rocks <i>Chemistry</i>	<ul style="list-style-type: none"> knowing and explaining that animals, including humans, need the right types and amounts of nutrition knowing and explaining that animals only get nutrition from the food they eat – they cannot make their own food like plants 	<ul style="list-style-type: none"> knowing how objects move on different surfaces using friction and resistance to explain why knowing and explaining the difference between contact and non-contact forces knowing and explaining how magnets attract and repel each other knowing and explaining how magnets attract some materials and not others 	<ul style="list-style-type: none"> knowing and explaining that rocks can be grouped together on the basis of their appearance and properties knowing and explaining how rocks are formed knowing and explaining what a rock is and what is not a rock
Animals, including humans <i>Biology</i>	<ul style="list-style-type: none"> knowing, identifying and explaining the purpose and function of the human skeleton, such as supporting the body, protecting the lungs and helping joints move knowing, identifying and explaining the purpose and function of the muscles, such as skeletal, cardiac or smooth muscles 	<ul style="list-style-type: none"> using what they know about the properties of materials from KS1 to group everyday materials that are attracted to a magnet 	<ul style="list-style-type: none"> knowing and explaining different types of rock, such as igneous, sedimentary and metamorphic rock knowing and explaining how fossils of animals and plants are formed
Forces and magnets <i>Physics</i>	<ul style="list-style-type: none"> knowing and explaining the difference between vertebrates and invertebrates knowing and identifying the structure of the different parts of flowering plants 	<ul style="list-style-type: none"> knowing and identifying magnetic materials knowing and explaining that a magnet has two poles, and predicting whether they will attract or repel each other 	<ul style="list-style-type: none"> knowing and explaining what soil is made from knowing and explaining the different types of material that make up soil, including rocks and organic matter
Plants <i>Biology</i>	<ul style="list-style-type: none"> knowing and explaining the function of the parts of flowering plants knowing and explaining what plants need to live and grow, such as air, light, water, nutrients from soil and space to grow 	<ul style="list-style-type: none"> knowing and explaining that light is needed to see things knowing and explaining that dark is the absence of light knowing and explaining that light is reflected from surfaces and enters our eyes 	
Light <i>Physics</i>	<ul style="list-style-type: none"> knowing how water is transported within plants and explaining the process of transpiration knowing and explaining the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal 	<ul style="list-style-type: none"> knowing that the light of the sun can be dangerous and how to protect their eyes knowing and explaining that shadows are formed when light from a source is blocked by an opaque object knowing and explaining how shadows change size 	

Disciplinary knowledge – this is the use of knowledge and how children become a little more expert as scientists by Working Scientifically.



Asking simple questions and recognising that they can be answered in different ways



Observing closely, using simple equipment



Performing simple tests



Identifying and classifying



Using their observations and ideas to suggest answers to questions



Gathering and recording data to help in answering questions.

This substantive and disciplinary knowledge is mapped out across the topics taught in each year group, ensuring children are building on their skills cumulatively.

	Autumn	Spring	Summer
Year 1	Seasonal changes and daily weather Introduce Plants – (trees) Animals, including humans	Everyday materials Revisit 1: Animals, including humans	Plants Revisit 2: Plants, Animals including humans
Year 2	Living things and their habitats Animals, including humans	Uses 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 Plants	Plants continued... Light
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	Forces (Gravity and Galileo) Earth in space	Living things and their habitats Forces continued
Year 6	Electricity Animals including humans (circulatory system)	Animals including humans (water transport) Light	Living things and their habitats Evolution and inheritance

Implementation

The CUSP science curriculum has carefully-mapped vocabulary combined with a clear progression of both knowledge and skills. This cumulative curriculum design allows opportunities for children to think hard and apply their learning in different contexts. Science is taught weekly across the school.

Teachers will deliver the curriculum using the CEEAAC model of learning. This allows opportunities to retrieve prior knowledge at regular intervals and ensures pupils have the background knowledge that they need for each lesson. Vocabulary is explicitly taught and concepts are explained clearly using examples. Teachers are able to check for understanding when pupils attempt learning, building in learning loops to ensure that pupils are ready to then apply their knowledge independently. All children have the opportunity to be challenged.



