

## **Science**

### **Intent**

At Powerstock School, it is our intention to instil a lifelong curiosity of and interest in science within our pupils. Science has been the key player in our understanding of our lives and the world, and has changed and improved them. Science is vital to the world's future prosperity, be it solving problems or improving how we live. Therefore, we intend to highly value the subject and give it the prominence it requires.

The Scientific area of learning is concerned with increasing pupils' knowledge and understanding of our world as well as developing skills associated with Science as a process of enquiry. It will develop the natural curiosity of the child, encourage respect for living organisms and the physical environment and provide opportunities for critical evaluation of evidence.

We intend for children to have the opportunity, wherever possible, to learn through varied systematic investigations, leading to them being equipped for life to ask and answer scientific questions about the world around them. As children progress through the year groups, they build on their skills in working scientifically, as well as on their scientific knowledge, as they develop greater independence in planning and carrying out fair and comparative tests to answer a range of scientific questions.

It is our intention that children consolidate and retain the science knowledge they have learnt as they experience a varied, progressive and well-mapped-out science curriculum that provides the opportunity for progression across the full breadth of the science national curriculum for EYFS, KS1 and KS2.

We endeavour to ensure that the Science curriculum we provide will give children the confidence and motivation to continue to further develop their skills into the next stage of their education and life experiences.

### **Implementation**

Teachers plan and challenge pupils based on the progressive curriculum maps of our 2 year (KS1) and 4 year (KS2) rolling programmes.

The progression of skills for working scientifically are developed through the year groups and scientific enquiry skills are of key

importance within lessons. The progression of these skills is set out below.

	KS1	LKS2	UKS2
Asking Questions and Carrying Out Fair and Comparative	<p><b>KS1 Science National Curriculum</b></p> <p>Asking simple questions and recognising that they can be answered in different ways.</p> <p>Performing simple tests. Children can:</p> <ul style="list-style-type: none"> <li>a explore the world around them, leading them to ask some simple scientific questions about how and why things happen;</li> <li>b begin to recognise ways in which they might answer scientific questions;</li> <li>c ask people questions and use simple secondary sources to find answers;</li> <li>d carry out simple practical tests, using simple equipment;</li> <li>e experience different types of scientific enquiries, including practical activities;</li> <li>f talk about the aim of scientific tests they are working on;</li> <li>g with support, start to recognise a fair test.</li> </ul>	<p><b>Lower KS2 Science National Curriculum</b></p> <p>Asking relevant questions and using different types of scientific enquiries to answer them.</p> <p>Setting up simple practical enquiries, comparative and fair tests.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a start to raise their own relevant questions about the world around them in response to a range of scientific experiences;</li> <li>b start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions;</li> <li>c recognise when a fair test is necessary;</li> <li>d help decide how to set up a fair test, making decisions about what observations to make, how long to make them for and the type of simple equipment that might be used;</li> <li>e set up and carry out simple comparative and fair tests.</li> </ul>	<p><b>Upper KS2 Science National Curriculum</b></p> <p>Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p>Using test results to make predictions to set up further comparative and fair tests.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a with growing independence, raise their own relevant questions about the world around them in response to a range of scientific experiences;</li> <li>b with increasing independence, make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions;</li> <li>c explore and talk about their ideas, raising different kinds of scientific questions;</li> <li>d ask their own questions about scientific phenomena;</li> <li>e select and plan the most appropriate type of scientific enquiry to use to</li> </ul>

			<p>answer scientific questions;</p> <p>f make their own decisions about what observations to make, what measurements to use and how long to make them for, and whether to repeat them;</p> <p>gc plan, set up and carry out comparative and fair tests to answer questions, including recognising and controlling variables where necessary;</p> <p>h use their test results to identify when further tests and observations may be needed;</p> <p>i use test results to make predictions for further tests.</p>
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Scientific knowledge and enquiry skills are developed with increasing depth and challenge as children move through the year groups. They complete investigations and hands-on activities while gaining the scientific knowledge for each unit. Interwoven into the teaching sequence are key assessment questions.

Children have weekly lessons in Science throughout Key Stage 1 and 2, using various programmes of study and resources. In Early years, science is taught through the children learning about the world around them in their learning through play.

Science will be taught in planned and arranged topic blocks by the class teacher. This is a strategy to enable the achievement of a greater depth of knowledge over a period of time.

We provide our children with wider opportunities in science and make links to other subjects. This frequently happens during Forest School sessions as well as in PE and music lessons, but where possible, links are made throughout the curriculum.

Additional opportunities are provided in Science where possible such as @Bristol and Science Dome visits. We also invite key people into school to share how science forms the basis for their work and give pupils opportunities to engage in these.

After each unit, the children are assessed and learning walls are completed. These assessments enable the teachers to plan appropriately for future units of work (assessment for learning – AFL) in both topic areas and ongoing scientific skills.

The subject leader monitors the progress across the school regularly in line with the science policy.

