

Science

Intent	At Brotherton and Byram, we encourage all children to be scientists and to develop the scientific skills needed to make sense of the world around them. We encourage our children to be investigative thinkers and have an inquisitive mind whilst challenging themselves through a diverse range of learning experiences, both in and outside of the classroom. From the beginning of their time at Brotherton and Byram, we help our children to understand the world around them by guiding children to make sense of their physical world and their community.
Implementation	We have a progressive long term curriculum for Science to both ensure there is full coverage of the National Curriculum and that it is taught to a high standard to achieve the best learning outcomes. All children work towards the end of year objectives, with some being supported or challenged where necessary. This may be through the choice and amount of vocabulary, visual aids, word lists, sentence length and complexity. We use key scientific language and skills to enable our children to become familiar with and use accurately and adeptly. We recognise that there are widely differing scientific abilities in all classes and we ensure that suitable learning opportunities are provided for all children. We encourage all of our children to be independent thinkers and learners, to ask questions and to share their findings. At the beginning of each topic, we allow time for children to consider what they already understand or have previously learnt and what they want to find out. This allows teachers to adapt and extend the curriculum to meet the interests of the children. We want our children to be amazed and interested in the world around them, both locally and beyond as we recognise that some of our children have limited experiences.
Impact	The approach to teaching Science at Brotherton and Byram results in a fun, engaging and high quality Science education that provides children with the foundation and knowledge for understanding the world around them. Our engagement with the local environment ensures that children learn through varied and first hand experiences alongside classroom based learning. This way, they gain an understanding that Science has changed our lives and that it is vital to the world's future prosperity. Children are exposed to the roles and careers in science through STEM weeks and interactions with experts through the year. This exposure allows children to feel that they are scientists and capable of achieving their own career goals. Children are excited by Science at Brotherton and Byram and this makes them motivated learners with sound scientific understanding.

