# Brookland Junior School

## Science Curriculum Overview

**Intent**

We at Brookland create a space where children are inspired and motivated to explore and build on their understanding of science in the world around them, through a range of different approaches that purposefully prepare them for the future. There is a culture to ask and investigate questions and foster a sense of awe and wonder. Together we build on pupils natural curiosity, knowing and drawing upon the work of famous scientists and are inspired to follow in their footsteps.

**Our Key Principles to achieve this are:**

We learn through a range of engaging, practical and memorable methods
We can talk confidently about the science in and around us using scientific language
We ask questions and have the tools and skills to get an answer
We work collaboratively and make learning accessible to all
We can take and apply our learning to the world around us

**Implementation**

We ensure high standards of teaching and learning in science through implementing a curriculum that is progressive, highlights key skills and the five investigative types, is engaging and adapted to pupils needs throughout the school. Through using a wide range of resources and the facilities local to us, we are able to support teachers in their planning and implementation of the science curriculum. This enables the science planners to engage pupils' interests, use support staff effectively and include current events where appropriate. We build upon the vocabulary, knowledge and skill development of the previous years including the Infant curriculum and develops reflective thinkers who can evaluate their work. As the children's knowledge and understanding increases, they become more proficient in selecting, using scientific equipment, collating and interpreting results, they become increasingly confident in their growing ability to come to conclusions based on real evidence. The 'Brookland Toolkit' and Working Scientifically skills are embedded into lessons to ensure that skills are systematically developed throughout the children's school career and new vocabulary and challenging concepts are introduced in-keeping with the topics in a collaborative learning style.

"We have learnt more things so we can think about more things and link them and we can discover more because we know more. I can write in more detail in lessons and use more scientific vocabulary."

Regular events, such as Science Week or investigation weeks allow all pupils to come off-timetable, to provide broader provision and the acquisition and application of knowledge and skills whilst including families and external visitors.

**Impact**

Our approach successfully creates an engaging, high quality and practical curriculum based on knowledge and understanding of the world around them. Pupils are demonstrating an enthusiasm and enjoyment of science, seeking out knowledge and participating eagerly in science club and focus weeks. Pupils are demonstrating more depth to their understanding of science both in class and through pupil's voice, as well as showing they are remembering more content over time. Through asking and answering their own questions, pupils are working scientifically, learning and embedding skills that will see them succeed and thrive both in their school career and beyond. Our impact is highlighted through the PSQM Guilt award that we are currently working towards thinking more thoroughly about next steps and what will happen and using prior learning in science to help pupils when they do experiments to understand more.

(Working scientifically skills in red link with scientific skills listed below this chart)

# Year 3 Science Overview

| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
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| Year 3<br><br>Science Unit Skills | **Light**<br><br>**(1, 2, 7, 9)** | **Forces and magnets**<br><br>**(1, 2, 3, 4, 7)** | **Rocks**<br><br>**(1, 2, 7, 9)** | **Animals including humans (nutrition, skeletons, muscles)**<br><br>**(2, 3, 9)** | **Plants**<br><br>**Sustainability and gardening**<br><br>**(1, 2, 3, 7, 8)** | |
| | Recognise that they need light in order to see things and that dark is the absence of light.<br><br>Notice that light is reflected from surfaces.<br><br>Recognise that light from the sun can be dangerous and that there are ways to protect their eyes.<br><br>Recognise that shadows are formed when the light from a light source is blocked by a solid object.<br><br>Find patterns in the way that the size of shadows change. | Notice that some forces need contact between two objects, but magnetic forces can act at a distance.<br><br>Observe how magnets attract or repel each other and attract some materials and not others.<br><br>Compare and group together a variety of everyday materials on the basis of whether they are attracted to a magnet<br><br>Describe magnets as having two poles.<br><br>Predict whether two magnets will attract or repel each other, depending on which poles are facing. | Compare and group together different kinds of rocks on the basis of their appearance and simple physical properties.<br><br>Describe in simple terms how fossils are formed when things that have lived are trapped within rock.<br><br>Recognise that soils are made from rocks and organic matter. | 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.<br><br>Identify that humans and some other animals have skeletons and muscles for support, protection and movement. | To understand what impacts biodiversity.<br><br>To observe and reports on how rewilding can increase biodiversity in my local area?<br><br>To plant wildflower seeds in key school locations; growing and nurturing plant life.<br><br>To understand deforestation and the impact on our natural environment.<br><br>Make paper using natural resources and understand the processes involved in making paper. | Identify and describe the functions of different parts of flowering plants: roots, stem/trunk, leaves and flowers<br><br>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.<br><br>Investigate the way in which water is transported within plants.<br><br>Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. |

