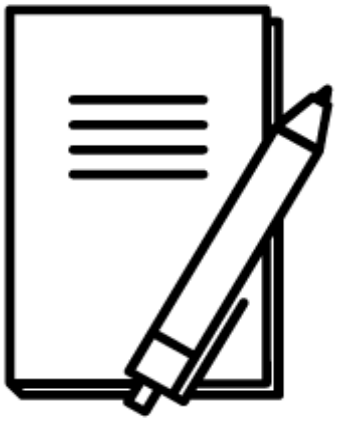
Curriculum Subject Guidance 2024

Brook Primary School



Science

Reviewed: March 2024

Subject Intent

At Brook, our children as scientists will be able to work scientifically, apply previous knowledge, to link theories and concepts. They are able to make predictions, carry out investigations, analyse data mathematically and draw conclusions linking to known scientific research across all areas. Children will also have an awareness of working safely.

Statutory Guidance

The national curriculum for science aims to ensure that all pupils: develop scientific knowledge and conceptual understanding through the specific disciplines of biology, chemistry and physics; develop understanding of the nature, processes and methods of science through different types of science enquiries that help them to answer scientific questions about the world around them; are equipped with the scientific knowledge required to understand the uses and implications of science, today and for the future.

Implementation

How is science organised at Brook Primary School?

What do we teach?

	Autumn Term	Spring Term	Summer Term
Pre-school	Liquids and solids Animals and their habitats Seasons Materials	Liquids and solids Seasons/ weather Animals and their habitats Shadows Materials Magnets	Liquids and solids Seasons/ weather Animals and their habitats Day and night Floating and sinking Materials Human body
Reception	Homes – buildings/materials Our bodies All 5 Senses Electricity (creating light) Hibernation Nocturnal animals Weather/seasons- autumn Light and dark Shadows	Heating /freezing (changing states) Dissolves Push and pull Magnets Babies and adults Animals- parts of an animal Weather/seasons Space Woodland animals Life cycles Habitats	Dinosaurs Tree and flower recognition Plants Recycling/materials Weather/seasons Floating and sinking Planting/growing Parts of a plant Growth and decay Sea creatures Mini beasts

Year 1						
Science focus	**Seasonal Changes**					
	Animals, including humans All about me	**Animals, including humans** All about animals	**Everyday Materials** *Exploring everyday materials 1*	**Everyday Materials** *Exploring everyday materials 2*	**Plants**	
Year 2						
Science focus	**Everyday Materials**	**Animals, including humans** *1 Growth*	**Animals, including humans** *2 Life cycles*	**Living Things and Their Habitats**	**Plants**	**Living things and their habitats** *Habitats around the world*
Year 3						
Science focus	**Animals, including humans**	**Light**	**Rocks**	**Plants**	**Forces and Magnets**	
Year 4						
Science focus	**Electricity**	**States of Matter**	**Sound**	**Animals Including Humans**	**Living things and their habitats**	
Year 5						
Science focus	**Earth and Space**	**Forces**	**Properties of Materials Changes of Materials**	**Living things and their habitats**	**Animals, including humans**	
Year 6						
Science focus	**Light**	**Electricity**	**Living things and their habitats**	**Evolution and Inheritance**	**Animals Including Humans**	

How do we teach science?

At Brook, science is taught in units, each focusing on a key area of scientific knowledge. Each unit is taught through a sequence of knowledge-based lessons, introducing the children to new scientific knowledge, concepts and vocabulary. These are further embedded through scientific enquiry and investigation which gives the children opportunities to demonstrate a range of scientific skills. Our science planning is informed through Developing Experts; however, staff should adapt lessons as they see fit to meet their children's needs.

Enrichment and Experiences

Through a wide range of enrichment opportunities and experiences we aim to inspire a thirst for learning within science and across the wider curriculum. Firsthand practical opportunities to collaborate, investigate, problem solve, question, present and explore are an integral part of our science curriculum. This includes enrichment activities such as utilising the school garden, visitors within school such as the animal man and exposing pupils to future scientific career pathways through selected 'Expert films' present within the Developing Experts scheme.

Inclusion of pupils with special educational needs and disabilities (SEND)

At Brook, we believe all children are individuals and have an equal right to a full-rounded education which will enable them to achieve their full potential. Therefore, class teachers will ensure that appropriate changes are made within the science curriculum to support and extend each child to achieve their full potential. This scaffolding may take the form of word mats, writing frames, adapted source materials, sentence stems, questioning and extension of tasks including, developing further lines of questioning, limiting or widening the range of sources used and independent research into own areas of interest with the unit of study.

