



## Science at Bardsey Primary School

### Vision

At Bardsey we believe it is important to provide children with the scientific knowledge they need as they move on to Key Stage 3. Units of work are taught to each year group as outlined in the national curriculum for Science, which gives children a broad understanding of many aspects of Biology, Physics and Chemistry. Children carry out scientific investigations right the way through school and learn how to work scientifically right from the beginning of Key Stage 1 through to Year 6. Science is used to develop writing skills as much as possible and we use the same structure of writing-up our experiments all the way through school using the question, prediction, method, results, conclusion and evaluation format.

### National Curriculum

The National Curriculum for Science in Key Stages 1 and 2 can be found using the links below. This highlights the programme of study both statutory and non-statutory objectives for each Key Stage.

<https://www.gov.uk/government/publications/national-curriculum-in-england-science-programmes-of-study/national-curriculum-in-england-science-programmes-of-study>

### EYFS Curriculum

Please use the link below to learn more about the content of the Early Years Curriculum.

<https://www.foundationyears.org.uk/files/2012/03/Development-Matters-FINAL-PRINT-AMENDED.pdf>

The following sections of the document link to objectives related to Science:

- Physical Development: Health and Self-Care
- Understanding the World: The World
- Expressive Arts and Design: Exploring and Using Media and Materials

### Intent

Our Science curriculum intends to:

- Develop a lifelong interest and curiosity in Science
- Provide children with solid scientific knowledge that they need in order to excel as they move onto Key Stage 3.
- Give opportunities for children to learn through varied investigations, leading them to be able to ask and answer scientific questions about the world around them.
- Progressively build on skills in working scientifically, as well as developing their scientific subject knowledge as they move through school.
- Give children solid foundations in planning and carrying out fair and comparative tests before allowing children greater independence in carrying out scientific investigations.



## Implementation

### **Progression**

Through collaborative planning our science curriculum builds on prior knowledge alongside introducing new skills and challenges each year. Scientific knowledge and enquiry are developed with increasing depth and challenge as children move through the year groups. As a result of this curriculum planning, all children continually expand on their skills in working scientifically, as well as their understanding of the key scientific strands of physics, chemistry and biology.

### **Teaching**

All science lessons are carefully planned with a clear focus and learning objective. Children complete investigations and hands-on activities while gaining the scientific knowledge for each unit. Key questions are planned into teaching to allow teachers to assess children's levels of understanding at various points in the lesson. They also enable opportunities to recap concepts where necessary. The sequence of lessons helps to embed scientific knowledge and skills, with each lesson building on previous learning. There is also the opportunity to regularly review and evaluate children's understanding. Activities are effectively differentiated so that all children have an appropriate level of support and challenge. Starting in Key Stage 1, children are encouraged to use the scientific vocabulary and structure of Question, Prediction, Method, Results, Conclusion and Evaluation when carrying out investigations and working scientifically. This consistent approach ensures that children are well-equipped with the skills they need when moving forward into high school.

### **Key Knowledge**

The acquisition of key scientific knowledge is an integral part of our science lessons. Linked knowledge organisers enable children to learn and retain the important, useful and powerful vocabulary and knowledge contained within each unit. Our Science curriculum is based on the idea that long-term learning is built upon repetition of prior knowledge and we allow opportunities for children to come back to and re-visit previous learning to embed this knowledge in the long-term memory. Key scientific knowledge and concepts are frequently re-visited through short recall quizzes which assess and revise children's knowledge of prior science learning from different units completed in previous terms and years.

### **Key Vocabulary**

The promotion of a language rich science curriculum is essential to the successful acquisition of knowledge and understanding in science. Key vocabulary and concepts should be presented in knowledge organisers and will be prominent in Science displays. Children are encouraged to use this vocabulary during discussions in lessons and when writing up scientific investigations.

### **Independent learning**

In Science, children are encouraged to ask questions, make predictions and to plan and carry out scientific investigations in order to gain understanding of key concepts. Children will gain more and more independence in planning and carrying out scientific investigations as they move through school.

### **High Quality Resources**

Children will access resources to acquire learning through relevant scientific equipment, textbooks and digital technology. Children will use a range of secondary resources to develop their knowledge and understanding that is integral to their learning.

