

Intent

Science at Brecknock Primary School intends to inspire children to be the scientists of the future. They are encouraged to enquire, test, discover and conclude, to develop their scientific knowledge and skills.

Knowledgeable learners

- Lessons will be contextualised to make them purposeful to ensure that children understand the relevance of the curriculum and how it can explain and impact the world around them.
- Science teaching delivers all the requirements of the National Curriculum in relation to science, covering all scientific concepts, including both substantive knowledge and disciplinary skills.
- Teachers will ensure that pupils have sufficient scientific knowledge to understand both the uses and implications of science, today and in the future.
- Children will understand that the concepts and ideas within science are constantly evolving as a result of new research and experimentation.



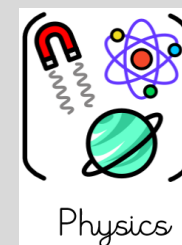
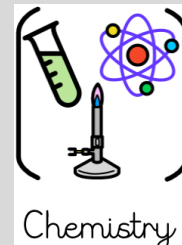
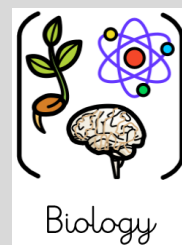
Confident communicators

- We will develop pupils' ability to pose questions, investigate these using correct techniques, accurately record their findings using appropriate scientific language and analyse their results.
- A range of oracy activities and techniques will be used to ensure that appropriate scientific vocabulary is learnt by all children.
- The relevance of presenting scientific knowledge and processes is highlighted by both the Scientist in Residence programme and STEAM projects and encourages children to share and explain their knowledge in a variety of different ways.



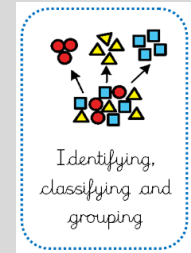
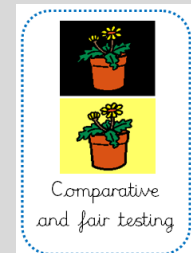
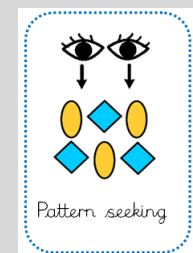
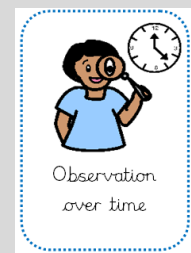
Active citizens

- We will help pupils develop the skills of prediction, hypothesising, experimentation, investigation, observation, measurement, interpretation and communication so they can be active scientists.
- Pupils will be made aware of and alert to links between science and other school subjects, as well as their lives more generally and within sustainability contexts in the wider community and world.
- Children will learn that science has the power to explain, impact and alter the world around them and will be inspired to consider how they can have an active role in being scientists.



Implementation

- Our science curriculum is based on the National Curriculum. Teachers use a wide range of resources to help guide their medium term and short term planning, including PLAN, Pzaz, Explorify, Science Museum, Ogden Trust and others.
- In EYFS, children begin to discover, explore and develop their curiosity about the world around them. Within both nursery and reception, topics will link to relevant areas of Understanding the World within Development Matters. They will be encouraged to test and experiment practically to develop a wide base of understanding upon which to develop their knowledge in later years.
- In KS1, children observe, explore and ask questions about living things, materials and physical phenomena. They begin to work together
- to collect evidence to help them answer questions and to link this to simple scientific ideas. They are exposed to the five different types of scientific enquiry within lessons, beginning to evaluate evidence and carry out comparative and fair tests;, using reference materials to research more about scientific ideas; completing observations over time; identifying, classifying and grouping within a range of units and pattern seeking They share ideas and communicate them using scientific language, drawings, charts and tables with the help of ICT if it is appropriate.
- At KS2, children build on their prior understanding of living things, materials and physical phenomena. They make links between ideas and explain things using simple models and theories. They think about the effects of scientific and technological developments on the environment and in other contexts. They carry out more systematic investigations, working on their own and with others through further familiarity of the types of scientific enquiry. They begin to not only ask their own questions, but plan how they will answer them through investigation. They develop their scientific vocabulary using oracy techniques.
- Teachers plan with skills progression and knowledge in mind. All learning starts by revisiting prior knowledge to encourage children to make connections and formative assessment is used throughout to address any misconceptions.
- Knowledge Mats provide children with subject-specific vocabulary and key learning as well as what they should already know and what comes next. They specify relevant enquiry questions, key working scientifically skills, relevant career links and scientists. Knowledge Mats are used for pre-teaching, to support home learning and as a part of regular review in lessons. Knowledge Mats for each term can be found on the relevant year group learning page. Click here to see an example.
- Teacher’s planning follows a progression of skills document that is set out in order to build and develop as children move through the school. This can be seen here.
- Opportunities for outdoor learning will be provided wherever possible and each year group will have the opportunity to undertake an external educational visit, which is science based, at least once a year.
- Further enrichment activities include our participation in the ZSL London Zoo Access Scheme, Scientist in Residence programme (developed with the Francis Crick Institute), Crick Primary Science week, British Science week and STEAM projects. There are further details about these on our Science Enrichment Page.