BB Science Knowledge and Skills Progression Overview							
	EYFS	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6
Units	<ul style="list-style-type: none">- All about me- Planting and Growing- Floating and Sinking- Farm animals-Minibeasts	<p>Animals including Humans</p> <p>Everyday Materials</p> <p>Plants</p>	<p>Everyday Materials</p> <p>Plants</p> <p>Animals including humans</p> <p>Living things and their habitats</p>	<p>Animals including humans</p> <p>Rocks</p> <p>Forces and Magnets</p> <p>Plants</p> <p>Light</p>	<p>Animals including humans</p> <p>Electricity</p> <p>States of Matter</p> <p>Sound</p> <p>Living Things and their habitats</p>	<p>Properties and changes of materials</p> <p>Forces</p> <p>Animals including humans</p> <p>Earth and Space</p> <p>Living things and their habitat</p>	<p>Animals including humans</p> <p>Evolution and inheritance</p> <p>Electricity</p> <p>Living things and their habitats</p> <p>Light</p>
Working Scientifically	<ul style="list-style-type: none">- Show curiosity about objects, events and people.Questions why things happenEngage in open-ended activity<ul style="list-style-type: none">- Take a task, engage in new experiences and learn by trial and error- Find ways to solve problems / find new ways to do things / test their ideas<ul style="list-style-type: none">- Develop ideas of grouping, forces, cause and effect- Comments and asks questions about aspects of their familiar world such as the place where they live or the natural world- Closely observes what animals, people and vehicles do- Use senses to explore the world around them- Make links and notice patterns in their experience- Choose the resources they need for their chosen activities<ul style="list-style-type: none">- Handle equipment and tools effectively.- Create simple representations of events, people and objects- Answer how and why questions about their experiences<ul style="list-style-type: none">- Make observations of animals and plants and explain why some things occur, and talk about changes.- Develop their own narratives and explanations by connecting ideas or events- Builds up vocabulary that reflects the breadth of their experience	<ul style="list-style-type: none">- Explore the world around them and raise their own simple questions.- Experience different types of science enquiries, including practical activities- Begin to recognise different ways in which they might answer scientific questions<ul style="list-style-type: none">- Carry out simple tests- Use simple features to compare objects, materials and living things and, with help, decode how to sort and group them (identifying and classifying)Ask people questions and use simple secondary sources to find answersObserve closely using simple equipment with help, observe changes over time.With guidance, they should begin to notice patterns and relationships<ul style="list-style-type: none">- Use simple measurements and equipment (eg. hand lenses, egg timers) to gather data<ul style="list-style-type: none">- Record simple data- Use their observations and ideas to suggest answers to questions. Talk about what they have found out and how they found it out.- With help, they should record and communicate their findings in a range of ways and begin to use simple scientific language.	<ul style="list-style-type: none">- Raise their own relevant questions about the world around them.- Should be given a range of scientific experiences including different types of science enquiries to answer questions;Start to make their own decisions about the most appropriate type of scientific enquiry they might use to answer questions.- Set up simple practical enquiries, comparative and fair tests.- Recognise when a simple fair test is necessary and help to decide how to set it up.about criteria for grouping, sorting and classifying and use simple keys.- Recognise when and how secondary sources might help them to answer questions that cannot be answered through practical investigations.- Make systematic and careful observations. Help to make decisions about what observations to make, how long to make them for and the type of simple equipment that might be used.- Begin to look for naturally occurring patterns and relationships and decide what data to collect to identify them.- Take accurate measurements using standard units. Learn how to use a range of (new) equipment, such as data loggers and thermometers appropriately- Collect and record data from their own observations and measurements in a variety of ways: notes, bar charts and tables, standard units, drawings, labelled grams, keys and help to make decisions about how to analyse this data.- With help, pupils should look for changes, patterns, similarities and differences in their data in order to draw simple conclusions and answer questions.- Use relevant simple scientific language to discuss their ideas and communicate their findings in ways that are appropriate for different audiences, including oral and written explanations, displays or presentations of results and conclusions.- With support, they should identify new questions arising from the data, making predictions for new values within or beyond the data they have collected and finding ways of improving what they have already done.	<ul style="list-style-type: none">- Use science experiences to explore and raise different kinds of questions<ul style="list-style-type: none">- Talk about how scientific ideas have developed over time- Select and plan the most appropriate type of scientific enquiry to answer scientific questions.- Recognise when and how to set up comparative and fair tests and explain which variables need to be controlled and why.- Use and develop keys and other information records to identify, classify and describe living things and materials, and identify patterns that might be found in the natural environment.- Recognise which secondary sources will be most useful to research their ideas and begin to separate opinion from fact.<ul style="list-style-type: none">- Make their own decisions about what observations to make, what measurements to use and how long to make them for.- Look for different causal relationships in their data and identify evidence that refutes or supports their ideas.<ul style="list-style-type: none">- Choose the most appropriate equipment to make measurements with increasing precision and explain how to use it accurately. Take repeat measurements where appropriate.- Decide how to record data and results of increasing complexity from a choice of familiar approaches: scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.- Identify scientific evidence that has been used to support or refute ideas or arguments.- Use relevant scientific language and illustrations to discuss, communicate and justify their scientific ideas; use oral and written forms such as displays and other presentations to report conclusions, causal relationships and explanations of degree of trust in results.- Use their results to make predictions and identify when further observations, comparative and fair tests might be needed.			
Everyday Materials (including Rocks, States Of Matter and Properties and Changes of Materials)	<ul style="list-style-type: none">- Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter.- Know some similarities and differences between the natural world around them and contrasting environments.	<ul style="list-style-type: none">- Distinguish between an object and material from which it is made.- Identify and name a variety of everyday materials, including wood, plastic, glass, water and rock.- Describe the simple physical properties of a variety of everyday materials.- Compare and group together a variety of everyday materials on the basis of their physical properties.	<ul style="list-style-type: none">-Identify and compare the suitability of a variety of everyday materials, including wood, metal, plastic, glass, brick, rock, paper and cardboard for particular uses.-Find out how the shapes of solid objects made from some materials can be changed by squashing, bending, twisting and stretching.	<ul style="list-style-type: none">- Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties- Describe in simple terms how fossils are formed when things that have lived are trapped within rock- Recognise that soils are made from rocks and organic matter.	<ul style="list-style-type: none">-Compare and group materials together, according to whether they are solids, liquids or gases-Observe that some materials change state when they are heated or cooled, and measure or research the temperature at which this happens in degrees Celsius (°C)-Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature.	<ul style="list-style-type: none">- Compare and group together everyday materials on the basis of their properties, including their hardness, solubility, transparency, conductivity (electrical and thermal), and response to magnets- Understand that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution-Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating- Demonstrate that dissolving, mixing and changes of state are reversible changesExplain that some changes result in the formation of new materials, and that this kind of change is not usually reversible, including changes associated with burning and the action of acid on bicarbonate of soda.	