### **Fieldwork and Outdoor Learning**

Across both key stages, children have a range of opportunities to experience science through practical engaging tasks beyond the classroom. Our school grounds are utilized as much as possible for lessons, enabling children to develop practical scientific fieldwork and exploration of the world around them.

### **Curriculum Enhancements**

Where applicable, links to science will be made to develop the children's learning.

### **CPD**

Continuous training to ensure teacher skill and knowledge is developed to teach the subject with confidence and accuracy.



## **Impact**

The impact and measure of our Science curriculum is that pupils:

- Move on to Key Stage 3 having met or exceeded the expected outcomes for Science as outlined in the National Curriculum.
- Are able to demonstrate their ability to know more, remember more and explain more.
- Feel confident in their scientific knowledge and enquiry skills.
- Are excited about Science and show that they are actively curious to learn more in this subject area.
- See the relevance of what they learn in Science lessons to real-life situations and contexts.
- Recognise the importance of Science in the wider world.

In addition, the learning environment across the school will be more consistent with subject-specific, technical vocabulary displayed, spoken and used by all learners. Whole-school and parental engagement will be improved through the use of Science home learning tasks and shared use of knowledge organizers.

### **Leadership, Assessment and Feedback**

The use of key questions ensures opportunities are built into the lesson for ongoing assessment. At the end of each Science unit of work from Years 1 to 6, children complete a short assessment which assesses their knowledge and retainment of what they have learned. Attainment and progress can then be measured across the school using our assessment spreadsheets.

## Progression Map

	KS1	LKS2	UKS2
Asking Questions and Carrying Out Fair and Comparative Tests	<p><b>KS1 Science National Curriculum</b> Asking simple questions and recognising that they can be answered in different ways.</p> <p><b>Performing simple tests.</b> 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> </ul>	<p><b>Lower KS2 Science National Curriculum</b> Asking relevant questions and using different types of scientific enquiries to answer them.</p> <p><b>Setting up simple practical enquiries, comparative and fair tests.</b></p> <p><b>Children can:</b></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> Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.</p> <p><b>Using test results to make predictions to set up further comparative and fair tests.</b></p> <p><b>Children can:</b></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>

Observing and Measuring Changes	<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 <u>accurately</u>;</li> <li>b take measurements using a range of scientific equipment with increasing accuracy and <u>precision</u>;</li> <li>c make careful and focused <u>observations</u>;</li> <li>d know the importance of taking repeat readings and take repeat readings where appropriate.</li> </ul>
Identifying, Classifying, Recording and Presenting Data	<p><b>KS1 Science National Curriculum</b> Identifying and classifying.</p> <p>Gathering and recording data to help in answering questions. Children can:</p> <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>	<p><b>Lower KS2 Science National Curriculum</b> Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.</p> <p>Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.</p> <p>Children can:</p> <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, drawings, labelled diagrams, keys, bar charts and tables.</li> </ul>	<p><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.</p> <p>Children can:</p> <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>

<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Drawing Conclusions, Noticing Patterns and Presenting Findings</b></p>	<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>
<p style="writing-mode: vertical-rl; transform: rotate(180deg);"><b>Using Scientific Evidence and Secondary Sources of Information</b></p>		<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>



## Bardsey Primary Curriculum



<b>Science</b>						
	Autumn 1	Autumn 2	Spring 1	Spring 2	Summer 1	Summer 2
<b>Reception</b>	Our Bodies	Seasons and Change	The Solar System	Age of the Dinosaurs	Life Cycles	Plants and Minibeasts
<b>Year 1</b>	Seasonal Changes Animals Including Humans	Everyday Materials	Seasonal Changes	Animals Including Humans	Plants	Seasonal Changes
<b>Year 2</b>	Everyday Materials	Animals Including Humans	Living Things and their Habitats	Plants	Environments	Scientists and Inventors
<b>Year 3</b>	Light	Scientists and Inventors	Forces and Magnets	Rocks	Plants	Animals Including Humans
<b>Year 4</b>	States of Matter	Electricity	Animals Including Humans	Living Things and Their Habitats	Sound	Scientists and Inventors
<b>Year 5</b>	Properties and Changes of Materials	Earth and Space	Forces	Scientists and Inventors	Animals Including Humans	Living Things and Their Habitats
<b>Year 6</b>	Animals Including Humans	Scientists and Inventors	Light	Electricity	Evolution and Inheritance	Living Things and Their Habitats