Impact

Through our science teaching and learning, pupils should be able to recall knowledge, use scientific vocabulary and develop scientific skills. A detailed document showing progression of skills for each year group can be found below.

Exposure to real life contexts, careers and scientists will build pupils’ science capital so that they might leave the school feeling that a career in science might be for them.





	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
<i>Working Scientifically</i>	<p>Children can begin to show curiosity and ask questions.</p> <p>With prompting, children make observations using their senses and make direct comparisons.</p> <p>With support, they can use simple equipment to measure or record their observations by drawing, taking photographs, using sorting rings or boxes.</p> <p>Children can use their observations to help them to answer their questions, talk about what they are doing and have found out, identify, sort and group items.</p>	<p>Children can show curiosity and ask questions.</p> <p>Children make observations using their senses and make direct comparisons.</p> <p>They can use simple equipment to measure or record their observations by drawing, taking photographs, using sorting rings or boxes and on simple tick sheets.</p> <p>Children can use their observations to help them to answer their questions, talk about what they are doing and have found out, identify, sort and group items.</p>	<p>Children can, with prompting, ask simple questions that can be tested and offer ways of gathering evidence to answer a question.</p> <p>They can examine objects to note key features and, with support, conduct simple tests.</p> <p>Children can, with prompting, identify what might usefully be recorded and identify key findings from an enquiry.</p> <p>Children can collect data and suggest answers to enquiry questions using data.</p>	<p>Children can ask simple questions that can be tested and suggest different ways of answering a question.</p> <p>They can examine carefully and conduct simple tests.</p> <p>Children can, with assistance, draw and label diagrams.</p> <p>They can identify and group key outcomes from enquiry and collect data relevant to the answering of questions.</p> <p>Children can answer enquiry questions using data and ideas.</p>	<p>Children can, with support, develop relevant, testable questions.</p> <p>They can plan and set up a comparative or fair test.</p> <p>Children can use various equipment as instructed, and take standard measurements.</p> <p>With prompting, they can draw and label diagrams and use tables to record evidence.</p> <p>With prompting, children can gather and display evidence in various ways and write a conclusion based on evidence.</p> <p>Children can indicate findings from an enquiry that could be reported and, with prompting, recognise patterns that relate to scientific ideas.</p> <p>With support, children can use evidence to produce a simple conclusion and suggest how an investigation could be extended.</p>	<p>Children can develop relevant testable questions and plan investigations using different types of scientific enquiry.</p> <p>They can set up comparative and fair tests, use various equipment, with care, and recognise the importance of accurate measuring.</p> <p>Children can use words and diagrams to record, group and display evidence and findings.</p> <p>They can write a conclusion, based on evidence, present findings orally and recognise patterns that relate to scientific ideas.</p> <p>Children can use evidence to produce a simple conclusion and suggest further relevant investigations.</p>	<p>Children can, with support, answer questions using evidence gathered from different types of scientific enquiry. They can, with prompting, identify and manage variables and select appropriate equipment (following discussion).</p> <p>They can take precise and accurate measurements and process repeat readings. They can start to use labelled diagrams to demonstrate more complex processes and use a line graph to record basic data.</p> <p>Children can, with prompting, write a conclusion using evidence and identifying causal links. They can, with support, display and present key findings and indicate why some results may not be entirely trustworthy.</p> <p>They can suggest further relevant comparative or fair tests.</p>	<p>Children can answer questions using evidence gathered from different types of scientific enquiry.</p> <p>They can identify and manage variables, use appropriate equipment and consider how modifying an instrument can improve measurements.</p> <p>Children can identify situations in which repeat readings will improve results.</p> <p>They will be able to use labelled diagrams to show complex outcomes and various methods to record evidence and data (including line graphs).</p> <p>Children can write a conclusion using evidence and identifying causal links, display and present key findings and indicate how trustworthy and outcome is.</p> <p>They can identify how an idea can be supported or refuted by evidence and use evidence to suggest further comparative or fair tests to develop and investigation.</p>
	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