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| Year 3<br><br>Working Scientifically | 1. Beginning to use results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.<br><br>2. Beginning to identify differences, similarities or changes related to simple scientific ideas and processes.<br><br>3. Beginning to use straightforward scientific evidence to answer questions or to support their findings.<br><br>4. Beginning to report on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.<br><br>5. Beginning to gather, record, classify and present data in a variety of ways to help in answering questions.<br><br>6. Beginning to record findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.<br><br>7. Beginning to set up simple practical enquiries, comparative and fair tests.<br><br>8. Beginning to make systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometers and data loggers.<br><br>9. Beginning to ask relevant questions and using different types of scientific enquiries to answer them. |

# Year 4 Science Overview

| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
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| Year 4 | **Electricity**<br><br>**(1,3,4,5,6,8,9)** | **Sound**<br><br>**(1,2,3,4,5,7,8,9)** | **Animals including humans (food-chains, teeth, digestive (2,3,4,5,6)** | **Sustainability and gardening**<br><br>**(3 4,8,9)** | **Living things and their habitats**<br><br>**(2,4,5,6)** | **States of Matter**<br><br>**(1,3,4,5,6,7,8,9)** |
| Year 4<br><br>Science Unit Skills | Identify common appliances that run on<br><br>Construct a simple series electrical circuit, identifying and naming its basic parts, including cells, wires, bulbs, switches and buzzers.<br><br>Identify whether or not a lamp will light in a simple series circuit, based on whether or not the lamp is part of a complete loop with a battery.<br><br>Recognise that a switch opens and closes a circuit and associate this with whether or not a lamp lights in a simple series circuit.<br><br>Recognise some common conductors and insulators, and associate metals with being good conductors. | Identify how sounds are made, associating some of them with something vibrating.<br><br>Recognise that vibrations from sounds travel through a medium to the ear.<br><br>Find patterns between the pitch of a sound and features of the object that produced it.<br><br>Find patterns between the volume of a sound and the strength of the vibrations that produced it.<br><br>Recognise that sounds get fainter as the distance from the sound source increases. | Construct and interpret a variety of food chains, identifying producers, predators and prey.<br><br>Identify the different types of teeth in humans and their simple functions.<br><br>Describe the simple functions of the basic parts of the digestive system in humans | To investigate sources of renewable energy.<br><br>To identify ways that we can reduce energy usage.<br><br>To create animal friendly environments in nature – e.g bug hotels, bee stations, bird feeders.<br><br>To grow vegetables for eating/cooking in the school garden – potatoes, peas, beans.. and learn how to support them to grow well. | Recognise that living things can be grouped in a variety of ways.<br><br>Explore and use classification keys to help group, identify and name a variety of living things in their local and wider environment.<br><br>Recognise that environments can change and that this can sometimes pose dangers to living things. | Compare and group materials together, according to whether they are solids, liquids or gases.<br><br>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).<br><br>Identify the part played by evaporation and condensation in the water cycle and associate the rate of evaporation with temperature. |

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| Year 4<br><br>Working Scientifically | 1. Using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions.<br>2. Identifying differences, similarities or changes related to simple scientific ideas and processes.<br>3. Using straightforward scientific evidence to answer questions or to support their findings.<br>4. Reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions.<br>5. Gathering, recording, classifying and presenting data in a variety of ways to help in answering questions.<br>6. Recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables.<br>7. Setting up simple practical enquiries, comparative and fair tests.<br>8. Making systematic and careful observations and, where appropriate, taking accurate measurements using standard units, using a range of equipment, including thermometer<br>9. Asking relevant questions and using different types of scientific enquiries to answer them |