<b>Observing and Measuring Changes</b>	<p><b>KS1 Science National Curriculum</b>          Observing closely, using simple equipment.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a observe the natural and humanly constructed world around them;</li> <li>b observe changes over time;</li> <li>c use simple measurements and equipment;</li> <li>d make careful observations, sometimes using equipment to help them observe carefully.</li> </ul>	<p><b>Lower KS2 Science National Curriculum</b>          Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a make systematic and careful observations;</li> <li>b observe changes over time;</li> <li>c use a range of equipment, including thermometers and data loggers;</li> <li>d ask their own questions about what they observe;</li> <li>e where appropriate, take accurate measurements using standard units using a range of equipment.</li> </ul>	<p><b>Upper KS2 Science National Curriculum</b>          Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a choose the most appropriate equipment to make measurements and explain how to use it accurately;</li> <li>b take measurements using a range of scientific equipment with increasing accuracy and precision;</li> <li>c take repeat readings when appropriate;</li> <li>d understand why we take an average in repeat readings.</li> </ul>
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Identifying, Classifying, Recording and Presenting Data

**KS1 Science National Curriculum**

Identifying and classifying.

Gathering and recording data to help in answering questions. Children can:

- a use simple features to compare objects, materials and living things;
- b decide how to sort and classify objects into simple groups with some help;
- c record and communicate findings in a range of ways with support;
- d sort, group, gather and record data in a variety of ways to help in answering questions such as in simple sorting diagrams, pictograms, tally charts, block diagrams and simple tables.

**Lower KS2 Science National Curriculum**

Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.

Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.

Children can:

- a talk about criteria for grouping, sorting and classifying;
- b group and classify things;
- c collect data from their own observations and measurements;
- d present data in a variety of ways to help in answering questions;
- e use, read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge;
- f record findings using scientific language, drawings, labelled diagrams, keys, bar charts and tables.

**Upper KS2 Science National Curriculum**

Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Children can:

- a independently group, classify and describe living things and materials;
- b use and develop keys and other information records to identify, classify and describe living things and materials;
- c decide how to record data from a choice of familiar approaches;
- d record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar graphs and line graphs.

**KS1 Science National Curriculum**

Using their observations and ideas to suggest answers to questions.

Children can:

- a notice links between cause and effect with support;
- b begin to notice patterns and relationships with support;
- c begin to draw simple conclusions;
- d identify and discuss differences between their results;
- e use simple and scientific language;
- f read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1;
- g talk about their findings to a variety of audiences in a variety of ways.

**Lower KS2 Science National Curriculum**

Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.

Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.

Children can:

- a draw simple conclusions from their results;
- b make predictions;
- c suggest improvements to investigations;
- d raise further questions which could be investigated;
- e first talk about, and then go on to write about, what they have found out;
- f report and present their results and conclusions to others in written and oral forms with increasing confidence.

**Upper KS2 Science National Curriculum**

Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and a degree of trust in results, in oral and written forms such as displays and other presentations.

Children can:

- a notice patterns;
- b draw conclusions based in their data and observations;
- c use their scientific knowledge and understanding to explain their findings;
- d read, spell and pronounce scientific vocabulary correctly;
- e identify patterns that might be found in the natural environment;
- f look for different causal relationships in their data;
- g discuss the degree of trust they can have in a set of results;
- h independently report and present their conclusions to others in oral and written forms.

**Lower KS2 Science National Curriculum**

Identifying differences, similarities or changes related to simple scientific ideas and processes.

Using straightforward scientific evidence to answer questions or to support their findings.

Children can:

- a make links between their own science results and other scientific evidence;
- b use straightforward scientific evidence to answer questions or support their findings;
- c identify similarities, differences, patterns and changes relating to simple scientific ideas and processes;
- d recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.

**Upper KS2 Science National Curriculum**

Identifying scientific evidence that has been used to support or refute ideas or arguments.

Children can:

- a use primary and secondary sources evidence to justify ideas;
- b identify evidence that refutes or supports their ideas;
- c recognise where secondary sources will be most useful to research ideas and begin to separate opinion from fact;
- d use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas;
- e talk about how scientific ideas have developed over time.

**Impact**

The successful approach at Powerstock School results in a fun, engaging, high-quality science education, that provides children with the foundations for understanding the world. The importance given to the subject means that science is designated teaching time each week.

Our engagement with the local environment ensures that all children from EYFS through to UKS2 children learn through varied and first hand experiences of the world around them. So much of science lends itself to outdoor learning and so we provide children with opportunities to experience this regularly both in the school grounds as well as at Forest School.

All children have a wider variety of skills linked to both scientific knowledge and understanding, and scientific enquiry/investigative skills. These skills are seen across the curriculum including problem solving in maths.

Children have a richer vocabulary which will enable them to articulate their understanding of taught concepts.

Through various trips and interactions with experts and charities, children have the understanding that science has changed our lives and that it is vital to the world's future prosperity.

Children learn the possibilities for careers in science as a result of connections with parents, workers in our local community through a careers morning, and sometimes with national agencies such as the STEM association.

Pupil voice is used to further develop the Science curriculum, through questioning of pupil's views and attitudes to Science to support the children's enjoyment of science and to motivate learners.

It is expected that the impact of high aspirations will see pupils through to further study at secondary school, work and a successful adult life.