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<p><i>Plants</i></p> <p>Biology</p>	<p>Children will grow plants and observe how they change over time</p>		<p>Children will learn about and be able to identify a variety of trees, including deciduous and evergreen trees. They will also learn about the basic structure of common flowering plants including trees</p>	<p>Children will observe and describe how seeds and bulbs grow into mature plants and find out and describe how plants need water, light and a suitable temperature to grow and stay healthy</p>	<p>Children will identify and describe the functions of different parts of flowering plants (roots, stem/trunk, leaves and flowers). They will explore the requirements of plants for life and growth and how they vary from plant to plant.</p> <p>Children will investigate the way in which water is transported within plants and explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal.</p>			
<p><i>Animals, including humans</i></p> <p>Biology</p>	<p>Children will learn about the life cycles of animals.</p> <p>They will compare adult animals to their babies and observe how baby animals change over time.</p> <p>Children will learn about the life cycles of humans, they will learn how to take care of themselves and learn about their senses.</p>	<p>Children will name and describe animals that live in different habitats. They will be able to describe different habitats.</p> <p>Children will describe people who are familiar to them. They will learn about how to take care of themselves.</p>	<p>Children will learn how to identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense.</p> <p>Children will be introduced to the different animal groups and begin identifying and naming common animals (fish, amphibians, reptiles, birds and mammals including pets).</p> <p>Children will describe and compare the structure of a variety of common animals and name those that are carnivores, herbivores and omnivores.</p>	<p>Children will notice that animals, including humans, have offspring which grow into adults.</p> <p>They will find out about the basic needs for survival and describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene.</p>	<p>Children identify that animals, including humans, need the right types and amounts of nutrition and that this comes from what they eat.</p> <p>Children will explain which parts of the skeleton provide support and protection and how they allow for movement.</p>	<p>Children will discover the role of the digestive system in the human body and identify the role of the different types of teeth in humans and their simple functions for carnivores, omnivores and herbivores.</p> <p>They will construct and interpret a variety of food chains, identifying producers, predators and prey.</p>	<p>Building on learning from animal life cycles, students will be able to describe the changes in humans as they develop from birth to old age.</p>	<p>Children will identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood. They will also recognise the impact of diet, exercise and lifestyle on the way their bodies function. As well as this, they will also describe the ways in which nutrients and water are transported within animals, including humans.</p>
	Nursery	Reception	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6

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<p><i>Living things and their habitats</i></p> <p>Biology</p>	<p>Children will explore the surrounding natural environment. They will explore natural objects from the surrounding environment.</p>	<p>Children will explore plants and animals in the surrounding natural environment. They will also explore plants and animals in a contrasting natural environment.</p>		<p>Children will explore and compare the differences between things that are living, dead and things that have never been alive.</p> <p>They will identify that most living things live in habitats to which they are suited, name animals and their habitats, describe how different habitats provide for basic needs of living things and how they depend on each other.</p> <p>They will describe how animals obtain their food from plants and other animals, using the idea of a simple food chain.</p>		<p>Children will recognise that living things can be grouped in a variety of ways.</p> <p>They will explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.</p> <p>They will recognise that environments can change and that this can sometimes pose dangers to living things.</p>	<p>Children will build on their knowledge of plants to learn about the different life processes of reproduction in some plants and animals.</p> <p>They will also be able to explain the differences between the life cycles of mammals, amphibians, insects and birds.</p>	<p>Children will describe how living things are classified into broad groups according to common observable characteristics and based on similarities and differences, including micro-organisms, plants and animals.</p> <p>They will also give reasons for classifying plants and animals based on specific characteristics.</p>
<p><i>Uses of everyday materials / Materials and their properties</i></p> <p>Chemistry</p>	<p>Children will explore a range of materials. They will shape and join materials, and combine and mix ingredients.</p>	<p>Children will explore a range of materials, including natural materials. They will make objects from different materials, including natural materials.</p>	<p>Children will begin this unit by learning to distinguish between an object and the material it is made out of. Children will then learn about a variety of materials, beginning to understand and describe their physical properties.</p> <p>Children will compare and group materials according to their simple physical properties.</p> <p>Children will learn how to identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock.</p>	<p>Children will learn about identifying and comparing the suitability of different materials.</p> <p>They will also learn how materials can be changed by squashing, bending, twisting and stretching.</p>			<p>Children will compare and group together everyday materials based on their properties, including hardness, solubility, transparency and conductivity. They will know that some materials dissolve and describe how to recover a substance from a solution.</p> <p>They will use knowledge of states of matter (Y4) to decide how to separate mixtures including filtering, sieving and evaporating.</p> <p>Children will give reasons, based on fair tests, for the uses of everyday materials including metals, woods and plastics.</p> <p>They will demonstrate that dissolving, mixing and changes of state are reversible changes, but that some changes form a</p>	