Recording, assessment and reporting of science

Assessment within science will take place 5-6 times throughout the year (at the end of each unit of work). Assessments will be made against the National Curriculum statutory requirements for each topic within the programme of study. These NC statutory requirements are presented as target sheets (kept in the back of pupil's books) and are completed as a record of attainment for each child. All assessments will be recorded on the non-core subjects' spreadsheet using the target sheets as guidance. Teachers will use the statements below to communicate a child's attainment.

1. WTS (working towards the expected standard)
2. EXS (working at the expected standard)
3. GDS (working at greater depth)

Assessment levels for science will be reported to parents formally at the end of the year through the school report. Teachers will make an overall judgement for science, following completion of the year group's programme of study. A pupil's attainment and progress in science may also be discussed at parent consultations where appropriate.

Teachers in Year 2 and Year 6 will make a statutory end-of-key stage judgement against the teacher assessment frameworks. Year 2 and 6 teachers should have evidence from the classroom that pupils have grasped all the 'working scientifically' statements and all the 'science content' taught in the final year of the key stage. It will be reported to the local authority whether pupils have or have not met the expected standard. (See appendix 1 and 2 for teacher assessment frameworks).

Monitoring arrangements

The delivery of science is monitored by the science subject leader (currently Vicky Tsang and Sophie Williams) through:

- Book scrutinies
- Learning walks
- Pupil interviews/questionnaires
- Staff interviews/questionnaires

This policy will be reviewed by the science subject leader every two years. At every review, the policy will be approved by the governors and the Head Teacher.

Appendix 1: KS1 Science Assessment Framework

Working at the expected standard

Working scientifically

The pupil can, using appropriate scientific language from the national curriculum:

- ask their own questions about what they notice
- use different types of scientific enquiry to gather and record data, using simple equipment where appropriate, to answer questions:
  - observing changes over time
  - noticing patterns
  - grouping and classifying things
  - carrying out simple comparative tests
  - finding things out using secondary sources of information
- communicate their ideas, what they do and what they find out in a variety of ways

Science content

The pupil can:

- name and locate parts of the human body, including those related to the senses (year 1), and describe the importance of exercise, a balanced diet and hygiene for humans (year 2)
- describe the basic needs of animals for survival and the main changes as young animals, including humans, grow into adults (year 2)
- describe the basic needs of plants for survival and the impact of changing these and the main changes as seeds and bulbs grow into mature plants (year 2)
- identify whether things are alive, dead or have never lived (year 2)
- describe and compare the observable features of animals from a range of groups (year 1)
- group animals according to what they eat (year 1), describe how animals get their food from other animals and/or from plants, and use simple food chains to describe these relationships (year 2)
- describe seasonal changes (year 1)
- name different plants and animals and describe how they are suited to different habitats (year 2)
- distinguish objects from materials, describe their properties, identify and group everyday materials (year 1) and compare their suitability for different uses (year 2)

Appendix 2: KS2 Science Assessment Framework

Working at the expected standard

Working scientifically

The pupil can, using appropriate scientific language from the national curriculum:

- describe and evaluate their own and others' scientific ideas related to topics in the national curriculum (including ideas that have changed over time), using evidence from a range of sources
- ask their own questions about the scientific phenomena that they are studying, and select the most appropriate ways to answer these questions, recognising and controlling variables where necessary (i.e. observing changes over different periods of time, noticing patterns, grouping and classifying things, carrying out comparative and fair tests, and finding things out using a wide range of secondary sources)
- use a range of scientific equipment to take accurate and precise measurements or readings, with repeat readings where appropriate
- record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs
- draw conclusions, explain and evaluate their methods and findings, communicating these in a variety of ways
- raise further questions that could be investigated, based on their data and observations.

Science content The pupil can:

- name and describe the functions of the main parts of the digestive [year 4], musculoskeletal [year 3] and circulatory systems [year 6]; and describe and compare different reproductive processes and life cycles in animals [year 5]
- describe the effects of diet, exercise, drugs and lifestyle on how the body functions [year 6]
- name, locate and describe the functions of the main parts of plants, including those involved in reproduction [year 5] and transporting water and nutrients [year 3]

