

## Progression in Science - working scientifically

### Early Years

#### Understanding the World (The World)

Children know about similarities and differences in relation to places, objects, materials and living things. They talk about the features of their own immediate environment and how environments might vary from one another. They make observations of animals and plants and explain why some things occur, and talk about changes.

#### Physical Development (Health and Self-Care)

Children know the importance for good health of physical exercise, and a healthy diet, and talk about ways to keep healthy and safe.

### Key Stage 1 National Curriculum Working Scientifically

During years 1 and 2, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- 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.

### Lower Key Stage 2 National Curriculum Working Scientifically

During years 3 and 4, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- asking relevant questions and using different types of scientific enquiries to answer them;
- setting up simple practical enquiries, comparative and fair tests;
- making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers;
- 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;
- reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions;
- using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions;
- identifying differences, similarities or changes related to simple scientific ideas and processes;
- using straightforward scientific evidence to answer questions or to support their findings.

### Upper Key Stage 2 National Curriculum Working Scientifically

During years 5 and 6, pupils should be taught to use the following practical scientific methods, processes and skills through the teaching of the programme of study content:

- planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary;
- taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate;
- recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs;
- using test results to make predictions to set up further comparative and fair tests;
- 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;
- identifying scientific evidence that has been used to support or refute ideas or arguments.

## Intent

Science teaching at Stannington First School aims to give all children a strong understanding of the world around them whilst acquiring specific skills and knowledge to help them to think scientifically, to gain an understanding of scientific processes and also an understanding of the uses and implications of science, today and for the future. Our aim for all pupils is to develop a lifelong curiosity and interest in the sciences.

At Stannington First School, scientific enquiry skills are embedded in each science theme the children study and these themes are revisited and developed throughout their time at school. Themes, such as Plants, are taught in Key Stage One and studied again in further detail throughout Key Stage Two. This model allows children to build upon their prior knowledge whilst embedding this procedural knowledge into the long-term memory.

All children are encouraged to develop and use a range of skills including observations, planning and investigations, as well as being encouraged to question the world around them and become independent learners in exploring possible answers for their scientific based questions. Specialist vocabulary for topics is taught and built up, and effective questioning to communicate ideas is encouraged. Concepts taught should be reinforced by focusing on the key features of scientific enquiry, so that pupils learn to use a variety of approaches to answer relevant scientific questions.

## Implementation

The science lead from Stannington First School has worked with colleagues across the Morpeth Partnership to create long term, subject specific plans that show clear progression of knowledge and skills from EYFS through to Year 13.

For each theme, from Year 1, class teachers share a knowledge organiser with pupils which outlines key knowledge/skills (including vocabulary) all children must master. There is a clear medium term plan for each theme which outlines a sequence of lessons for each subject, carefully planning for progression and depth.

Teacher assessment is measured against the key knowledge and skills and other forms of assessment are used, such as the use of a class quiz, which also supports learners' ability to block learning and increase space in the working memory. Challenge questions create opportunities for pupils to apply their learning and educational visits and visiting experts are planned to enhance the learning experience.

Forest school sessions give children the opportunity to develop a deeper understanding of nature processes and through different types of scientific enquiries helps them answer scientific questions about the world around them.

## Impact

Our science curriculum is high quality, well thought out and is planned to demonstrate progression.

If children are keeping up with the curriculum, they are deemed to be making good or better progress. In addition, we measure the impact of our curriculum through the following methods:

- A reflection on standards achieved against the planned outcomes
- Pupil discussions about their learning
- Attainment and progress can be measured across the school using our My Progress Goals sheet.
- The learning environment across the school is consistent with science technical vocabulary displayed, spoken and used by all learners. .
- Children who are confident in their science knowledge and enquiry skills and are excited about science. They show that they are actively curious to learn more and see the relevance of what they learn in science lessons to real-life situations and also the importance of science in the real world.