Seasonal Changes	<ul style="list-style-type: none"> - Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. 	<ul style="list-style-type: none"> - Observe changes across the four seasons - Observe and describe weather associated with the seasons and how day length varies. 				Talk about how scientific ideas have developed over time.	
Plants	<ul style="list-style-type: none"> - Explore the natural world around them, making observations and drawing pictures of animals and plants. 	<ul style="list-style-type: none"> - Identify and name a variety of common plants, including garden plants, wild plants and trees, and those identified as deciduous and evergreen - Identify and describe the basic structure of a variety of common plants including roots, stem/trunk, leaves and flowers. 	<ul style="list-style-type: none"> - Observe and describe how seeds and bulbs grow into mature plants - Find out and describe how plants need water, light and a suitable temperature to grow and stay healthy. 	<ul style="list-style-type: none"> - Identify and describe the functions of different parts of plants; roots, stem, leaves and flowers - Explore the requirements of plants for life and growth (air, light, water, nutrients from soil and room to grow) and how they vary from plant to plant. - Investigate the ways in which water is transported within plants. - Explore the role of flowers in the life cycle of flowering plants, including pollination, seed formation and seed dispersal 		Select and plan the most appropriate type of scientific enquiry to answer scientific questions.	
Animals Including Humans	<ul style="list-style-type: none"> - Explore the natural world around them, making observations and drawing pictures of animals and plants. 	<ul style="list-style-type: none"> - Identify and name a variety of common animals that are birds, fish, amphibians, reptiles and mammals - Identify and name a variety of common animals that are carnivores, herbivores and omnivores. - Describe and compare the structure of a variety of common animals (birds, fish, amphibians, reptiles and mammals, and including pets). - Identify, name draw and label the basic parts of the human body and say which parts of the body is associated with each sense. 	<ul style="list-style-type: none"> - Notice that animals, including humans, have offspring which grow into adults - Find out about and describe the basic needs of animals, including humans, for survival (water, food and air) - Describe the importance for humans of exercise, eating the right amounts of different types of food, and hygiene. 	<ul style="list-style-type: none"> - Identify that animals, including humans, need the right types and amount of nutrition, and that they cannot make their own food; they get nutrition from what they eat - Identify that humans and some animals have skeletons and muscles for support, protection and movement. 	<ul style="list-style-type: none"> - Describe the simple functions of the basic parts of the digestive system in humans - Identify the different types of teeth in humans and their simple functions - Construct and interpret a variety of food chains, identifying producers, predators and prey. 	<ul style="list-style-type: none"> - Describe the changes as humans develop from birth to old age 	<ul style="list-style-type: none"> - Identify and name the main parts of the human circulatory system, and explain the functions of the heart, blood vessels and blood - Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function - Describe the ways in which nutrients and water are transported within animals, including humans.
Living Things and Their Habitats	<ul style="list-style-type: none"> - Explore the natural world around them, making observations and drawing pictures of animals and plants. - know some similarities and differences between the natural world around them and contrasting environments drawing on their experiences and what has been read in class. 		<ul style="list-style-type: none"> - Explore and compare the differences between things that are living, dead, and things that have never been alive. - Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. - Identify and name a variety of plants and animals in their habitats, including micro-habitats. - Describe how animals obtain their food from plants and other animals, using the idea of a simple food chain, and identify and name different sources of food. 		<ul style="list-style-type: none"> - Recognise that living things can be grouped in a variety of ways - Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment - Recognise that environments can change and that this can sometimes pose dangers to living things 	<ul style="list-style-type: none"> - Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird - Describe the life process of reproduction in some plants and animals. 	<ul style="list-style-type: none"> - 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 - Give reasons for classifying plants and animals based on specific characteristics

Forces and Magnets	<ul style="list-style-type: none"> - Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. - Know some similarities and differences between the natural world around them and contrasting environments. 			<ul style="list-style-type: none"> - Compare how things move on different surfaces - Notice that some forces need contact between two objects, but magnetic forces can act at a distance - Observe how magnets attract or repel each other and attract some materials and not others - Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet, and identify some magnetic materials - Describe magnets as having two poles; Predict whether two magnets will attract or repel each other; ending on which poles are facing. 		<ul style="list-style-type: none"> - Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object - Identify the effects of air resistance, water resistance and friction, that act between moving surfaces - Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. 	
Light	<ul style="list-style-type: none"> - Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. 			<ul style="list-style-type: none"> - Recognise that they need light in order to see things and that dark is the absence of light - Notice that light is reflected from surfaces - Recognise that light from the sun can be dangerous and that there are ways to protect their eyes - Recognise that shadows are formed when the light from a light source is blocked by a solid object - Find patterns in the way that the sizes of shadows change. 			<ul style="list-style-type: none"> - Recognise that light appears to travel in straight lines - Use the idea that light travels in straight lines to explain that objects are seen because they give out or reflect light into the eye - Explain that we see things because light travels from light sources to our eyes or from light sources to objects and then to our eyes - Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them
Earth and Space	<ul style="list-style-type: none"> - Understand some important processes and changes in the natural world around them, including the seasons and changing states of matter. - Know some similarities and differences between the natural world around them and contrasting environments. 					Describe the movement of the Earth, and other planets, relative to the Sun in the solar system - Describe the movement of the Moon relative to the Earth - Describe the Sun, Earth and Moon as approximately spherical bodies - Use the idea of the Earth's rotation to explain day and night and the apparent movement of the Sun across the sky	
Electricity					<ul style="list-style-type: none"> - Identify common appliances that run on electricity - Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers - Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of complete loop with a battery - Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit - Recognise some common conductors and insulators, and associate metals with being good conductors. 		<ul style="list-style-type: none"> - Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit - Compare and give reasons for variations in how components function, including the brightness of bulbs, the loudness of buzzers and the on/off position of switches - Use recognised symbols when representing a simple circuit in a diagram.
Sound					<ul style="list-style-type: none"> - Identify how sounds are made, associating some of them with something vibrating - Recognise that vibrations from a sound travel through a medium to the ear. - Find patterns between the pitch of a sound and features of the object that produced it - Find patterns between the volume of a sound and the strength of the vibrations that produced it. - Recognise that sounds get fainter as the distance from the sound source increases. 		

Evolution						Look for different causal relationships in their data and identify evidence that refutes or supports their ideas.	<ul style="list-style-type: none">- Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.- Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents- 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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