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- use the observable features of plants, animals and micro-organisms to group, classify and identify them into broad groups, using keys or other methods [year 6]
- construct and interpret food chains [year 4]
- describe the requirements of plants for life and growth [year 3]; and explain how environmental changes may have an impact on living things [year 4]
- use the basic ideas of inheritance, variation and adaptation to describe how living things have changed over time and evolved [year 6]; and describe how fossils are formed [year 3] and provide evidence for evolution [year 6]
- group and identify materials [year 5], including rocks [year 3], in different ways according to their properties, based on first-hand observation; and justify the use of different everyday materials for different uses, based on their properties [year 5]
- describe the characteristics of different states of matter and group materials on this basis; and describe how materials change state at different temperatures, using this to explain everyday phenomena, including the water cycle [year 4]
- identify and describe what happens when dissolving occurs in everyday situations; and describe how to separate mixtures and solutions into their components [year 5]
- identify, with reasons, whether changes in materials are reversible or not [year 5]
- use the idea that light from light sources, or reflected light, travels in straight lines and enters our eyes to explain how we see objects [year 6], and the formation [year 3], shape [year 6] and size of shadows [year 3]
- use the idea that sounds are associated with vibrations, and that they require a medium to travel through, to explain how sounds are made and heard [year 4]
- describe the relationship between the pitch of a sound and the features of its source; and between the volume of a sound, the strength of the vibrations and the distance from its source [year 4]
- describe the effects of simple forces that involve contact (air and water resistance, friction) [year 5], that act at a distance (magnetic forces, including those between like and unlike magnetic poles) [year 3], and gravity [year 5]
- identify simple mechanisms, including levers, gears and pulleys, that increase the effect of a force [year 5]
- use simple apparatus to construct and control a series circuit, and describe how the circuit may be affected when changes are made to it; and use recognised symbols to represent simple series circuit diagrams [year 6]
- describe the shapes and relative movements of the Sun, Moon, Earth and other planets in the solar system; and explain the apparent movement of the sun across the sky in terms of the Earth's rotation and that this results in day and night [year 5].

Appendix 3: Science Outcomes

Year Group	End points
1	A successful scientist in Year 1 can: • Identify and name a variety of common animals and categorise using terms such as (fish, amphibians, reptiles, birds, mammals, carnivores, herbivores and omnivores) • Identify, name, draw and label the basic parts of the human body and say which part of the body is associated with each sense • Distinguish between an object and the material from which it is made • Identify and name a variety of everyday materials, including wood, plastic, glass, metal, water, and rock • Describe and compare a variety of everyday materials based on their simple physical properties • Identify and name a variety of common wild and garden plants, including deciduous and evergreen trees • Identify and describe the basic structure of a variety of common flowering plants, including trees • Observe changes across the four seasons including describing the weather associated and how day length varies • Carry out investigations planning and using equipment, making predictions and drawing simple conclusions
2	A successful scientist in Year 2 can: • Explain how habitats (including micro-habitats) provide the elements that living things need to survive and can explain how they obtain food through the use of food chains • Identify the basic needs of animals including humans, that they have offspring and why exercise is an important element of a healthy lifestyle • Identify and compare the suitability of a variety of everyday materials for a specified use and how these materials can also be manipulated in different ways • Observe the growth of a variety of seeds and bulbs, discussing what plants need in order to grow and stay health • Carry out a simple experiment, make observations and use these to answer a range of simple questions whilst also presenting their data
3	A successful scientist in Year 3 can: • 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 • 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 size of shadows change • With prompts carry out a simple scientific experiment, explaining what a fair test is and using scientific equipment accurately • Collect and record their findings on a simple bar chart, making observations from these results
4	A successful scientist in Year 4 can: • 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 • 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 • 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 • Identify how sounds are made, associating some of them with something vibrating • Recognise that vibrations from sounds travel through a medium to the ear • Find patterns between the pitch and volume of a sound and features of the object that produced it • Recognise that sounds get fainter as the distance from the sound source increases • 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 a 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. • Plan a fair test and conduct the experiment using a data logger • Record data from an experiment using a data logger, record their findings on a bar chart and/or line graph and answer questions about their results
5	A successful scientist in Year 5 can: • Describe the movement of the Earth, the moon and other planets in the solar system • Use the idea of the Earth's rotation to explain day and night and the apparent movement of the sun across the sky • Understand the force of gravity acting between the earth and falling objects • Identify the effects of air resistance, water resistance and friction • Recognise that some mechanisms, including levers, pulleys and gears, allow a smaller force to have a greater effect • Compare and group together everyday materials on the basis of their properties to demonstrate an understanding of dissolving, mixing and changes of state, reversible and irreversible • 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 • Describe the changes as humans develop to old age • Plan different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary
6	A successful scientist in Year 6 can: • 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 • Identify and name the main parts of the human circulatory system • 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; why shadows have the same shape as the objects that cast them • 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 • Recognise that living things' offspring vary and are not identical to their parents; how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution • Plan different types of scientific enquiries, controlling variables where necessary • Take measurements, using a range of scientific equipment, taking repeat readings when appropriate

	• Record data and results using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs • Use test results to make predictions to set up further tests • Present findings from enquiries, including conclusions • Identify scientific evidence that has been used to support or refute ideas or arguments