	KS1	LKS2	UKS2
Asking Questions and Carrying Out Fair and Comparative Tests	<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 answer scientific questions;</li> <li>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;</li> <li>g plan, set up and carry out comparative and fair tests to answer questions, including recognising and controlling variables where necessary;</li> <li>h use their test results to identify when further tests and observations may be needed;</li> <li>i use test results to make predictions for further tests.</li> </ul>

	KS1	LKS2	UKS2
Observing and Measuring Changes	<b>KS1 Science National Curriculum</b> Observing closely, using simple equipment. Children can: <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>	<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. Children can: <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>	<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. Children can: <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>
Identifying, Classifying, Recording and Presenting Data	<b>KS1 Science National Curriculum</b> Identifying and classifying. Gathering and recording data to help in answering questions. Children can: <ul style="list-style-type: none"> <li>a use simple features to compare objects, materials and living things;</li> <li>b decide how to sort and classify objects into simple groups with some help;</li> <li>c record and communicate findings in a range of ways with support;</li> <li>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.</li> </ul>	<b>Lower KS2 Science National Curriculum</b> 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: <ul style="list-style-type: none"> <li>a talk about criteria for grouping, sorting and classifying;</li> <li>b group and classify things;</li> <li>c collect data from their own observations and measurements;</li> <li>d present data in a variety of ways to help in answering questions;</li> <li>e use, read and spell scientific vocabulary correctly and with confidence, using their growing word reading and spelling knowledge;</li> <li>f record findings using scientific language;</li> <li>g drawings, labelled diagrams, keys, bar charts and tables.</li> </ul>	<b>Upper KS2 Science National Curriculum</b> Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs. Children can: <ul style="list-style-type: none"> <li>a independently group, classify and describe living things and materials;</li> <li>b use and develop keys and other information records to identify, classify and describe living things and materials;</li> <li>c decide how to record data from a choice of familiar approaches;</li> <li>d record data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar graphs and line graphs.</li> </ul>

Drawing Conclusions, Noticing Patterns and Presenting Findings	<p><b>KS1 Science National Curriculum</b> Using their observations and ideas to suggest answers to questions.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a notice links between cause and effect with support;</li> <li>b begin to notice patterns and relationships with support;</li> <li>c begin to draw simple conclusions;</li> <li>d identify and discuss differences between their results;</li> <li>e use simple and scientific language;</li> <li>f read and spell scientific vocabulary at a level consistent with their increasing word reading and spelling knowledge at key stage 1;</li> <li>g talk about their findings to a variety of audiences in a variety of ways.</li> </ul>	<p><b>Lower KS2 Science National Curriculum</b> Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.</p> <p>Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a draw simple conclusions from their results;</li> <li>b make predictions;</li> <li>c suggest improvements to investigations;</li> <li>d raise further questions which could be investigated;</li> <li>e first talk about, and then go on to write about, what they have found out;</li> <li>f report and present their results and conclusions to others in written and oral forms with increasing confidence.</li> </ul>	<p><b>Upper KS2 Science National Curriculum</b> 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.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a notice patterns;</li> <li>b draw conclusions based in their data and observations;</li> <li>c use their scientific knowledge and understanding to explain their findings;</li> <li>d read, spell and pronounce scientific vocabulary correctly;</li> <li>e identify patterns that might be found in the natural environment;</li> <li>f look for different causal relationships in their data;</li> <li>g discuss the degree of trust they can have in a set of results;</li> <li>h independently report and present their conclusions to others in oral and written forms.</li> </ul>
Using Scientific Evidence and Secondary Sources of Information		<p><b>Lower KS2 Science National Curriculum</b> Identifying differences, similarities or changes related to simple scientific ideas and processes.</p> <p>Using straightforward scientific evidence to answer questions or to support their findings.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a make links between their own science results and other scientific evidence;</li> <li>b use straightforward scientific evidence to answer questions or support their findings;</li> <li>c identify similarities, differences, patterns and changes relating to simple scientific ideas and processes;</li> <li>d recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.</li> </ul>	<p><b>Upper KS2 Science National Curriculum</b> Identifying scientific evidence that has been used to support or refute ideas or arguments.</p> <p>Children can:</p> <ul style="list-style-type: none"> <li>a use primary and secondary sources evidence to justify ideas;</li> <li>b identify evidence that refutes or supports their ideas;</li> <li>c recognise where secondary sources will be most useful to research ideas and begin to separate opinion from fact;</li> <li>d use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas;</li> <li>e talk about how scientific ideas have developed over time.</li> </ul>