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<p><i>States of matter/ seasonal changes</i></p> <p>Chemistry</p>	<p>Children will change materials by heating and cooling, including cooking.</p>	<p>Children will observe, measure and record how materials change when heated and cooled. They will compare how materials change over time and in different conditions.</p> <p>Children will play and explore outside in all seasons and in different weather. They will observe living things and how they change throughout the year.</p>	<p>Children will observe changes across the four seasons. They will also observe and describe weather associated with the seasons and how day length varies.</p>			<p>Children will compare and group materials together, according to whether they are solids, liquids or gases.</p> <p>They will observe that some materials change state when they are heated or cooled and measure or research the temperature at which this happens in °C.</p> <p>Children will identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.</p>	<p>new material and are irreversible, such as burning.</p>	
<p><i>Light</i></p> <p>Physics</p>	<p>Children will explore light sources and shine light on or through different materials.</p>	<p>Children will explore shadows and rainbows.</p>			<p>Children will recognise that they need light to see and dark is the absence of light. They will notice that light is reflected from surfaces and can be dangerous. They will learn how to protect their eyes from the light.</p> <p>When exploring shadows, children will recognise that they are formed when light is blocked and find patterns in the way the sizes of shadows change.</p>			<p>Children will recognise that light appears to travel in straight lines. They will use this idea to explain that objects are seen because they give out or reflect light into the eye and that shadows have the same shape as the object that cast them.</p> <p>Children will explain that we see things because light travels from the light source to our eyes.</p>
<p><i>Forces/ Magnets</i></p>	<p>Children will feel forces. They will explore how things work and explore how objects and materials are affected by forces.</p>	<p>Children will explore how to change how things work. They will explore how the wind can move objects and how</p>			<p>Children will be able to compare how objects move on different surfaces and recognise the difference between</p>		<p>Children will be taught to explain that unsupported objects fall towards the Earth due to gravity. They will identify the effects of air resistance, water resistance</p>	

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 Physics		objects move in water.			contact and non contact forces. Children will observe how magnets attract or repel each other and attract some materials but not others. They will investigate the two poles on the magnet and categorise materials into magnetic and non-magnetic materials.		and friction that act between moving surfaces. They will recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect.	
 Electricity Physics	Children will identify electrical devices. They will use battery-powered devices.					Children will identify common appliances that run on electricity. They will construct simple series electrical circuits, identifying and naming basic parts (including cells, wires, bulbs, switches and buzzers). They will identify whether or not a lamp will light based on whether it is in a loop, recognise that switches open and close circuits and associate this with the light turning on. They will recognise some common conductors and insulators.		Children will be able to associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit. They will compare and give reasons for variations in how components function, including the brightness of bulbs, loudness of buzzers and the on/off position of switches. Children will be able to use recognised symbols when representing a simple circuit in a diagram.
Other	Sound Children will listen to sounds and make sounds.	Sound Children will listen to sounds outside and identify the source. They will also make sounds. Earth and Space Children will learn about the sun, moon and stars. They will learn about space travel.			Rocks Children will compare and group different rocks on the basis of their appearance and simple physical properties. They will describe, in simple terms, how fossils are formed when things that have lived are trapped within a rock.	Sound Children will identify how sounds are made, associating some of them with vibrations and recognise that these vibrations travel through a medium to the ear.	Space Children will describe the movement of the Earth and other planets relative to the sun in the solar system. They will use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. They will describe the movement of the moon relative to the Earth.	Evolution and Inheritance Children will recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago. They will recognise that living things produce offspring of



					Children will recognise that soils are made from rocks and organic matter.		They will describe the sun, Earth and moon as approximately spherical bodies.	the same kind, but normally offspring vary and are not identical to their parents. Children will be able to identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution.
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