Connect



Explain



Example



Attempt

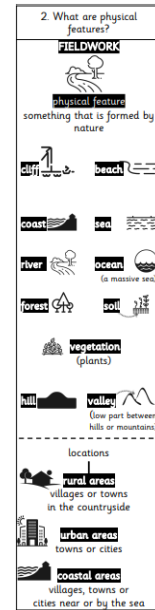
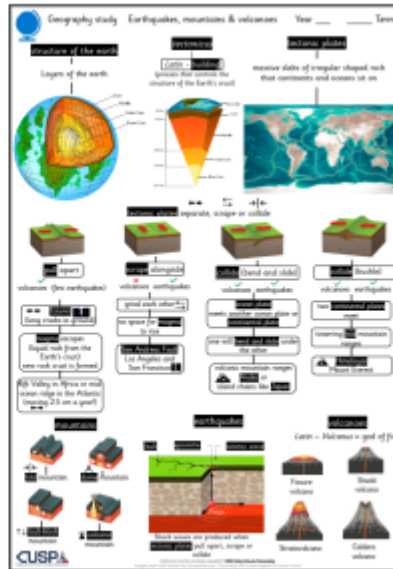
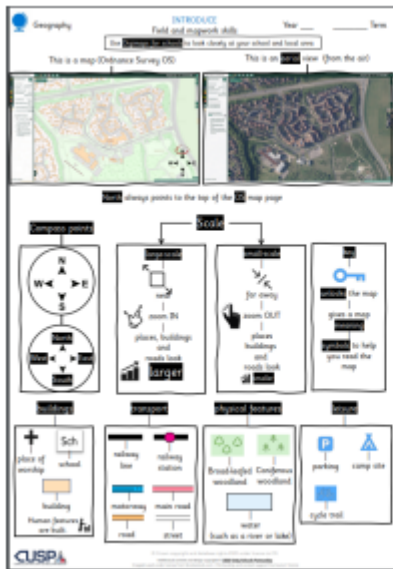


Apply



Challenge

To support vocabulary teaching, dual coding of images and words are used. As well as this, knowledge notes and knowledge organisers are used in lessons to aid understanding and support retrieval of prior learning. Teachers are able to use CUSP resources to support their subject knowledge and lesson design, tailoring their lessons to be inclusive for their individual classes.



Science subject leaders have strong subject knowledge, which they regularly share with staff through planned training and collaborative meetings. Teachers provide regular opportunities for pupils to apply their skills independently, building the scientific thinking needed for future learning. Practical demonstrations, visitors, trips, and events enrich the curriculum, enabling children to reflect on scientific phenomena and the wonders of the natural world. These experiences promote discussion, encourage respect for different viewpoints, and allow pupils to consider moral issues in science.

Science is presented as an integral part of our culture and future, with visitors and case studies highlighting scientists from a diverse range of backgrounds and cultures. Teachers skilfully use assessment to address misconceptions and move learning forward through clear, purposeful feedback. Pupils also have access to a wide range of resources, which inspire independent enquiry and help deepen their scientific understanding. Pupil book studies will be carried out regularly to track learning, progress, and application of knowledge. Practical tasks, and cross-curricular links will be reviewed to ensure lessons are engaging, relevant, and provide opportunities for pupils to apply their learning in real-world contexts.

Impact

Learners develop a secure and detailed knowledge of science across biology, chemistry, and physics, alongside the practical skills needed to apply their understanding in a range of contexts. Scientific knowledge is carefully sequenced and revisited to ensure it is stored in long-term memory, while key vocabulary is explicitly taught so pupils can accurately describe concepts and processes. Over time, pupils build strong enquiry and working scientifically skills, becoming confident in asking questions, planning investigations, interpreting evidence, and explaining their findings with increasing precision.

Children are aware of the breadth of scientific opportunities available to them, both within school and beyond, and show enthusiasm and curiosity to continue exploring science in the future. They

understand the importance of science in everyday life and its role in solving real-world challenges. By engaging with examples of scientists past and present, from diverse backgrounds and cultures, pupils are inspired to see themselves as future scientists and innovators.