# Year 5 Science Overview

| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
|---|---|---|---|---|---|---|
| Year 5 | **Forces**<br><br>**(1,2,3,4,5,6)** | **Earth And Space**<br><br>**(1,2,3,6)** | **Sustainability and gardening**<br><br>**(1,3,6)** | **Living Things And Their Habitats**<br><br>**(1,6)** | **Animals Including Humans**<br><br>**(1,4,6)** | **Properties And Changes Of Materials**<br><br>**(1,2,3,4,5,6)** |
| Year 5<br><br>Science Unit Skills | Explain that unsupported objects fall towards the Earth because of the force of gravity acting between the Earth and the falling object.<br><br>Identify the effects of air resistance, water resistance and friction, that act between moving surfaces.<br><br>Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect. | Describe the movement of the Earth, and other planets, relative to the Sun in the solar system.<br><br>Describe the movement of the Moon relative to the Earth.<br><br>Describe the Sun, Earth and Moon as approximately spherical bodies.<br><br>Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky. | To explore how global warming occurs.<br><br>To understand what a 'greenhouse gas' is and how it affects our planet.<br><br>Work scientifically and practically for children to think of ways to reduce their own carbon footprint.<br><br>Planning and preparing outdoor vegetable beds ready for Spring planting.<br><br>Sow seeds indoors. | Describe the differences in the life cycles of a mammal, an amphibian, an insect and a bird.<br><br>Describe the life process of reproduction in some plants and animals. | Describe the changes as humans develop to old age.<br><br>Describe how vaccines have developed and helps support human health. | 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.<br><br>Know that some materials will dissolve in liquid to form a solution, and describe how to recover a substance from a solution.<br><br>Use knowledge of solids, liquids and gases to decide how mixtures might be separated, including through filtering, sieving and evaporating.<br><br>Demonstrate that dissolving, mixing and changes of state are reversible changes.<br><br>Explain 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. |

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| Year 5<br><br>Working Scientifically | 1. Beginning to identify scientific evidence that has been used to support or refute ideas or arguments.<br><br>2. Beginning to plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.<br><br>3. Beginning to take measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.<br><br>4. Beginning to record data and results of using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.<br><br>5. Beginning to use test results to make predictions to set up further comparative and fair tests.<br><br>6. Beginning to report and represent findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. |

# Year 6 Science Overview

| | Autumn 1 | Autumn 2 | Spring 1 | Spring 2 | Summer 1 | Summer 2 |
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| Year 6 | **Living things and their habitats (classification)**<br><br>**(1,4,6)** | **Evolution and inheritance**<br><br>**(1,6,4)** | **Light**<br><br>**(2,3,4,6)** | **Animals including humans (circulatory system etc)**<br><br>**(2,3,4,5,6)** | **Electricity**<br><br>**(2,3,6)** | **Sustainability and gardening**<br><br>**(1,2,5)** |
| Year 6<br><br>Science Unit Skills | 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.<br><br>Give reasons for classifying plants and animals based on specific characteristics. | Recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago.<br><br>Recognise that living things produce offspring of the same kind, but normally offspring vary and are not identical to parents.<br><br>Identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution. | Recognise that light appears to travel in straight lines.<br><br>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.<br><br>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.<br><br>Use the idea that light travels in straight lines to explain why shadows have the same shape as the objects that cast them. | Identify and name the main parts of the human circulatory system, and describe the functions of the heart, blood vessels and blood.<br><br>Recognise the impact of diet, exercise, drugs and lifestyle on the way their bodies function.<br><br>Describe the ways in which nutrients and water are transported within animals, including humans. | Associate the brightness of a lamp or the volume of a buzzer with the number and voltage of cells used in the circuit.<br><br>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.<br><br>Use recognised symbols when representing a simple circuit in a diagram. | Explore how light pollution affects human and animal behaviour.<br><br>Explore how renewable energy, such as solar and wind power, is used to generate electricity.<br><br>Create and maintain gardening beds using mulch and compost.<br><br>Grow and tend to seasonal vegetables to use in cooking. |

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| Year 6<br><br>Working Scientifically | 1. Identifying scientific evidence that has been used to support or refute ideas or arguments.<br><br>2. Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary.<br><br>3. Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.<br><br>4. Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.<br><br>5. Using test results to make predictions to set up further comparative and fair tests.<br><br>6. Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations. |